User Manual

CD-3000+ Series
Retrofit Control System

Model	Application
CD-3000+AE	Strand CD80® AMX or Advanced Electronic (AE) permanent installation racks
CD-3000+AE-48RR	Strand CD80® AMX or Advanced Electronic (AE) 48 channel rolling racks
CD-3000+AE-96RR	Strand CD80® AMX or Advanced Electronic (AE) 96 channel rolling racks
CD-3000+SV	Strand CD80® Supervisor (SV) permanent installation racks
CD-3000+SV-48RR	Strand CD80® Supervisor (SV) 48 channel rolling racks
CD-3000+SV-96RR	Strand CD80® Supervisor (SV) 96 channel rolling racks
CD-3000+C21	Strand/Signify C21 permanent installation racks
CD-3000+U19	Universal 19" rack mount dimmer driver
i96e-3000	Leviton Colortran i series e dimmer racks

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Contents

Warranty

All CD-3000+ models come with a factory two (2) year limited warranty.
Extended warranties of up to ten (10) years are available at the time of purchase.

For details visit www.johnsonsystems.com/warranties.htm.

For Technical Assistance

1. Refer to your product user manual.

   The most current revision is available online:

   https://www.johnsonsystems.com/pdf_files/jsi_cd_3000+_user_manual_REV_12.pdf

2. Contact the "point-of-sale" dealer or distributor from which this product was originally purchased and ask for technical assistance.

3. If neither of the above can provide you with the necessary information, please contact our factory via email (info@johnsonsystems.com) or phone (403-287-8003) during business hours (Monday to Friday, 8:00AM to 5:00PM MST).

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Introduction

The **CD-3000+** is a next-generation retrofit electronics package designed specifically for any vintage Strand CD80® or Strand/Signify C21 dimmer rack. The CD-3000+ will replace the aging control electronics of the existing dimmer rack making system replacement unnecessary. This ETL Listed, full-featured state-of-the-art unit provides a low-cost digital interface to any of today's modern lighting communication protocols.

GO GREEN

Designed to install in minutes with only basic hand tools, this elegant package has been designed for longevity and reliability with the end user in mind. An intuitive LCD user interface combined with a single modular design makes the CD-3000+ extremely user-friendly and easily serviceable. USB-C Tech Port and face panel LED's permit easy firmware upgrades and operational status indication.

Full-featured, hi-resolution dimming with a lightning-fast response. Embedded LED lamp curves permit 120VAC line voltage LED dimming with optional Presidor™ LED dimmers delivering unsurpassed LED dimming performance and efficiency. An environmentally and financially responsible solution that installs in a matter of minutes!

CD-3000+

i96e-3000

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CD-3000+AE	Strand CD80® AMX or Advanced Electronic (AE) permanent installation racks
CD-3000+AE-48RR	Strand CD80® AMX or Advanced Electronic (AE) 48 channel rolling racks
CD-3000+AE-96RR	Strand CD80® AMX or Advanced Electronic (AE) 96 channel rolling racks
CD-3000+SV	Strand CD80® Supervisor (SV) permanent installation racks
CD-3000+SV-48RR	Strand CD80® Supervisor (SV) 48 channel rolling racks
CD-3000+SV-96RR	Strand CD80® Supervisor (SV) 96 channel rolling racks
CD-3000+C21	Strand/Signify C21 permanent installation racks
CD-3000+U19	Universal 19" rack mount dimmer driver
i96e-3000	Leviton Colortran i series e dimmer racks

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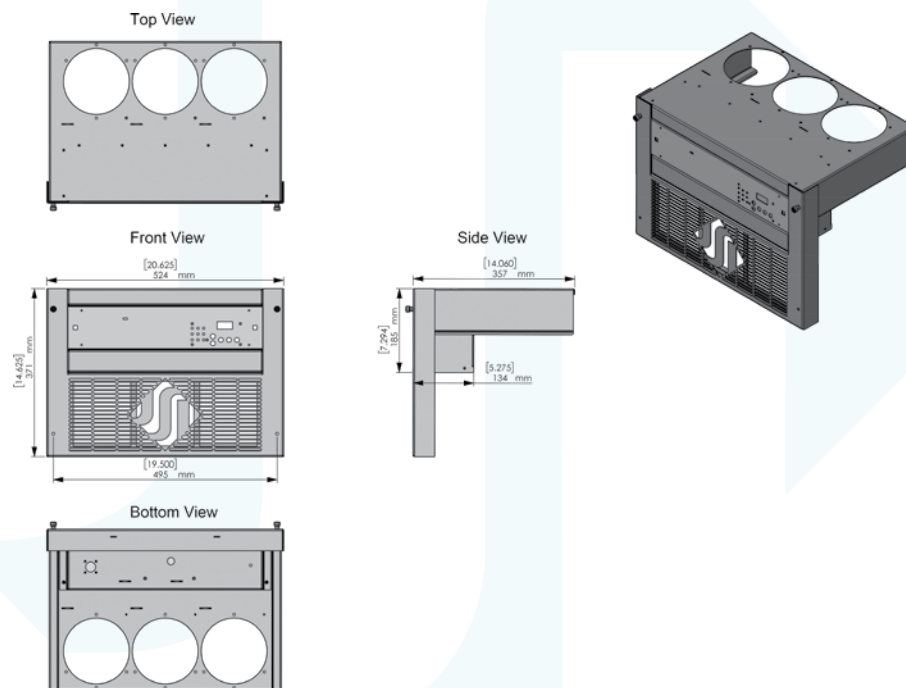info@johnsonsystems.com

Packaging & Contents

Each **CD-3000+** Series retrofit system is shipped in a custom-designed box for the protection of the unit. For warranty maintenance, please keep the box and packaging stored in a safe place. In the unlikely event that the system needs to be returned to the JSI Factory, the packaging will be required to prevent shipping damage and warranty maintenance.

Each **CD-3000+** Series system includes all of the hardware required to complete the retrofit.

Installation

CD-3000+AE

Top View

Front View

[20.625]
524   mm

[14.625]
371   mm

[19.500]
495   mm

Side View

[14.060]
357   mm

[7.294]
185   mm

[5.275]
134   mm

Bottom View

- Disconnect (turn off) the power supply to the Strand CD80® dimmer rack(s) and rack processor electronics. Some systems may have their processor electronics powered by an isolated (separate) feed.

WARNING! Verify all power is disconnected (turned off) before proceeding.

Removal of the Old Processor Housing

- Remove the upper ventilation grille and lower air filter grille from the CD80® rack and set them aside.
- Inspect the lower portion of the dimmer rack for any wiring, AC line voltage bussing, conduit, etc. that could prevent the smooth removal of the old processor housing. Take the appropriate measures to remove any obstructions, being careful not to strain or remove any of the control wiring that terminates on the rear of the existing processor housing.
- Inspect the upper portion of the dimmer rack for any similar obstructions. Pay particular attention to the upper left side of the dimmer rack. This portion of the rack contains hardware, circuitry, and wiring that must be retained to retrofit the rack as designed.
- Unscrew the two mounting (thumb) screws that hold the old processor housing in place.

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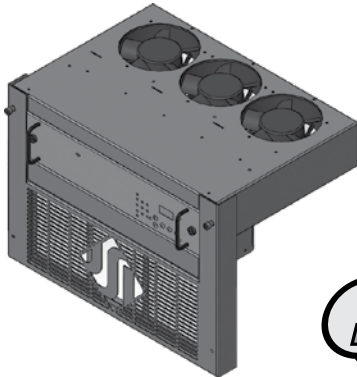
Slowly remove the old card cage, taking care not to strain or disconnect any of the original CD80® wiring. Carefully observe and label as necessary all wiring as to its location and polarity.

- If you are not familiar with the Strand CD80® dimmer rack processor electronics and wiring, it is strongly advised that you take a few minutes to look at the back of the processor housing connections and compare it to the backplane on the CD-3000+AE. Do not disconnect any wiring until you are satisfied with how easy this is going to be.

NOTE: Never pull directly on the wires to remove connectors. Some tightly fitted connectors may require slight "prying" on one or both sides of stuck connectors with a small flathead screwdriver to loosen.

- Disconnect the power connector. This connector is a 9-position CPC (Circular Plastic Connector) plug (female - cable mount) and receptacle (male - chassis mount). It is black in color and approximately two (2) inches in length. It is located at the lower (rear) right-hand side of the old processor housing. Turn the locking ring counterclockwise to disconnect..

NOTE: Some OEM Models of CD80-AE racks were supplied from the factory with dual processors and will require two CD-3000+AE systems to upgrade (one per dimmer rack cell). The secondary rack of these models does not have a CPC power connector. JSI will supply, at no charge, a CPC wiring kit for the secondary rack if notified prior to ordering and supported by a site photo emailed.

- Disconnect the four (4) 27-conductor control output cables. **Do not pull on the wire to disconnect.** Carefully apply pressure to the connector itself with either your fingers or preferably a small flat head screwdriver. Do not mix up the cable order or polarity. Label with an indelible marker if necessary.

- Disconnect the smaller 10-conductor connector. This connector and cable are not required on the CD-3000+ retrofit and should be coiled up and wire-tied. Carefully set it aside inside the rack and keep it isolated from any AC line voltage.

- The old processor housing can now be set aside.

- Vacuum and/or blow out the dimmer rack with compressed air as required to remove excessive dust build-up which can inhibit system cooling and performance.

Installation of the new CD-3000+AE System

- Remove your new CD-3000+AE system from the box. **Leave the foam end caps in place to protect the unit from damage.**

- Familiarize yourself with the backplane, and low voltage control input/output connections. Refer to page 18 for details.

- Dress out all DMX and other low voltage connections to the backplane using the Phoenix style breakaway connectors provided. Be sure to isolate and protect all shield wires with heat-shrink or electrical tape.

- Place the CD-3000+AE in front of the rack face down/backplane up. **Leave the foam end caps in place to protect the unit from damage. Alternatively, place the inverted CD-3000+AE face down on the foam caps after careful removal.**
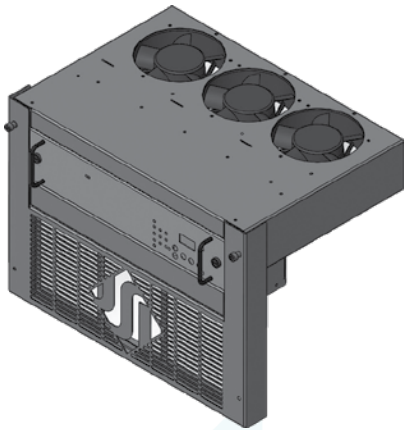
- Connect the four (4) 27-conductor control output cables to the backplane in the same order and polarity in which they were removed. **Extra care should be taken not to bend or break any of the connector/header pins.** Damage to these pins may require replacement of the entire CD-3000+ assembly and will not be considered warranty! Refer to page 14 for the connector pinout.
- Connect all other applicable low voltage control input/output connections to the backplane.
- Connect the 9-position CPC power connector. The connector is keyed, so the plug and receptacle must be aligned to mate properly. Once aligned, turn the locking ring clockwise until a "click" is heard and felt indicating that the connector is fully seated. Refer to page 14 for the connector pinout.

NOTE: Some older OEM systems may not have a Ground Wire (typically green in color) pre-wired from the factory CPC power connector. In such systems it is important to install the supplied #18AWG green Grounding Wire, pin first into the CPC connector, until the pin is fully seated and an audible "click" is heard. Tug/pull on the wire to ensure the pin is securely in the connector. Connect the other end of the wire to a solid building/earth ground (typically the rack dimmer frame).

- Remove the protective foam caps.
- Place the CD-3000+AE onto the CD80® dimmer rack guide rails located on each side and carefully slide the unit into place. Ensure that the CD-3000+AE is fully seated and securely in place on both sides.
- Tighten the mounting (thumb) screws into the threaded speed clips mounted on the end of each of the guide rails. Replacement speed clips are provided in case the original ones are worn out or missing.
- Install the CD-3000+AE air filter grille assembly. Start the upper two (2) mounting (thumb) screws, located on the upper arms of the air filter grille assembly and screw into the CD-3000+AE chassis. **DO NOT TIGHTEN!** Start the lower two (2) mounting (thumb) screws located on the lower portion of the air filter grille assembly and screw into the brackets at the bottom CD80® dimmer rack. Once all four (4) mounting (thumb) screws are started, tighten them down and verify the assembly is fully seated. Be sure not to over-tighten or cross-thread the mounting screws.
- The air filter grille assembly is precisely engineered to allow for safe air flow and filtration. The air filter and frame can be easily removed for cleaning and maintenance. Pushing up on the filter frame will free it to be pivoted out. Always ensure the filter frame is fully seated and secure before installing the CD-3000+ air filter grille assembly. The air filter should be removed from the rack and cleaned annually using compressed air.

WARNING! Never connect power with the air filter grille assembly removed.

- Reinstall the upper ventilation grille assembly onto the dimmer rack.
- Connect (turn on) the power supply to the Strand CD80® dimmer rack(s) and CD-3000+.
- Verify system status LED indicators and LCD display. Refer to page 30 and page 28 for details.
- Refer to the programming section of this manual for system setup. Refer to page 32 to page 44 for details.

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- Test the system thoroughly to ensure all wiring terminations are functioning and the control signals to the dimmers have the correct phase referencing.
- Verify fan operation. The fans are triggered on at 6% DMX input control and stay on as long as the DMX is at 6% or greater. When the DMX input is brought down below 6%, there is a 5-minute timeout for the fans to turn off. This is to evacuate the hot air from the dimmer rack and increase the longevity of the dimmers.

CD-3000+AE-48RR

- Follow the same installation procedure as CD-3000+AE.

CD-3000+AE-96RR

- Follow the same installation procedure as CD-3000+AE for the primary processor side of the rack.
- The CD-3000+AE-96RR is supplied with a fan housing assembly used to cool the secondary side of the rolling rack.
- The CD-3000+AE-96RR is supplied with a fan wiring harness used to supply power to the fans in the fan housing assembly.
- Remove the old fan housing similarly to the processor housing and set aside.
- Place the fan housing assembly in front of the rack with the foam end caps left in place to protect the unit from damage.
- Connect the fan wiring harness to the connectors supplied on the fan housing assembly.
- Remove the protective foam caps.
- Install the fan housing assembly and ventilation grille assembly similarly to the CD-3000+AE.

CD-3000+SV (Supervisor)

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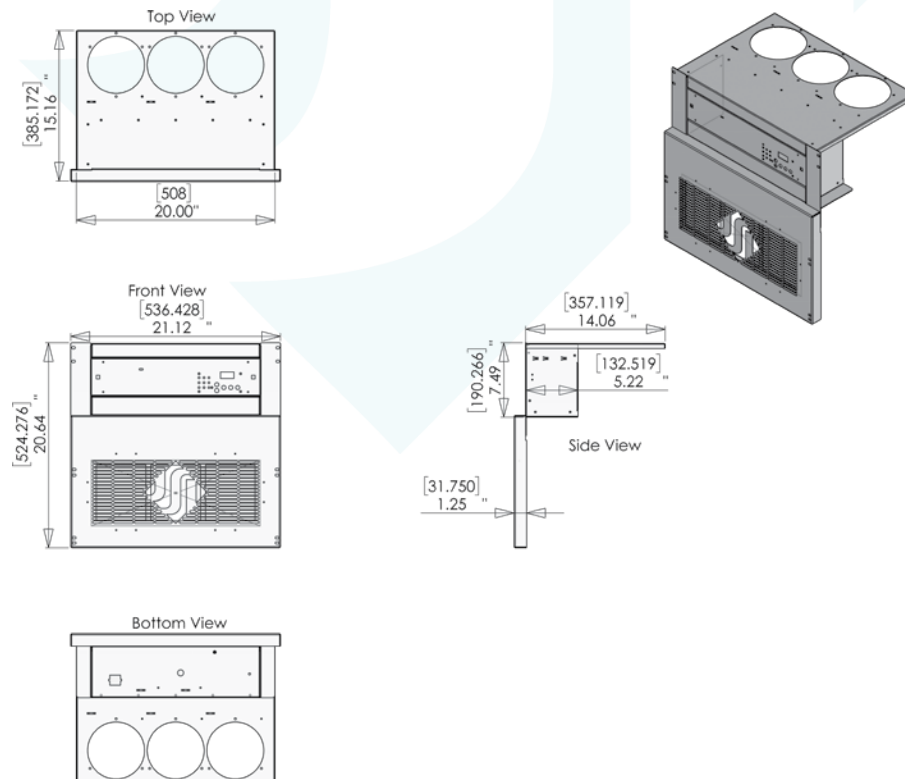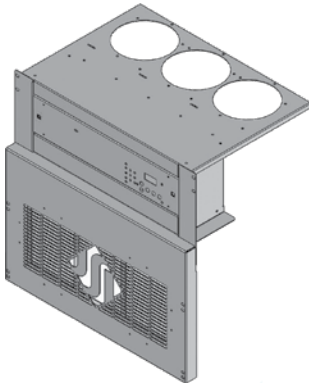
CD-3000+SV (Supervisor)   (Continued)

- Disconnect (turn off) the power supply to the Strand CD80® dimmer rack(s) and rack processor electronics. Some systems may have their processor electronics powered by an isolated (separate) feed.

WARNING! Verify all power is disconnected (turned off) before proceeding.

Removal of the Old Processor Housing

- Remove the screws located on the left and right sides of the processor housing.
- Slowly pull (wiggle if necessary) the OEM processor housing approximately halfway out of the dimmer rack to expose the OEM control cable connections and field wiring.
- If you are not familiar with the Strand CD80® Supervisor dimmer rack processor electronics and wiring, it is strongly advised that you take a few minutes to look at the control cables connected to the circuit board on top of the processor housing and compare it to the backplane on the CD-3000+SV. Do not disconnect any wiring until you are satisfied with how easy this is going to be.

NOTE: Never pull directly on the wires to remove connectors.

- Note the location and function of all control cables landed on the circuit board on top of the processor housing. Do not mix up the cable order or polarity. Label with an indelible marker if necessary. These control cables may now be disconnected from the circuit board. Disconnect the "TOP COLUMNS" and "BOTTOM COLUMNS" control cables making sure they have their respective labels. If not, label the box connectors with an indelible marker or similar permanent method of labeling.
- The processor housing can now be carefully withdrawn from the rack, wiggle if necessary. Carefully "thread" the control cables out from under the plexiglass cover. The back end must be supported as it is withdrawn so the power connector (square, white, 12-position connector) located at the rear left can be disconnected. To disconnect, squeeze the tabs on both sides of the connector together and pull out. The processor housing may now be fully removed and set aside.
- Unscrew and remove the blank panel located under the slot for the processor housing.
- Unscrew and remove the air filter grille on the fan housing located above the slot for the processor housing.
- Unscrew and remove the fan housing. There is a Molex connector at the rear of the fan housing that must be disconnected. This connector and cable are not required on the CD-3000+SV retrofit and should be coiled up and wire-tied to the wiring harness it emerges from. Keep it isolated from any AC line voltage.
- With everything removed, inspect the fuse block in the back of the rack and check the phasing. The wires landed on the bottom of this fuse block connect to the processor power connector. The black wire should be on Phase "A", red on Phase "B", and blue on Phase "C". Correct if necessary.
- Vacuum and/or blow out the dimmer rack with compressed air as required to remove excessive dust build-up which can inhibit system cooling and performance.

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Installation of the new CD-3000+SV System

- Remove your new CD-3000+SV system from the box. Leave the foam end caps in place to protect the unit from damage.
- Familiarize yourself with the backplane, and low voltage control input/output connections. Refer to page 18 for details.
- Dress out all field wiring connections (DMX and other low voltage) to the backplane using the breakaway connectors provided on the CD-3000+SV. Be sure to isolate and protect all shield wires with heat shrink or electrical tape.
- Place the CD-3000+SV in front of the rack face down/backplane up. Leave the foam end caps left in place to protect the unit from damage. Alternatively, place the inverted CD-3000+SV face down on the foam caps after careful removal.
- Connect the "TOP COLUMNS" and "BOTTOM COLUMNS" control cables to their designated locations on the backplane. Lock it in place using the ejection clamps on the connector. Refer to page 15 for the connector pinout.
- Connect all other applicable low voltage control input/output connections to the backplane.
- Connect the power connector (square, white, 12-position connector) into its mate mounted on the CD-3000+SV chassis. The connector is keyed so it can only be inserted one way. Push the connector in until an audible "click" is heard and the clamps locked indicating that the connector is fully seated. Refer to page 15 for the connector pinout.
- Carefully slide the CD-3000+SV into the rack using the rails for the old fan housing. It is helpful to start one side very slightly and then the other. Be sure not to pinch or stress any wires or cables. Secure in place using the four (4) 10-32 x 3/8" screws provided.
- Place the new air filter grille assembly over the bottom opening of the rack. Secure in place using the four (4) 10-32 x 1 3/4" screws provided.

  The air filter grille assembly is precisely engineered to allow for safe air flow and filtration. The air filter and frame can be easily removed for cleaning and maintenance. Pushing up on the filter frame will free it to be pivoted out. Always ensure the filter frame is fully seated and secure before installing the CD-3000+ air filter grille assembly. The air filter should be removed from the rack and cleaned annually using compressed air.

WARNING! Never connect power with the air filter grille assembly removed.

- Connect (turn on) the power supply to the Strand CD80® dimmer rack(s) and CD-3000+.
- Verify system status LED indicators and LCD display. Refer to page 28 and page 30 for details.
- Refer to the programming section of this manual for system setup. Refer to page 32 to page 44 for details.
- Test the system thoroughly to ensure all wiring terminations are functioning and the control signals to the dimmers have the correct phase referencing.
- Verify fan operation. The fans are triggered on at 6% DMX input control and stay on as long as the DMX is at 6% or greater. When the DMX input is brought down below 6%, there is a 5-minute timeout for the fans to turn off. This is to evacuate the hot air from the dimmer rack and increase the longevity of the dimmers.
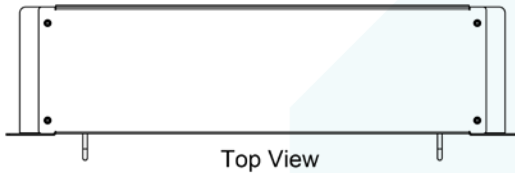
CD-3000+SV-48RR

- Addendum to this manual provided for minor differences.
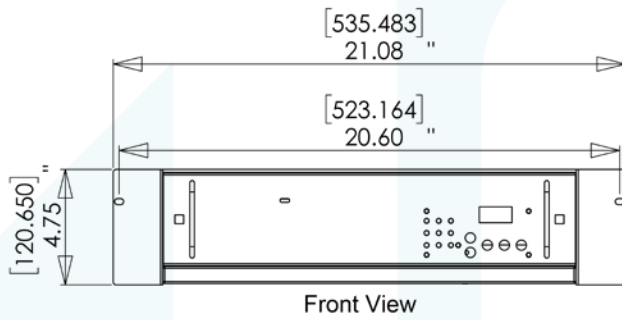
CD-3000+SV-96RR

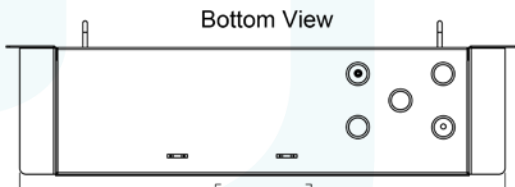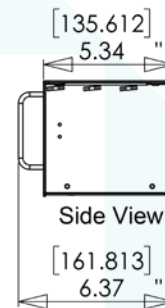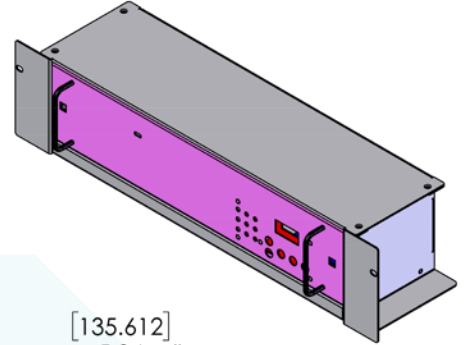- Addendum to this manual provided for minor differences.

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CD-3000+C21

Top View

$\begin{bmatrix} 535.483 \end{bmatrix}$ 21.08 "

$\begin{bmatrix} 523.164 \end{bmatrix}$ 20.60 "

$\begin{bmatrix} 120.650 \end{bmatrix}$ 4.75 "

Front View

Bottom View

$\begin{bmatrix} 135.612 \end{bmatrix}$ 5.34 "

Side View

$\begin{bmatrix} 161.813 \end{bmatrix}$ 6.37 "

- Disconnect (turn off) the power supply to the Strand/Signify C21 dimmer rack(s) and rack processor electronics. Some systems may have their processor electronics powered by an isolated (separate) feed.

WARNING! Verify all power is disconnected (turned off) before proceeding.

Removal of the Old Processor Housing

- Remove the screws located on the left and right sides of the processor housing.
- Slowly pull (wiggle if necessary) the OEM processor housing approximately halfway out of the dimmer rack to expose the OEM control cable connections and field wiring.
- If you are not familiar with the Strand/Signify C21 dimmer rack processor electronics and wiring, it is strongly advised that you take a few minutes to look at the control cables connected to the circuit board on top of the processor housing and compare it to the backplane on the CD-3000+C21. Do not disconnect any wiring until you are satisfied with how easy this is going to be.

NOTE: Never pull directly on the wires to remove connectors.

- Note the location and function of all control cables landed on the circuit board on top of the processor housing. Do not mix up the cable order or polarity. Label with an indelible marker if necessary. These control cables may now be disconnected from the circuit board. Disconnect the "TOP COLUMNS" and "BOTTOM COLUMNS" control cables making sure they have their respective labels. If not, label the box connectors with an indelible marker or similar permanent method of labeling.

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- The processor housing can now be carefully withdrawn from the rack, wiggle if necessary. Carefully "thread" the control cables out from under the plexiglass cover. The back end must be supported as it is withdrawn so the power connector (square, white, 12-position connector) located at the left rear can be disconnected. To disconnect, squeeze the tabs on both sides of the connector together and pull out. The processor housing may now be fully removed and set aside.
- Unscrew and remove the air filter grille on the fan housing located above the slot for the processor housing. Clean the existing filter with compressed air and inspect the existing fan within the fan housing. Ensure they spin freely by pushing blades with fingers. Replace as required. Direct replacements can be purchased from Johnson Systems under part #CF-CD80R. Contact your selling dealer for pricing and availability.
- Vacuum and/or blow out the dimmer rack with compressed air as required to remove excessive dust build-up which can inhibit system cooling and performance.

Installation of the new CD-3000+C21 System

- Remove your new CD-3000+C21 system from the box. Leave the foam end caps in place to protect the unit from damage.
- Familiarize yourself with the backplane, and low voltage control input/output connections. Refer to page 16 for details.
- Dress out all field wiring connections (DMX and other low voltage) to the backplane using the breakaway connectors provided on the CD-3000+C21. Be sure to isolate and protect all shield wires with heat shrink or electrical tape.
- Place the CD-3000+C21 in front of the rack face down/backplane up. **Leave the foam end caps left in place to protect the unit from damage. Alternatively, place the inverted CD-3000+C21 face down on the foam caps after careful removal.**
- Connect the "TOP COLUMNS" (T1 thru T6) and "BOTTOM COLUMNS" (B1 Thru B6) control cables to their designated locations on the backplane. Lock in place using the ejection clamps on the connector. Refer to page 19 for the connector pinout.
- Connect all other applicable low voltage control input/output connections to the backplane.
- Connect the power connector (square, white, 12-position connector) into its mate mounted on the CD-3000+C21 chassis. The connector is keyed so it can only be inserted one way. Push the connector in until an audible "click" is heard and the clamps locked indicating that the connector is fully seated. Refer to page 19 for the connector pinout.
- Carefully slide the CD-3000+C21 into the rack using the rails for the old fan housing. It is helpful to start one side very slightly and then the other. Be sure not to pinch or stress any wires or cables. Secure in place using the four (4) 10-32 x 3/8" screws provided.
- Re-install the OEM air filter grille assembly on the face of the OEM fan box. Secure in place using the four (4) 10-32 x 1 3/4" screws provided.

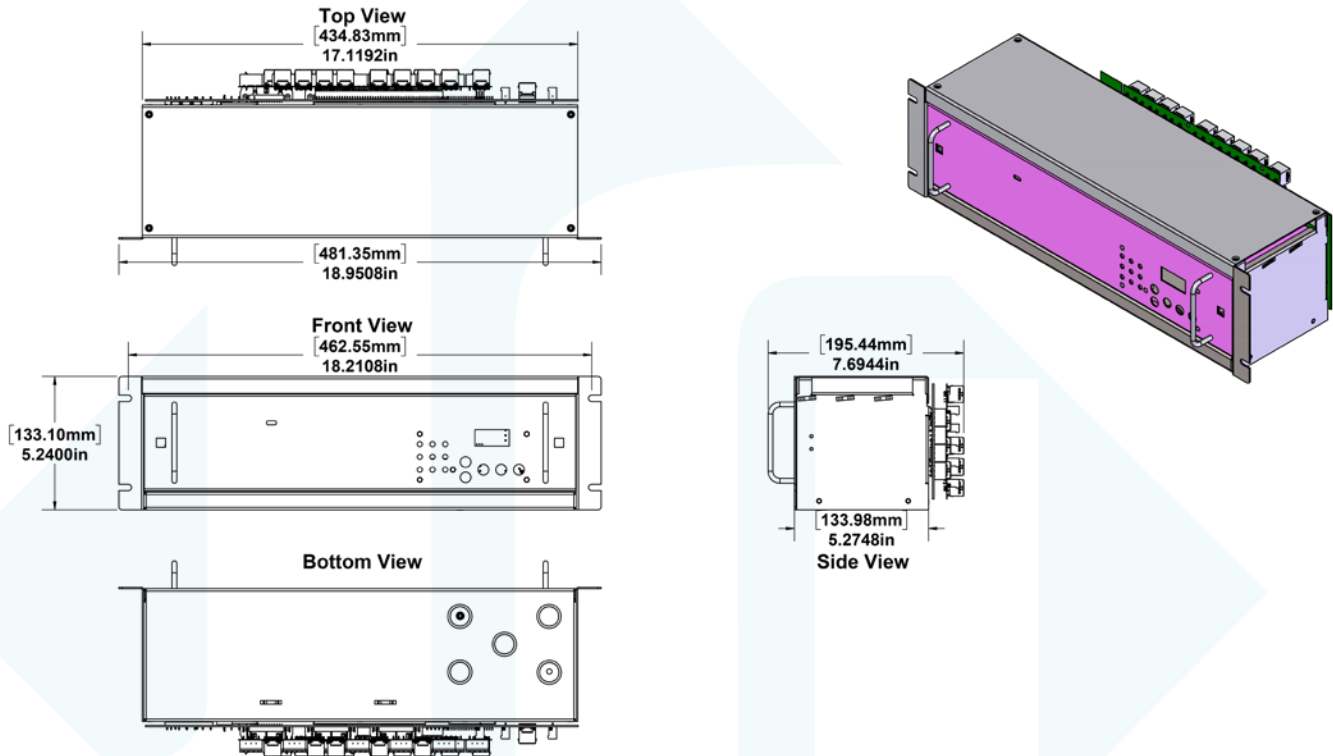   The air filter should be removed from the rack and cleaned annually using compressed air.

WARNING! Never connect power with the air filter grille assembly removed.

- Connect (turn on) the power supply to the Strand/Signify C21 dimmer rack(s) and CD-3000+C21.
- Verify system status LED indicators and LCD display. Refer to page 28 and page 30 for details.
- Refer to the programming section of this manual for system setup. Refer to page 32 to page 44 for details.
- Test the system thoroughly to ensure all wiring terminations are functioning and the control signals to the dimmers have the correct phase referencing.
- Verify fan operation. Temporarily removing the row of dimmers directly above the fan housing will allow careful verification that all three fans are functioning. The fans are triggered on at 6% DMX input control and stay on as long as the DMX is at 6% or greater. When the DMX input is brought down below 6%, there is a 5-minute timeout for the fans to turn off. This is to evacuate the hot air from the dimmer rack and increase the longevity of the dimmers.

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CD-3000+U19

Top View
[434.83mm]
17.1192in

[481.35mm]
18.9508in

Front View
[462.55mm]
18.2108in

[133.10mm]
5.2400in

Bottom View

[195.44mm]
7.6944in

[133.98mm]
5.2748in
Side View

The CD-3000+U19 is a universal 96 channel DMX to PWM demultiplexer designed for installation in standard 19" rack enclosures. Measuring 3 Rack Units (3RU) in height, it installs quickly and can be configured to output either standard PWM with a negative common or inverted PWM with a positive common permitting universal application of virtually any forward phase control dimmer rack.

All 96 PWM outputs can be accessed in both "break-away" style Phoenix connectors as well as RJ45 connectors in multiples of 4 channels per connector on the breakout/backplane PCB (CD-3000-96CH-BO).

An optional Mini 19" rack is available (PRLCR-4U) for mounting the CD-3000+U19 and is designed to permit ease of installation by providing rear access to the CD-3000-96CH-BO. Reversible hinges and latch allow for either left or right-side opening. Additional CD-3000-96CH-BO PCB's can be ordered separately for distant mounting of the CD-3000+U19 from a secondary CD-3000-96CH-BO. Interconnection is made via the RJ45 connectors using off-the-shelf Cat5 or Cat6 cabling. Each Cat5 cable contains a group of 4 PWM channels that are decoupled for noise immunity permitting distance connection up to 50 feet.

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A pigtail power connector is supplied permitting connection to either 3-phase or single-phase power, 120VAC fan control, and remote temperature sense inputs.

Below is a typical riser diagram of a CD-3000+U19 installed in an optional PRLCR-4RU rack controlling an additional CD-3000-96CH-BO break-out PCB remotely mounted in a dimmer enclosure.

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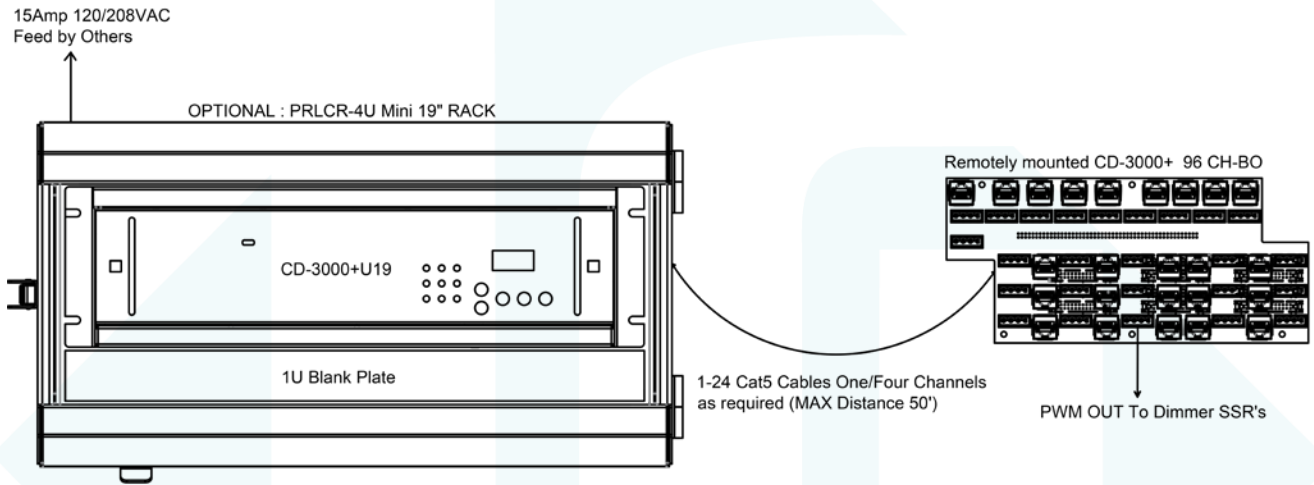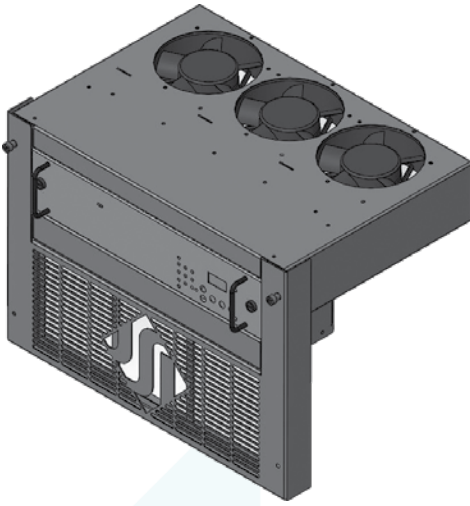
CD-3000+AE Dimmer Control Cable Pinout

J1AE Connector		J2AE Connector		J3AE Connector		J4AE Connector	
PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	Dimmer 24	1	Dimmer 48	1	Dimmer 72	1	Dimmer 96
2	Dimmer 23	2	Dimmer 47	2	Dimmer 71	2	Dimmer 95
3	Dimmer 18	3	Dimmer 42	3	Dimmer 66	3	Dimmer 90
4	Dimmer 17	4	Dimmer 41	4	Dimmer 65	4	Dimmer 89
5	Dimmer 12	5	Dimmer 36	5	Dimmer 60	5	Dimmer 84
6	Dimmer 11	6	Dimmer 35	6	Dimmer 59	6	Dimmer 83
7	Dimmer 6	7	Dimmer 30	7	Dimmer 54	7	Dimmer 78
8	Dimmer 5	8	Dimmer 29	8	Dimmer 53	8	Dimmer 77
9	Dimmer 22	9	Dimmer 46	9	Dimmer 70	9	Dimmer 94
10	Dimmer 21	10	Dimmer 45	10	Dimmer 69	10	Dimmer 93
11	Dimmer 16	11	Dimmer 40	11	Dimmer 64	11	Dimmer 88
12	Dimmer 15	12	Dimmer 39	12	Dimmer 63	12	Dimmer 87
13	Common	13	Common	13	Common	13	Common
14	Common	14	Common	14	Common	14	Common
15	Common	15	Common	15	Common	15	Common
16	Dimmer 10	16	Dimmer 34	16	Dimmer 58	16	Dimmer 82
17	Dimmer 9	17	Dimmer 33	17	Dimmer 57	17	Dimmer 81
18	Dimmer 4	18	Dimmer 28	18	Dimmer 52	18	Dimmer 76
19	Dimmer 3	19	Dimmer 27	19	Dimmer 51	19	Dimmer 75
20	Dimmer 20	20	Dimmer 44	20	Dimmer 68	20	Dimmer 92
21	Dimmer 19	21	Dimmer 43	21	Dimmer 67	21	Dimmer 91
22	Dimmer 14	22	Dimmer 38	22	Dimmer 62	22	Dimmer 86
23	Dimmer 13	23	Dimmer 37	23	Dimmer 61	23	Dimmer 85
24	Dimmer 8	24	Dimmer 32	24	Dimmer 56	24	Dimmer 80
25	Dimmer 7	25	Dimmer 31	25	Dimmer 55	25	Dimmer 79
26	Dimmer 2	26	Dimmer 26	26	Dimmer 50	26	Dimmer 74
27	Dimmer 1	27	Dimmer 25	27	Dimmer 49	27	Dimmer 73

CD-3000+AE Power Connector Pinout

PIN	FUNCTION
1	Ground
2	No Connect
3	Neutral
4	No Connect
5	Phase C
6	No Connect
7	Phase A
8	No Connect
9	Phase B

JOHNSON SYSTEMS INC.
"PROFESSIONAL LIGHT CONTROL PRODUCTS"
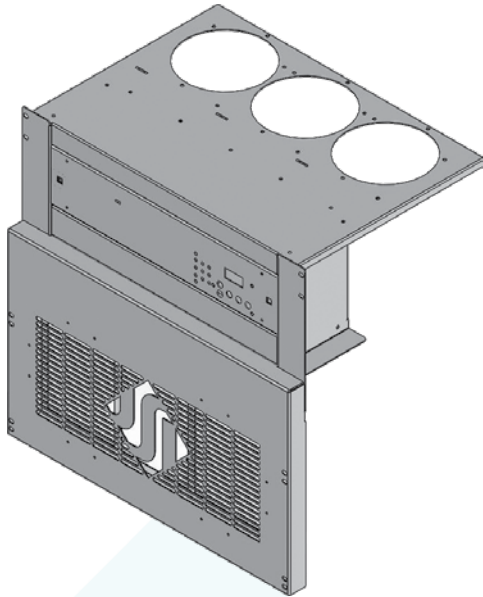
CD-3000+SV Dimmer Control Cable Pinout

#1 Top Columns		#2 Top Columns		#3 Top Columns	
PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	Dimmer 1	1	Dimmer 3	1	Dimmer 5
2	Dimmer 2	2	Dimmer 4	2	Dimmer 6
3	Dimmer 13	3	Dimmer 15	3	Dimmer 17
4	Dimmer 14	4	Dimmer 16	4	Dimmer 18
5	Dimmer 25	5	Dimmer 27	5	Dimmer 29
6	Dimmer 26	6	Dimmer 28	6	Dimmer 30
7	Dimmer 37	7	Dimmer 39	7	Dimmer 41
8	Dimmer 38	8	Dimmer 40	8	Dimmer 42
9	V+	9	V+	9	V+
10	NC	10	NC	10	NC
#4 Top Columns		#5 Top Columns		#6 Top Columns	
PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	Dimmer 7	1	Dimmer 9	1	Dimmer 11
2	Dimmer 8	2	Dimmer 10	2	Dimmer 12
3	Dimmer 19	3	Dimmer 21	3	Dimmer 23
4	Dimmer 20	4	Dimmer 22	4	Dimmer 24
5	Dimmer 31	5	Dimmer 33	5	Dimmer 35
6	Dimmer 32	6	Dimmer 34	6	Dimmer 36
7	Dimmer 43	7	Dimmer 45	7	Dimmer 47
8	Dimmer 44	8	Dimmer 46	8	Dimmer 48
9	V+	9	V+	9	V+
10	NC	10	NC	10	NC
#1 Bottom Columns		#2 Bottom Columns		#3 Bottom Columns	
PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	Dimmer 49	1	Dimmer 51	1	Dimmer 53
2	Dimmer 50	2	Dimmer 52	2	Dimmer 54
3	Dimmer 61	3	Dimmer 63	3	Dimmer 65
4	Dimmer 62	4	Dimmer 64	4	Dimmer 66
5	Dimmer 73	5	Dimmer 75	5	Dimmer 77
6	Dimmer 74	6	Dimmer 76	6	Dimmer 78
7	Dimmer 85	7	Dimmer 87	7	Dimmer 89
8	Dimmer 86	8	Dimmer 88	8	Dimmer 90
9	V+	9	V+	9	V+
10	NC	10	NC	10	NC
#4 Bottom Columns		#5 Bottom Columns		#6 Bottom Columns	
PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	Dimmer 55	1	Dimmer 57	1	Dimmer 59
2	Dimmer 56	2	Dimmer 58	2	Dimmer 60
3	Dimmer 67	3	Dimmer 69	3	Dimmer 71
4	Dimmer 68	4	Dimmer 70	4	Dimmer 72
5	Dimmer 79	5	Dimmer 81	5	Dimmer 83
6	Dimmer 80	6	Dimmer 82	6	Dimmer 84
7	Dimmer 91	7	Dimmer 93	7	Dimmer 95
8	Dimmer 93	8	Dimmer 94	8	Dimmer 96
9	V+	9	V+	9	V+
10	NC	10	NC	10	NC

CD-3000+SV Power Connector Pinout

PIN	FUNCTION
1	Phase C
2	Phase B
3	Phase A
4	Neutral
5	No Connect
6	Ground
7	O/T N.C. (V+)
8	O/T N.C.
9	O/T N.O.
10	O/T N.C. (COM)
11	No Connect
12	No Connect

JOHNSON SYSTEMS INC.
"PROFESSIONAL LIGHT CONTROL PRODUCTS"
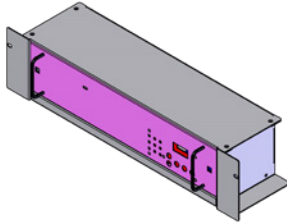
CD-3000+C21 Dimmer Control Cable Pinout

#1 Top Columns		#2 Top Columns		#3 Top Columns		#1 Bottom Columns		#2 Bottom Columns		#3 Bottom Columns	
PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	V+	1	V+	1	V+	1	V+	1	V+	1	V+
2	NC	2	NC	2	NC	2	NC	2	NC	2	NC
3	NC	3	NC	3	NC	3	NC	3	NC	3	NC
4	NC	4	NC	4	NC	4	NC	4	NC	4	NC
5	NC	5	NC	5	NC	5	NC	5	NC	5	NC
6	NC	6	NC	6	NC	6	NC	6	NC	6	NC
7	NC	7	NC	7	NC	7	NC	7	NC	7	NC
8	NC	8	NC	8	NC	8	NC	8	NC	8	NC
9	NC	9	NC	9	NC	9	NC	9	NC	9	NC
10	NC	10	NC	10	NC	10	NC	10	NC	10	NC
11	Dimmer 1	11	Dimmer 3	11	Dimmer 5	11	Dimmer 49	11	Dimmer 51	11	Dimmer 53
12	Dimmer 13	12	Dimmer 15	12	Dimmer 17	12	Dimmer 61	12	Dimmer 63	12	Dimmer 65
13	Dimmer 2	13	Dimmer 4	13	Dimmer 6	13	Dimmer 50	13	Dimmer 52	13	Dimmer 54
14	Dimmer 14	14	Dimmer 16	14	Dimmer 18	14	Dimmer 62	14	Dimmer 64	14	Dimmer 66
15	NC	15	NC	15	NC	15	NC	15	NC	15	NC
16	NC	16	NC	16	NC	16	NC	16	NC	16	NC
17	NC	17	NC	17	NC	17	NC	17	NC	17	NC
18	NC	18	NC	18	NC	18	NC	18	NC	18	NC
19	Dimmer 37	19	Dimmer 39	19	Dimmer 41	19	Dimmer 85	19	Dimmer 87	19	Dimmer 89
20	Dimmer 25	20	Dimmer 27	20	Dimmer 29	20	Dimmer 73	20	Dimmer 75	20	Dimmer 77
21	Dimmer 38	21	Dimmer 40	21	Dimmer 42	21	Dimmer 86	21	Dimmer 88	21	Dimmer 90
22	Dimmer 26	22	Dimmer 28	22	Dimmer 30	22	Dimmer 74	22	Dimmer 76	22	Dimmer 78
23	NC	23	NC	23	NC	23	NC	23	NC	23	NC
24	NC	24	NC	24	NC	24	NC	24	NC	24	NC
25	NC	25	NC	25	NC	25	NC	25	NC	25	NC
26	NC	26	NC	26	NC	26	NC	26	NC	26	NC
#4 Top Columns		#5 Top Columns		#6 Top Columns		#4 Bottom Columns		#5 Bottom Columns		#6 Bottom Columns	
PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	V+	1	V+	1	V+	1	V+	1	V+	1	V+
2	NC	2	NC	2	NC	2	NC	2	NC	2	NC
3	NC	3	NC	3	NC	3	NC	3	NC	3	NC
4	NC	4	NC	4	NC	4	NC	4	NC	4	NC
5	NC	5	NC	5	NC	5	NC	5	NC	5	NC
6	NC	6	NC	6	NC	6	NC	6	NC	6	NC
7	NC	7	NC	7	NC	7	NC	7	NC	7	NC
8	NC	8	NC	8	NC	8	NC	8	NC	8	NC
9	NC	9	NC	9	NC	9	NC	9	NC	9	NC
10	NC	10	NC	10	NC	10	NC	10	NC	10	NC
11	Dimmer 7	11	Dimmer 9	11	Dimmer 11	11	Dimmer 55	11	Dimmer 57	11	Dimmer 59
12	Dimmer 19	12	Dimmer 21	12	Dimmer 23	12	Dimmer 67	12	Dimmer 69	12	Dimmer 71
13	Dimmer 8	13	Dimmer 10	13	Dimmer 12	13	Dimmer 56	13	Dimmer 58	13	Dimmer 60
14	Dimmer 20	14	Dimmer 22	14	Dimmer 24	14	Dimmer 68	14	Dimmer 70	14	Dimmer 72
15	NC	15	NC	15	NC	15	NC	15	NC	15	NC
16	NC	16	NC	16	NC	16	NC	16	NC	16	NC
17	NC	17	NC	17	NC	17	NC	17	NC	17	NC
18	NC	18	NC	18	NC	18	NC	18	NC	18	NC
19	Dimmer 43	19	Dimmer 45	19	Dimmer 47	19	Dimmer 91	19	Dimmer 93	19	Dimmer 95
20	Dimmer 31	20	Dimmer 33	20	Dimmer 35	20	Dimmer 79	20	Dimmer 81	20	Dimmer 83
21	Dimmer 44	21	Dimmer 46	21	Dimmer 48	21	Dimmer 92	21	Dimmer 94	21	Dimmer 96
22	Dimmer 32	22	Dimmer 34	22	Dimmer 36	22	Dimmer 80	22	Dimmer 82	22	Dimmer 84
23	NC	23	NC	23	NC	23	NC	23	NC	23	NC
24	NC	24	NC	24	NC	24	NC	24	NC	24	NC
25	NC	25	NC	25	NC	25	NC	25	NC	25	NC
26	NC	26	NC	26	NC	26	NC	26	NC	26	NC

CD-3000+C21 Power Connector Pinout

PIN	FUNCTION
1	Phase C
2	Phase B
3	Phase A
4	Neutral
5	FAN
6	Ground
7	O/T N.C. (V+)
8	O/T N.C.
9	O/T N.O.
10	O/T N.O. (Com)
11	No Connect
12	No Connect

JOHNSON SYSTEMS INC.
"PROFESSIONAL LIGHT CONTROL PRODUCTS"

i96e-3000 Backplane Connections

TB 4			TB 1			TB 2			TB 3		
PIN	NAME	3000I	PIN	NAME	3000I	PIN	NAME	3000I	PIN	NAME	3000I
1	A1	ANA 1	1			1			1	DMXGND?	DMXGND
2	A2	ANA 2	2	GRD	GND	2	GRD	GND	2	DMX0-	DMXA-
3	A3	ANA 3	3			3			3	DMX0+	DMXA+
4	A4	ANA 4	4	GRD	GND	4			4		
5			5			5	DMXB+	DMXB+	5		
6	A6	O/T N/O	6			6	DMXB-	DMXB-	6		
7	A7	FIRE	7	12VDC	12V	7			7		
8	A8	SECURITY	8	GRD	GND	8			8		
9			9	RAKCOM+	24V	9	HH+12V	12V	9		
10			10	RACLCOM+	24V	10	GRD	GND	10		
11											
12											
13	COM	GND									
14	+V	12V									

TB1 +24VDC Power Supply Output Connector

TB2 DMX Input Connector

TB3 DMX Input Connector

TB4 0-10VDC Analog Input Connector and Input/Ouput Contacts

JSI Updated Labels To Replace Existing OEM Backplane Labels

JOHNSON SYSTEMS INC.
"PROFESSIONAL LIGHT CONTROL PRODUCTS"

CD-3000+ AE/SV Backplane

Internal Fuses (3)
Replace with 5A 250V (Littlelfuse Part #0217005.HXP)
Fast-Acting Fuse Only!

WARNING! Verify all power is disconnected (turned off) before checking or servicing fuses.

CD-3000+SV Control Output Connectors (12)

CD-3000+AE Control Output Connectors (4)

Input / Output Contacts Connector

+12VDC Power Supply Output Connector

0-10VDC Analog Input Connector

RJ45 DMX I/O Connectors (2). Used to connect (daisy-chain) DMX A and DMX B between CD-3000+ systems in multi-rack installations.

Dual DMX Input and Thru Connectors

JOHNSON SYSTEMS INC.

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CD-3000+ C21/U19 Backplane
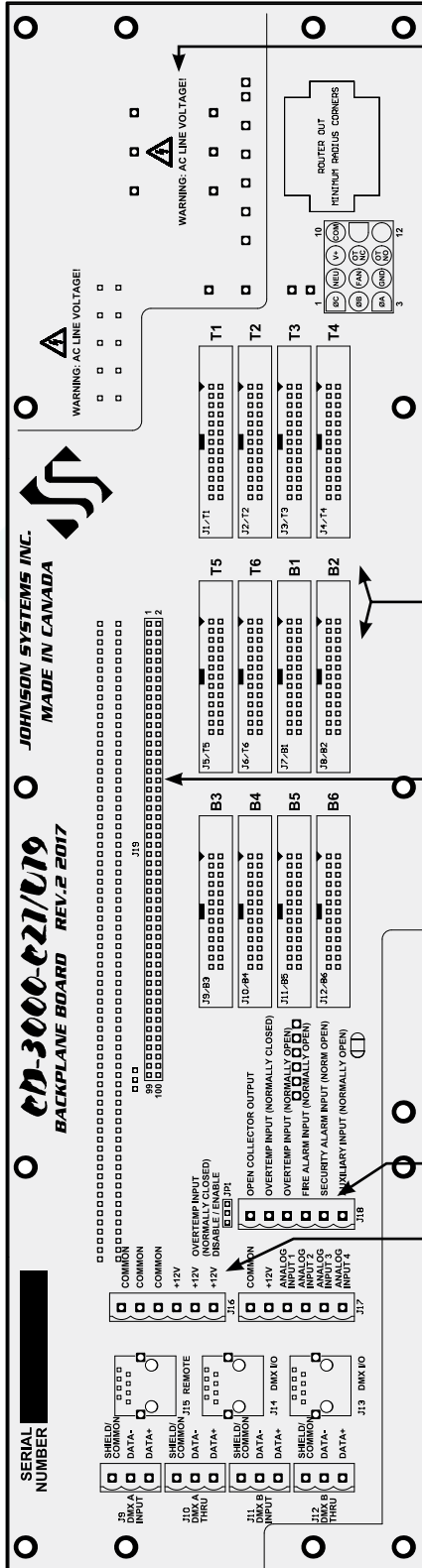
Internal Fuses (3)
Replace with 5A 250V (Littlelfuse Part #0217005.HXP)
Fast-Acting Fuse Only!

WARNING! Verify all power is disconnected (turned off) before checking or servicing fuses.

CD-3000+C21 Control Output Connectors (12)

Connection to U19 Breakout PCB

Input / Output Contacts Connector

+12VDC Power Supply Output Connector

0-10VDC Analog Input Connector

RJ45 DMX I/O Connectors (2). Used to connect (daisy-chain) DMX A and DMX B between CD-3000+ systems in multi-rack installations.

Dual DMX Input and Thru Connectors

CD-3000+ U19 Breakout Board
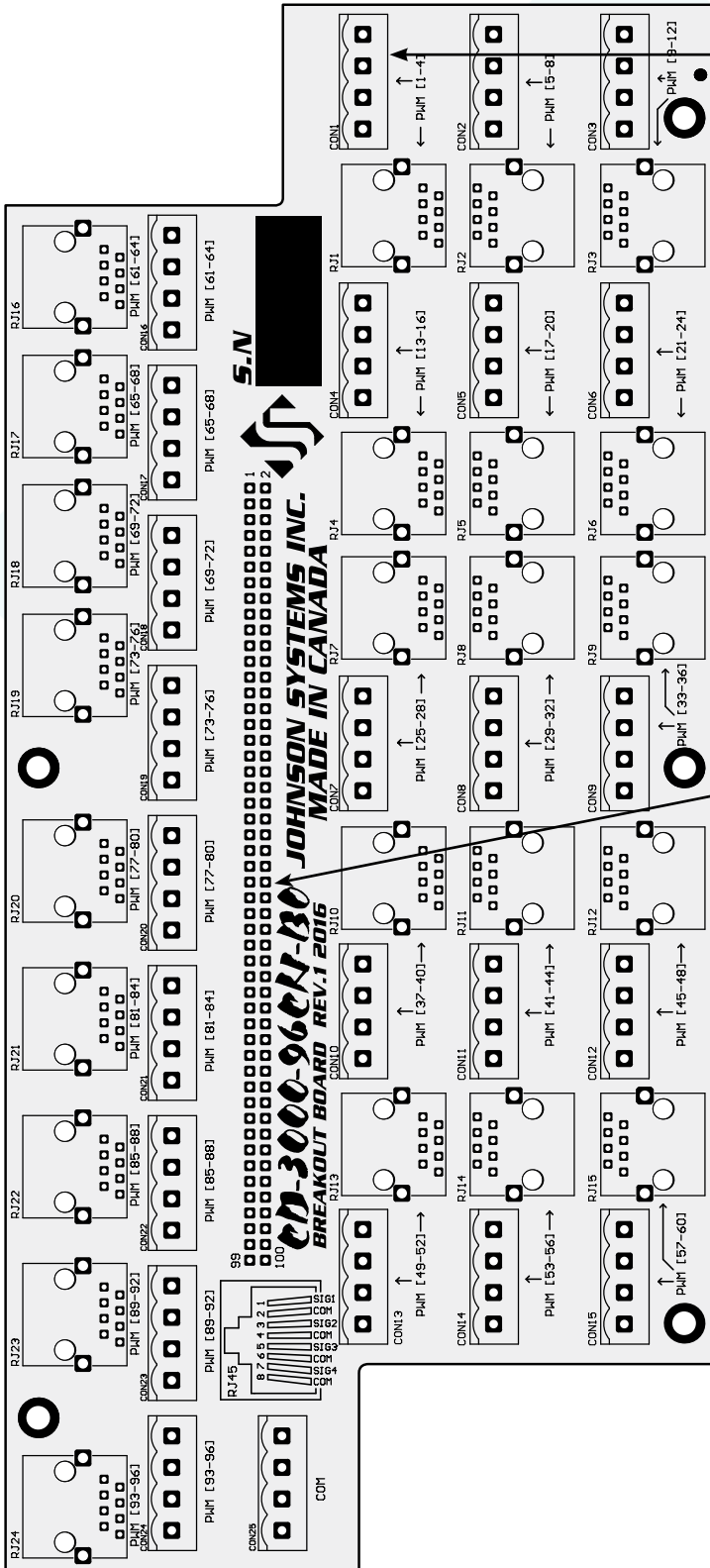
PWM Outputs
4 Channels per Connector
Total 24 Connectors

WARNING! Verify all power is disconnected (turned off) before checking or servicing fuses.

PWM Outputs 4 Channels Per RJ45 Connector
Total 24 Connectors

Connection To CD-3000+ Backplane

JOHNSON SYSTEMS INC.
"PROFESSIONAL LIGHT CONTROL PRODUCTS"

i96e-CD-3000 Backplane Pinout

PWM Outputs

WARNING! Verify all power is disconnected (turned off) before checking or servicing fuses.

Redundant spare OEM ECU connector

TB1	+24VDC Power Supply Output Connector
TB2	DMX Input Connector
TB3	DMX Input Connector
TB4	0-10VDC Analog Input Connector and Input/Ouput Contacts

TB3
N/C 10
N/C 9
N/C 8
N/C 7
N/C 6
N/C 5
N/C 4
DMX A+ 3
DMX A- 2
DMX Common 1

TB2
Common 10
+12VDC 9
N/C 8
N/C 7
DMX B- 6
DMX B+ 5
N/C 4
N/C 3
Common 2
N/C 1

TB1
+24VDC 10
+24VDC 9
Common 8
+24VDC 7
N/C 6
N/C 5
Common 4
N/C 3
Common 2
N/C 1

TB4
A1 14
A2 13
A3 12
A4 11
N/C 10
Over Temp 9
Fire 8
Security 7
N/C 6
N/C 5
N/C 4
N/C 3
Common 2
+12VDC 1

i96e-3000

JOHNSON SYSTEMS INC.
"PROFESSIONAL LIGHT CONTROL PRODUCTS"

i96e-3000

Control Input / Output Connections

The **i96e-3000** comes with a variety of control input and output (I/O) capabilities. All I/O connections are terminated on the Backplane.

Breakaway type connectors are supplied for all I/O connections.

- Use wire size #28 to #12 AWG. Strip insulation length to 0.3" (7.5mm).
- Torque terminations to 3.6 IN-LBS (0.4 NM).

NOTE: For connection use copper wire only, rated for 167°F (75°C) minimum.

Dual DMX Input and Thru

- DMX A (SHIELD/COMMON, DATA-, DATA+) is terminated on TB3 Pins 2 & 3.
- DMX B (SHIELD/COMMON, DATA-, DATA+) is terminated on TB2 Pins 5 & 6.
- Complies with USITT DMX512-A (ANSI E1.11 - 2008), a standard protocol for digital data control.
- Recommended cable is Belden 9829, 9842, CAT5, CAT5E, CAT6 or equivalent (low capacitance, twisted pair).
- Wiring must follow a daisy-chain topology with end-of-line (EOL) termination active on the i96e-3000.
- Maximum of 64 receiving devices on a single DMX line.
- Maximum cable length is 1,500 feet (455 meters).

+12VDC Power Supply Output
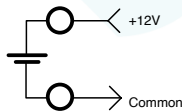
- A regulated +12VDC power supply output is available for powering external devices.
- Terminate on +12V and COMMON on either TB2 Pins 9 & 10 or TB4 Pins 13 & 14.
- ***External devices should not exceed the maximum combined current draw of 1 Amp.***

+24VDC Power Supply Output
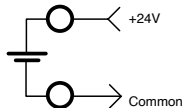
- A regulated +24VDC power supply output is available for powering PWS-20P and PWS-70P.
- Terminate on +24V and COMMON on either TB1 Pins 8 & 9.
- External devices should not exceed the maximum combined current draw of 1 Amp.

0-10VDC Analog Inputs or Load Shed Contact Inputs

- Four (4) analog inputs terminate on TB4 Pins 1, 2, 3, 4.
- Inputs can be configured for normal (0-10VDC analog) or load shed mode of operation.
- Inputs can be patched to any combination of dimmer output circuits.
- Programmed in the "ANA MODE" and "ANA PAT" menus. See page 39 for details.

JOHNSON SYSTEMS INC.

"PROFESSIONAL LIGHT CONTROL PRODUCTS"

1923 Highfield Cres. S.E.
Calgary, Alberta T2G 5M1 Canada
tel: 403.287.8003 · fax: 403.287.9003
info@johnsonsystems.com

Normally
Closed
Thermostat
Switch

+12V

Overtemp
Input
Normally
Closed

Maintained
Normally
Open
Switch
Contact

Fire
Alarm
Input

Common

Maintained
Normally
Open
Switch
Contact

Security
Alarm
Input

Common
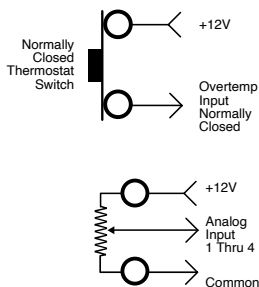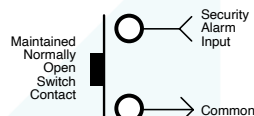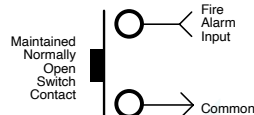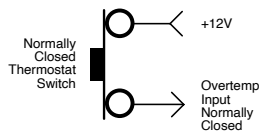
Over-Temperature Input From Dimmer

- When a dimmer goes into Overtemp it will activate an O/T alarm on the i96e-3000 and is only active when DMX is at Zero. This will activate the Fans for 5min. If DMX is over 10% the fans will be on already and if this O/T alarm occurs and DMX is set to Zero, the fans will stay on for 5 min.

Over-Temperature Input (Normally Open)

- Terminate (OVERTEMP INPUT (NORMALLY OPEN) on TB4 Pins 6 & 13.
- Disables all dimmer outputs when contact/switch is closed.
- Controlled via a maintained contact/switch to low-voltage common (COMMON).
- Optionally connects to OEM wiring in Colortran i96e Rack(s). NOT SUPPLIED.

Fire Alarm Input (Normally Closed)

- Terminate on TB4 Pins 7&13.
- Triggers selected channels to turn on when contact/switch is closed.
- Controlled via a maintained contact/switch to low-voltage common (COM).
- Programmed in the "F-ALARM" menu. See page 40 for details.

Security Alarm Input (Normally Open)

- Terminate on TB4 Pins 8 &13.
- Triggers selected channels to cycle on and off at a 1 Hertz rate when contact/switch is closed.
- Controlled via a maintained contact/switch to low-voltage common (COM).
- Programmed in the "S-ALARM" menu. See page 40 for details.

Removal of the Old Processor Housing

The i96e-3000 is a custom 96-channel DMX to PWM demultiplexer designed for installation in standard i Series e Colortran rack enclosures. Measuring 2 Rack Units (2RU) in height, it installs quickly.

Remove the bottom 1 Rack Unit (1RU) Metal filler plate (If installed). Install the provided labels as per the instruction sheet.

Please, attach the labels to the Backplane board according to the sample that is presented at left.

Carefully slide the Johnson Systems i96e-3000 into the rack using the rails, and power up the rack.

Overtemp

If a dimmer module triggers an Overtemp, the rack will only activate the fans at full-on once the DMX has been removed. The fan will stay on for 5 Min. There is an additional Overtemp N/O contact that can be used to install a contactor to severe L1, L2, L3, and N in the event of thermal runaway.

JSI Updated Labels To ReJSI Updated Labels To Replace Existing OEM Backplane Labels

TB1	TB2	TB3	TB4
-------	-------	-------	-------
		DMXGND	+12V
GND	GND	DMXA-	Com
		DMXA+	-------
-------			-------
GND			-------
-------	DMXB+		-------
	DMXB-		-------
+12V			Sec
GND			Fire
+24V			O/T
+24V	+12V		-------
	GND		A4
			A3
			A2
			A1

CD-3000+ All Models

Control Input / Output Connections

All **CD-3000+** systems come with a variety of control input and output (I/O) capabilities. All I/O connections are terminated on the Backplane.

Breakaway type connectors are supplied for all I/O connections.

- Use wire size #28 to #12 AWG. Strip insulation length to 0.3" (7.5mm).
- Torque terminations to 3.6 IN-LBS (0.4 NM).

NOTE: For connection use copper wire only, rated for 167°F (75°C) minimum.

Dual DMX Input and Thru

- DMX A (SHIELD/COMMON, DATA-, DATA+) is terminated on the J9 and J10 connectors.
- DMX B (SHIELD/COMMON, DATA-, DATA+) is terminated on the J11 and J12 connectors.
- For multi-rack CD-3000+ installations, a 10-foot (3 meter yellow) Cat5e patch cable is supplied. This cable is used to daisy-chain both the DMX A inputs and DMX B inputs between multiple CD-3000+ systems. The Cat5e patch cable terminates to J13 and J14 connectors.
- Complies with USITT DMX512-A (ANSI E1.11 - 2008), standard protocol for digital data control.
- Recommended cable is Belden 9829, 9842, CAT5, CAT5E, CAT6 or equivalent (low capacitance, twisted pair).
- Wiring must follow a daisy-chain topology with end-of-line (EOL) termination active on the last CD-3000+.
- Maximum of 64 receiving devices on a single DMX line.
- Maximum cable length is 1,500 feet (455 meters).

NOTE: Ensure only the last (end-of-line) DMX receiving device is terminated!

+12VDC Power Supply Output

- A regulated +12VDC power supply output is available for powering external devices.
- Terminate on +12V and COMMON of J16 connector.
- ***External devices should not exceed the maximum combined current draw of 2 Amp.***

+24VDC Power Supply Output

- A regulated +24VDC power supply output is available for powering PWS-20P and PWS-70P.
- Terminate on +24V and COMMON on either TB1 Pins 8 & 9.
- External devices should not exceed the maximum combined current draw of 1 Amp.

0-10VDC Analog Inputs or Load Shed Contact Inputs

- Four (4) analog inputs terminate on J17 connector.
- Inputs can be configured for normal (0-10VDC analog) or load shed mode of operation.
- Inputs can be patched to any combination of dimmer output circuits.
- Programmed in the "ANA MODE" and "ANA PAT" menus..
 See page 39 for details.

Over-Temperature Input (Normally Closed)

- Terminate (OVERTEMP INPUT (NORMALLY CLOSED)) on J18 connector.
- Disables all dimmer outputs when contact/switch is opened.
- Controlled via a maintained contact/switch to +12V.
- Connects to OEM wiring in Strand CD80® Supervisor (SV) and Strand/Signify C21 racks via the power connector.

Over-Temperature Input (Normally Open) (TS1)

- Terminate (OVERTEMP INPUT (NORMALLY OPEN) (TS1)) on J18 connector.
- Disables all dimmer outputs when contact/switch is closed.
- Controlled via a maintained contact/switch to low-voltage common (COMMON).
- Connects to OEM wiring in Strand CD80® Supervisor (SV) and Strand/Signify C21 racks via the power connector.
- Optionally connects to OEM wiring in Strand CD80® AMX or Advanced Electronic (AE) racks.
  Connect to TS1 located on the upper left-hand side of the dimmer rack. Connect COM, also located on the upper left-hand side of the dimmer rack, to COMMON on the CD-3000+ Backplane.
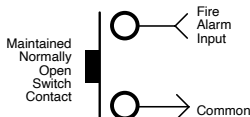
Fire Alarm Input (Normally Open)

- Terminate on J18 connector.
- Triggers selected channels to turn on when contact/switch is closed.
- Controlled via a maintained contact/switch to low-voltage common (COM).
- Programmed in the "F-ALARM" menu. See page 40 for details.

Security Alarm Input (Normally Open)

- Terminate on J18 connector.
- Triggers selected channels to cycle on and off at a 1 Hertz rate when contact/switch is closed.
- Controlled via a maintained contact/switch to low-voltage common (COM).
- Programmed in the "S-ALARM" menu. See page 40 for details.
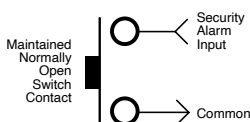
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Control Module / Processor MADD-96

(Multiple Application Dimmer Driver)

The MADD-96 is the central electronic control system (brain) for all CD-3000+ Series retrofit systems. The MADD-96 is mounted in the Control Module. The Control Module can be removed by releasing the two (2) quarter-turn fasteners on each side. To release the fasteners, turn them a quarter-turn counter-clockwise using a flathead screwdriver. Once the fasteners are released, pull the module outwards using the two (2) handles on each side. To reinstall the Control Module, slide the metalwork through the guide rails on each side of the CD-3000+ chassis and push it in until it is fully seated. You will hear and feel the Control Module snap into place. Once the Control Module is fully seated, the quarter-turn fasteners can be locked into place by lining the slot up horizontally and pushing it in with the thumb.
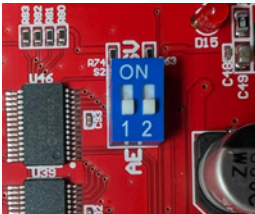
Output PWM Polarity Selection

PWM Polarity Selection

CD-3000+ processors can have their PWM output set on processor switch S2 (see pic. Both switches set to AE allow for standard PWM output with a negative common. This is typical for all CD80® racks where the dimmer modules have vertical handles (AMX and AE). Both switches set to the SV position will provide inverted PWM output with a positive common. This is typical for all later-generation CD80® Supervisor and C21 racks where the dimmer modules have horizontal handles (SV and C21).

Located on the MADD-96 is a removable EEPROM memory module. The EEPROM slides into the connector J8 located on the upper left-hand side of the board. The EEPROM is used to back up important configuration settings and may be removed for safe storage. Refer to menu items "RESTORE" and "BACKUP" on page 42 and page 43 for further details.
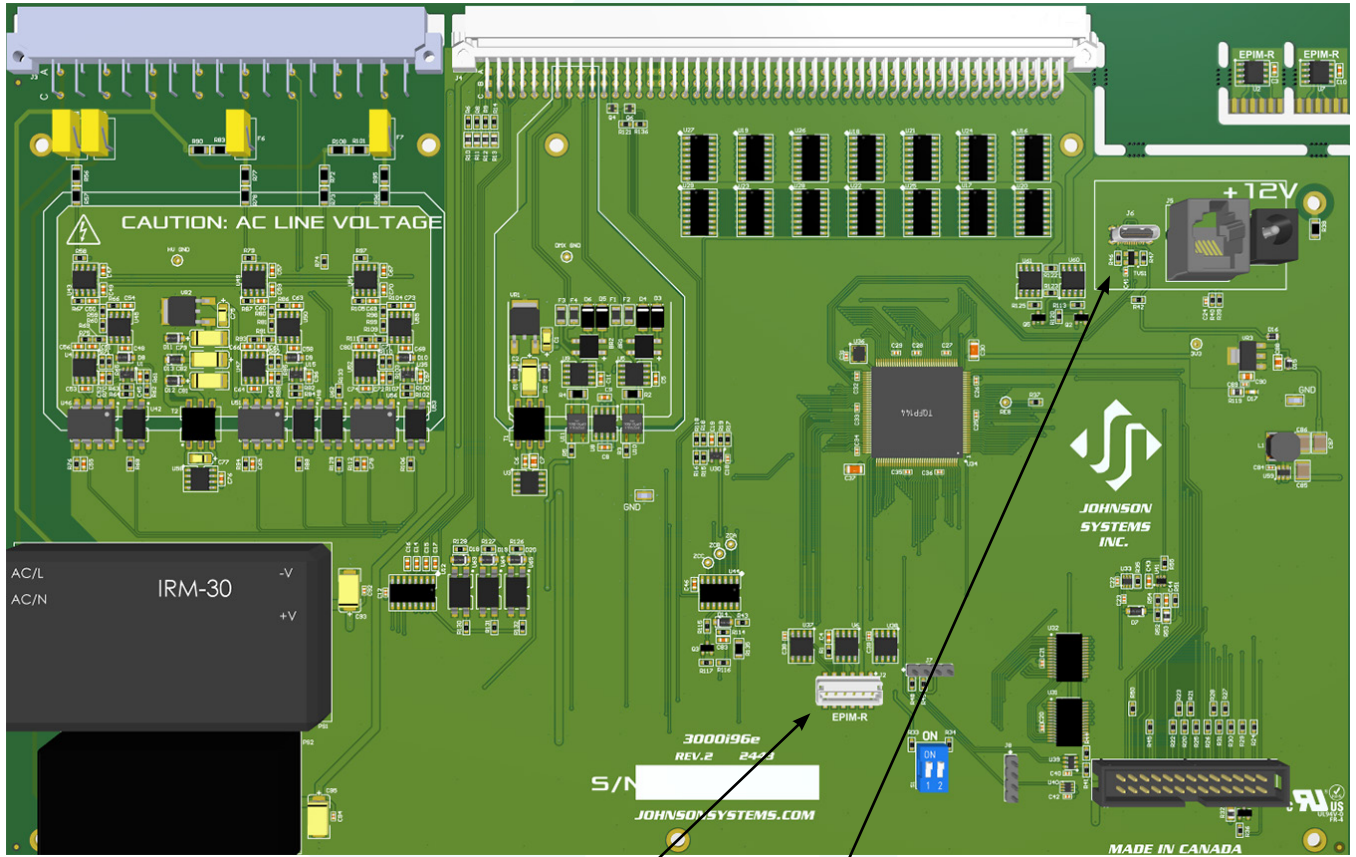
Firmware Loading

EEPROM Memory Module

All CD-3000+ systems have an embedded bootloader that permits filed firmware upgrades (if necessary) via a PC or laptop computer. Connection is via the USB-C Tech Port on the CD-3000+ face panel and a PC (Win10 or newer). A standard USB-A to USB-C computer interface cable (not supplied) will be required to perform this upload.
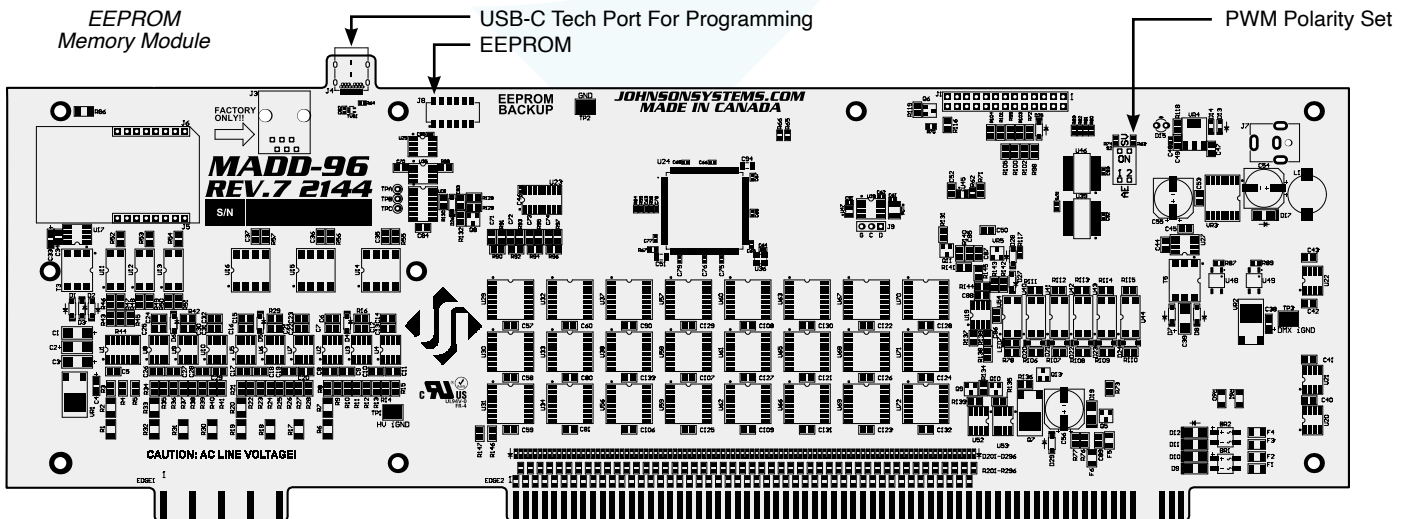
i96e-3000

EEPROM   USB-C Tech Port For
Programming

User Interface

All CD-3000+ Series retrofit systems are equipped with a user interface. The user interface provides access to all programming and configuration settings. System status is easily visible on the LCD and LED indicators. An infrared LED allows for the printout of all system configuration settings when used with a handheld infrared printer (Johnson System Inc., Part Number: JS-IP).

All the programming is accomplished using four (4) switches. Within a few minutes, most users will find the menu structure very intuitive and easy to navigate. All configuration settings are automatically stored in EEPROM.

LCD Display

The LCD can display 2 lines of 8 characters. A backlight automatically comes on when activity is sensed on the switches. The LCD contrast can be easily adjusted for optimum viewing. Refer to menu item "LCD VIEW" on page 44 for further details.

Programming Switches

The MENU UP/DOWN (⬍) switches are used for navigating through the various system configuration menu items. They also allow for the programming of other specific parameters within a selected menu. Pressing and holding either switch will speed up the scroll rate, which can be helpful to speed up the configuration time.

The EXECUTE switch is normally used to select/enter a menu item, advance within a selected menu item, or toggle between parameters within a selected menu item.

The ESCAPE switch is normally used to back up a selected menu item one step at a time or exit the menu completely. The escape switch also saves the data in relevant menus.
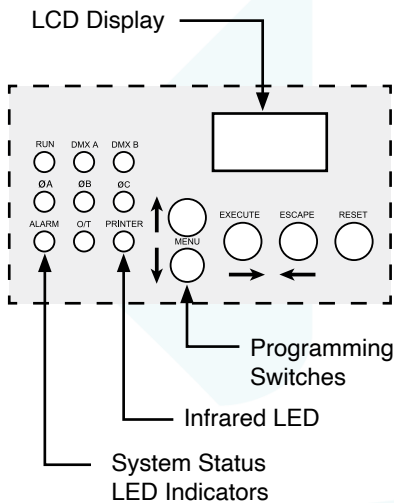
NOTE: The programming switches can be locked out to prevent inadvertent configuration changes. To toggle between "LOCKED!!" and "UNLOCKED" press and hold down the EXECUTE and then ESCAPE switches at the same time for 4-5 seconds.

The RESET switch has two purposes. First, it allows for a quick exit from a menu item after a programming change and automatically puts the system into normal run mode. Second, it provides a soft reboot for the system's microcontroller.

NOTE: A detailed procedure for programming all system configuration menu items can be found on page 32 to page 44.

LCD Display

Programming Switches

Infrared LED

System Status LED Indicators

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Tech Port

Also, see "FIRMWARE LOADING" on page 26. The face panel of the CD-3000+ Processor Module is equipped with a USB-C "Tech Port" permitting interface to a PC. This permits in-field firmware updates via the internal bootloader of the CD-3000+ processor. ***Please contact the factory for a paper copy of the upgrade procedure as well as where to download the updated firmware to be loaded.***

WARNING: Only firmware supplied from the factory with installation instructions applies to this connection.

System Status • LED Indicators

RUN (Green)

Illuminates when the power is on, and the microcontroller status is in normal run mode. The LED flashes once every 2 seconds when the system is in STANDBY mode.

ØA, ØB and ØC (Green)

Illuminates when the line voltage power is within the acceptable range of 100-140 VAC for each phase and the zero-cross reference circuitry is functioning properly.

DMX A and DMX B (Yellow)

Illuminates when valid DMX is received on each of the inputs. Flashes when invalid DMX is received.

ALARM

Illuminates and flashes twice per second when either a fire or security alarm is sensed on each of the inputs.

O/T

Illuminates and flashes twice per second whenever one of three over-temperature sensing inputs are triggered: N/O OT; N/C OT; CTL Temp.

System Status • LCD Display

When DMX is being received, the top line of the LCD shows the active DMX MODE ("PTY A", "PTY B", "MERGE", "DMX A+B", "2 ROOM" or "PATCH"). When DMX is not being received, the top line of the LCD shows "STANDBY!", unless the system is in standby mode, then "STANDBY!" is displayed.

The bottom line of the LCD shows the status of the system unless the system configuration menu items are being accessed. Below are descriptions for each status indication.

NO DMX!

Displayed when DMX is not being received on either input or the system is not in scene mode.

A512B512

Displayed when valid DMX is being received on one or both inputs and both inputs are not terminated. When termination is activated a "$\top_\text{M}$" will replace A or B in front of the 512 to indicate active end-of-line (EOL) DMX termination. For example, "$\top_\text{M}$512 $\top_\text{M}$512" for both DMX inputs terminated.

SH XX:YY

Displayed when DMX is disconnected, and the system's predetermined DMX status hold (SH) time is counting down. "XX" represents minutes, while "YY" represents seconds. Refer to menu item "SH TIME" on page 37 for further details.

INF HOLD

Displayed when DMX is disconnected, and the system's predetermined DMX status hold (SH) time is set for infinite (INF) hold. Refer to menu item "SH TIME" on page 37 for further details.

FIRE!!!

Displayed when the fire alarm input is triggered.
Refer to menu item "F-ALARM" on page 40 for further details.

SECURITY

Displayed when the security alarm input is triggered.
Refer to menu item "S-ALARM" on page 40 for further details.

CTL-TEMP

Displayed when the microcontroller senses an internal over-temperature condition of 167°F (75°C) or more. All dimmer outputs are disabled, and the fans are turned on to full until the temperature cools down to 158°F (70°C) or less. See the menu item "CTL TEMP" to view the current microcontroller temperature.

Ø ERROR!

Displayed when an error is sensed on any of the input power phases. A phase error can be caused by an under-voltage of less than 100VAC, an over-voltage of greater than 140VAC, or if a zero-cross phase reference is not detected.

RTC ERR!

Displayed when the system detects a runtime counter (RTC) error. This occurs when there is an invalid HARD KEY code, and the runtime counter is greater than 2160 hours (90 days). Refer to menu item "HARD-KEY" on page 42 for further details.

LOCKED!!

Displayed when an attempt is made to access the system configuration menu items, and the programming switches are locked out. To toggle between "LOCKED!!" and "UNLOCKED" press Esc 3-4 times and then press and hold down the "EXECUTE" and then "ESCAPE" switches at the same time for 4-5 seconds. You must be in the main run menu to access and toggle this feature.

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Detailed Programming of System Configuration Menu Items

NOTE: The programming switches can be locked out to prevent inadvertent configuration changes. To toggle between "LOCKED!!" and "UNLOCKED" you have to be in the top MENU so press escape 4-5 times then press and hold down the EXECUTE and then ESCAPE switches at the same time for 4-5 seconds.

The sequence of the following system configuration menu items appears as the MENU DOWN (↓) switch is pressed. Pressing the MENU UP (↑) switch will sequence the system configuration menu items in the opposite order. Pressing and holding either of the MENU UP/DOWN (↕) switches will speed up the scroll rate, which can be helpful to speed up the configuration time.

1. DIM TEST   *Test the dimmer outputs one at a time, or all at once.*

A technician's best friend! Used for troubleshooting the dimmer outputs and field wiring to the load..

Press EXECUTE to enter the menu and activate dimmer test mode.

D 01<0%	Displays the active dimmer (D) and the test level (L).
D 01>50%	Press MENU (↕) to select the desired test level.
D 01>100%	Press MENU (↓) to toggle the test level from full-on (100%) and off (0%).
D 01<100%	Press EXECUTE to toggle between the dimmer (D>) and the test level (L>).
ALL<100%	Press MENU (↕) to select the active dimmer from 01 to 96 or ALL.

Press ESCAPE or RESET to exit the menu.

The menu will automatically time out after 5 minutes of inactivity..

HELPFUL HINT!

HELPFUL HINT! Johnson Systems manufactures a wide range of Non-Dim Power Modules that double as "TEST" modules. Power Modules have control LED's that provide useful troubleshooting assistance with their internal control LED's that allow visual confirmation of control signal to any dual dimmer slot in the existing dimmer rack.

2. DIM LOCK   *Set a fixed output level for each channel.*

D 01<0%	Displays the active dimmer (D) and the test level (L).
D 01>50%	Press EXECUTE to toggle between the dimmer (D>) and the test level (L>).
	Press MENU (↕) to select the desired test level.
D 01>100%	Press MENU (↓) to toggle the test level from full-on (100%) and off (0%).
D 01<100%	Press EXECUTE to toggle between the dimmer (D>) and the test level (L>).
ALL<100%	Press MENU (↕) to select the active dimmer from 01 to 96 or ALL.

Press ESCAPE or RESET to exit the menu.

The menu will automatically time out after 5 minutes of inactivity.

3. MONITOR   *View the control level of each dimmer output.*

The dimmer control level is displayed as a percentage from 00-FL where FL is 100%. This menu will timeout automatically after 5 five of inactivity.

Press EXECUTE to enter the menu and activate monitor mode.

D 01 99%	Press MENU (↕) to select the dimmer (D) output to monitor from 01 to 96.
D 01 99%	Display shows dimmer 01 has a control output of 99%.
	Press ESCAPE or RESET to exit the menu.

NOTE: The control value will not reach FL when voltage output limiting is activated, or when regulation is enabled, and the line voltage is greater than 118 VAC.

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4. **ADDRESS**　　*Set the DMX start address.*

The DMX start address can be assigned from 001 to 512 and is common to both DMX inputs.

NOTE: When DMX MODE is set for DMX A+B operation, each of the DMX inputs can be assigned to a separate DMX start address. The DMX inputs are merged, and DMX-B is offset by the number of DMX-A channels.

Press EXECUTE to enter the menu.

DMXA<001	Displays the current DMX start address for both DMX inputs.
DMXA>001	Press MENU (⬍) to modify and select the desired DMX start address.
	You can move the Underscore to the desired digit and then change that digit with MENU (⬍)
DMXA>025	Press EXECUTE to save the selected DMX start address.
DMXB>001	* Press EXECUTE to advance to select the DMX-B start address.
DMXB>512	* Press MENU (⬍) to modify and select the desired DMX start address.
#CHA=>01	* Press EXECUTE to advance to select the number of DMX-A channels.
#CHA=>96	* Press MENU (⬍) to modify the number of DMX-A channels from 01 to 96.
	Press ESCAPE to exit the menu and save the selected DMX start address.
	Press RESET to exit the menu without saving.
	The menu will automatically time out after 5 minutes of inactivity and save.

NOTE: * DMX MODE must be set for DMX A+B operation to access this feature.
NOTE: DMX O/P must be set to OFFSET mode for this menu to function.

5. **DMX MODE**　　*Configure the mode of the on-board DMX protocol manager.*

There are five different mode settings for the DMX protocol manager.

Merge (MERGE) Mode combines both DMX inputs with highest-takes-precedence (HTP) operation. Merge mode allows for simultaneous DMX control of the dimmers from both inputs and is the default for the system.

Priority A (PTY A) and Priority B (PTY B) modes are intended for the implementation of a backup DMX source. Priority A (PTY A) sets the DMX A input as the priority and ignores the DMX B input when the DMX A input is active. Priority B (PTY B) sets the DMX B input as the priority and ignores the DMX A input when the DMX B input is active.

Dual Universe DMX (DMX A+B) mode provides a method to combine two universes of DMX within one system. It permits two independent DMX sources to be active on the DMX inputs, with each having a separate DMX start address. The DMX inputs are merged, and DMX-B is offset by the number of DMX-A channels programmed via the ADDRESS menu (see page 34 for further details). This feature is typically used when a system is at the end of one DMX universe (DMX-A) and the beginning of another (DMX-B).

Two Room (2 ROOM) mode enables each of the DMX inputs to act independently and be assigned to any dimmers in the rack. (A or B) assignment for each of the dimmer outputs via the 2 RM SET menu.

PTY A	Press EXECUTE to toggle into Priority A (PTY A) mode.
PTY B	Press EXECUTE to toggle into Priority B (PTY B) mode.
MERGE	Press EXECUTE to toggle into Merge (MERGE) mode.
DMX A+B	Press EXECUTE to toggle into Dual Universe DMX (DMX A+B) mode.
2 ROOM	Press EXECUTE to toggle into Two Room (2 ROOM) mode.
	Press ESCAPE or RESET to exit the menu.
	Any change in the configuration is automatically saved.

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NOTE: DMX O/P must be set to OFFSET mode for this menu to function.
NOTE: The control value will not reach FL when voltage output limiting is activated, or when regulation is enabled, and the line voltage is greater than 118 VAC.

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6. 2 RM SET   *Set the two-room assignment for each of the dimmer outputs.*

This menu is used to assign each of the 96 dimmer outputs to room "A" or room "B". Dimmer outputs assigned to room "A" are controlled via the DMX-A input. Dimmer outputs assigned to room "B" are controlled via the DMX-B input. This creates separation within the dimmer rack and makes a single dimmer rack function as though it is two independent dimmer racks. When used in conjunction with the DC PATCH menu, the dimmer rack can be configured for sequential DMX control of two rooms, even if the dimmer room assignments are not sequential.

DMX MODE must be set for 2 ROOM operation for this menu to function.

Press EXECUTE to enter the menu and activate 2 RM SET mode.

DIM 01 A   Displays the dimmer (DIM) output (01) and the room assignment (A).
DIM 96 A   Press MENU (⬍) to select a different dimmer output from 01 to 96.
DIM 96 B   Press EXECUTE to toggle the room assignment from A to B.

Press ESCAPE or RESET to exit the menu.

Any change in the configuration is automatically saved.

NOTE: DMX O/P must be set to OFFSET mode for this menu to function.

7. DMXA TRM   *Enable or disable termination on the DMX A input.*

Activates and deactivates an internal DMX termination for end-of-line operation. DMX termination is indicated on the LCD display when DMX is being received. When the DMX A input is not terminated (DISABLED) the LCD display will read A512B512. When the DMX A input is terminated (ENABLED) the LCD display will read ẘ512B512.

ENABLED   Press EXECUTE to toggle termination from ENABLED to DISABLED.
DISABLED   Press EXECUTE to toggle termination from DISABLED to ENABLED.

Any change in the configuration is automatically saved.

NOTE: Ensure only the last (end-of-line) DMX receiving device is terminated!

8. DMXB TRM   *Enable or disable termination on the DMX B input.*

Activates and deactivates an internal DMX termination for end-of-line operation. DMX termination is indicated on the LCD display when DMX is being received. When the DMX B input is not terminated (DISABLED) the LCD display will read A512B512. When the DMX B input is terminated (ENABLED) the LCD display will read A512ẘ512.

ENABLED   Press EXECUTE to toggle termination from ENABLED to DISABLED.
DISABLED   Press EXECUTE to toggle termination from DISABLED to ENABLED.

Any change in the configuration is automatically saved.

NOTE: *Ensure only the last (end-of-line) DMX receiving device is terminated*!

9. DMX O/P   *Configure the on-board DMX protocol manager for offset or patch mode.*

OFFSET mode is typically used for most systems and is the factory default. OFFSET mode refers to the DMX start address, with each of the 96 dimmer (PWM) outputs addressed sequentially from the DMX start address.

PATCH mode provides full flexibility for addressing each of the 96 dimmer (PWM) outputs. Each of the 96 dimmer (PWM) outputs can be patched to be (controlled from) any DMX input channel from 001 to 512, from either or both DMX A and DMX B inputs simultaneously.

With DMX patch mode activated, any configuration within the ADDRESS, DMX MODE, 2 RM SET and DC PATCH menus is ignored, and the DMX patch configured within the DMXA PAT and DMXB PAT menus takes precedence.

When using the system in DMX patch mode, it is strongly recommended to print out the patch using a handheld infrared printer (Johnson System Inc., Part Number: JS-IP).

Press EXECUTE to enter the menu and configure the DMX mode.

DISABLED	This menu is disabled to help prevent inadvertent changes. Proceed to enable.
ENABLED	Press and hold MENU (▲) and MENU (▼) at the same time for 4-5 seconds.
OFFSET	Press EXECUTE to toggle the DMX mode from OFFSET to PATCH.
PATCH	Press EXECUTE to toggle the DMX mode from PATCH to OFFSET.

Press ESCAPE or RESET to exit the menu.

Any change in the configuration is automatically saved.

10. DMXA PAT *Patch the 96 dimmer (PWM) outputs to any DMX A input channel.*

There are two ways to configure the DMX patch. Each of the 96 dimmer (PWM) outputs can be manually (MANUAL) patched to a DMX input channel or patched in blocks (BLOCK) of sequential dimmers and DMX channels.

For MANUAL patching, each of the dimmers is patched individually. First, the dimmer (DIM) output is selected, and then any DMX input channel from 001 to 512 is patched to the selected dimmer.

For BLOCK patching, a sequential range of dimmers are patched to a sequential range of DMX channels. First, the first dimmer number (DIM#) in the block is selected, then the DMX A start address (DMXA) for the block is selected, and then finally the number of dimmers (#DIM) in the block is selected. For example, if DIM# is 001, DMX is 001, and #DIM is 096, then all the dimmer outputs, 001 thru 096 are addressed sequentially to DMX channels 001 thru 096.

For a more complex example, if DIM# is 049, DMX is 321, and #DIM is 024, then dimmer outputs 049 thru 073 are addressed sequentially to DMX channels 321 thru 344.

Using a combination of MANUAL and BLOCK patching methods can speed up configuration. Typically, a BLOCK of dimmers is first patched and then edited using the MANUAL patch.

The DMX patch should be cleared (CLEAR) before configuring the patch. Clearing the patch ensures all previously configured patch data is cleared (erased).

When DMXA PAT is utilized in conjunction with DMXB PAT, each of the 96 dimmer (PWM) outputs can be patched to (controlled from) any DMX input channel from 001 to 512, from either or both DMX A and DMX B inputs simultaneously.

If a dimmer is patched to both DMX A and DMX B input channels, the DMX levels are merged and highest-takes-precedence (HTP).

Press EXECUTE to enter the menu and configure the DMX A patch.

Press MENU (▲) to scroll through and select the patching method.

MANUAL?	Press EXECUTE to patch each of the dimmers manually (MANUAL).
DIM DMXA	The top line shows the dimmer (DIM) and (DMXA) address headings.
D01<999?	The second line shows the dimmer (DIM) and (DMXA) address values.
D96<999?	Press MENU (▲) to select the dimmer (DIM) from 001 to 096 to patch.
D01 999?	Press EXECUTE to advance and select the DMXA address for the dimmer.
D01 999?	DMXA is initialized at 999 to indicate the dimmer is not patched.
D01 999?	? indicates the DMXA address (513 to 999) is invalid and is not patched.
D01 999?	The cursor (_) position indicates the DMXA digit to be edited.
D01 999?	Press EXECUTE to move the cursor to the right, under the digit to be edited.
D01 999?	Press ESCAPE to move the cursor to the left or to exit the menu.
D01 512	Press MENU (▲) to select the DMXA address from 001 to 512.
BLOCK?	Press EXECUTE to patch the dimmers in a sequential block (BLOCK).
DIM#:001	Press EXECUTE to select the first dimmer number (DIM#) in the block.
DIM#:096	Press MENU (▲) to edit the dimmer number (DIM#) from 001 to 096.
DMXA:001	Press EXECUTE to select the DMX A (DMXA) start address for the block.
DMXA:512	Press MENU (▲) to edit the DMX A (DMXA) start address from 001 to 512.

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#DIM:001	Press EXECUTE to select the number of dimmers (#DIM) in the block.
#DIM:096	Press MENU ( ) to edit the number of dimmers (#DIM) from 001 to 096.
PROCEED?	Press EXECUTE to proceed.
SURE ???	Press EXECUTE to proceed.
DONE !!!	Indicates the sequential block patch has been completed.
	Repeat until all required blocks of sequential dimmers have been patched.
	Press ESCAPE to exit the menu.
CLEAR???	Press EXECUTE to clear the entire patch.
SURE ???	Press EXECUTE to proceed.
DONE !!!	Indicates the entire patch has been cleared.
	Press ESCAPE to exit the menu and save the selected patch.
	Press RESET to exit the menu without saving.

The menu will automatically time out after 5 minutes of inactivity and save.

NOTE: Be sure to BACKUP any configuration changes!

NOTE: With DMX patch mode activated, any configuration within the ADDRESS, DMX MODE, 2 RM SET, and DC PATCH menus is ignored, and the DMX patch configured within this menu takes precedence.

11. DMXB PAT   *Patch the 96 dimmer (PWM) outputs to any DMX B input channel.*

Refer to the DMXA PAT menu for further information.

The DMXA PAT menu is used to patch dimmers to DMX A input channels, while the DMXB PAT menu is used to patch dimmers to DMX B input channels..

12. SH TIME   *Set the DMX status hold time from 0 to 99 minutes or infinite.*

When DMX is disconnected the system will hold the status of the last received DMX levels for the selected amount of time. When activated, the LCD display shows a countdown of the status hold time or infinite hold.

Press EXECUTE to enter the menu.

TIME ⬍ 0m	Displays the current DMX status hold time (HTIME) setting.
TIME 99m	Press MENU (⬍) to set the desired hold time from 0 to 99 minutes.
TIME INF	Press MENU (⬇) to set the desired hold time to infinite (INF).
	Press ESCAPE to exit the menu and save the desired DMX status hold time.
	Press RESET to exit the menu without saving.

The menu will automatically time out after 5 minutes of inactivity and save

13. DC PATCH   *Configure the dimmer to channel patch for the dimmer rack.*

Each of the 96 dimmer (PWM) outputs can be assigned and patched to any of the 96 control channels. Multiple dimmer outputs may be patched to a single control channel. The dimmer-to-channel patch is used by other menu features to provide transparent control of the dimmer output circuits. 3000+ systems are typically patched for 1 to 1 operation but may be altered for custom applications.

Press EXECUTE to enter the menu.

D01<C01	Displays the dimmer (D) output (01) and its current control channel (C) patch (01).
D96<C96	Press MENU (⬍) to select the desired dimmer output from 01 to 96.
D96 C96<	Press EXECUTE to toggle the pointer (<) to select the control channel to patch.
D96 C01<	Press MENU (⬍) to select the desired control channel from 01 to 96.
D96<C01	Press EXECUTE to toggle the pointer (<) to select another dimmer output.
	Press ESCAPE to exit the menu and save the desired dimmer channel patch.
	Press RESET to exit the menu without saving.

NOTE: DMX O/P must be set to OFFSET mode for this menu to function.

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14. DIM CURV   *Configure the dimmer curve for each output.*

Five different dimmer curve profiles can be assigned to each individual dimmer output circuit:

1. Direct Drive (DD) curve is a digital unmodified curve - meaning the control input level is directly proportional to the control output level. DD Drive is necessary for the operation of LED Dimmers. This is the default curve of the system.

2. Square Law (SQ) curve is the industry standard for theatrical applications where standard (OEM) dimmers are being operated.

3. Linear (LN) curve modifies the dimmer output for a linear relationship to the control input level.

4. Non-Dim (ND) curve assigns the dimmer circuit to operate in a full-on or off-state only, with no dimming. Dimmers set for Non-Dim (ND) will be triggered full-on at the ND-LEVEL setting where the ND-LEVEL trigger point is selectable in 10% increments.

5. LED (LD) allows the user to choose between 8 predefined dim curves (whichever fits best) based on the characteristics of the load.
    LD1 = 4% · LD2 =5% · LD3 = 7% · LD4 = 9% · LD5 = 10%
    LD6 =12% · LD7 = 13% · LD8 =15% · LD9=16%.

Press EXECUTE to enter the menu.

DIM01 SQ   Displays the dimmer (DIM) output (01) and its current dimmer curve.
DIM96 SQ   Press MENU (⬍) to select the desired dimmer number from 01 to 96.
DIM96 LN   Press EXECUTE to toggle to linear (LN) curve mode.
DIM96 DD   Press EXECUTE to toggle to direct drive (DD) mode.
DIM96 ND   Press EXECUTE to toggle to non-dim (ND) mode.
DIM96 LD   Press EXECUTE to toggle to LED (LD) mode.

Press EXECUTE to choose between 8 pre-defined LED dim curves.

Press ESCAPE to exit the menu and save the desired dimmer curves.

Press RESET to exit the menu without saving.

The menu will automatically time out after 5 minutes of inactivity and save.

15. ND-LEVEL   *Set the Non-Dim trigger level threshold for each output.*

The non-dim trigger level threshold can be set for each of the 96 dimmer (PWM) outputs. The trigger level setting is only relevant when the dimmer curve profile is set to non-dim (ND). The trigger level can be set from 10% to 100% DMX control input in 10% increments. There is 5% hysteresis to ensure there is no false triggering. When the trigger level is set to 10%, the output is turned full-on at 10% and off at 5%. When the trigger level is set to 100%, the output is turned full-on at 100% and off at 95%. The default trigger level is 10%.

Press EXECUTE to enter the menu.

D01<10%   Displays the dimmer (D) output (01) and the trigger level setting (010%).
D96<10%   Press MENU (⬍) to select the desired dimmer output from 01 to 96.
D96>10%   Press EXECUTE to toggle the pointer (>) to set the non-dim trigger level.
D96>100%   Press MENU (⬆) to set the trigger level from 10% to 100% DMX control.
D96<100%   Press EXECUTE to toggle the pointer (<) to select another dimmer output.

Press ESCAPE to exit the menu and save the desired trigger level settings.

Press RESET to exit the menu without saving.

The menu will automatically time out after 5 minutes of inactivity and save.

NOTE: DIM CURVE for the selected dimmer must be set to Non-Dim (ND) for ND-LEVEL to take effect.

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16. ANA MODE *Configure the analog inputs for normal or load shed mode.*

Each of the four (4) analog inputs can be independently configured for normal (NORM) or load shed (SHED) mode of operation.

Normal (NORM) mode sets the analog input for 0-10VDC operation. The analog voltage level sensor sets the level for the selected dimmer outputs.

Load shed (SHED) mode is used as a power management interface to building management systems (BMS). Contact closure devices such as a photocell or maintained switch contact may be used to trigger the analog input. When a voltage of 5.5VDC to 12VDC is sensed on the analog input the selected dimmer outputs are disabled (set to zero output level). The selected dimmer outputs are enabled when the voltage sensed on the analog input drops to below 4.5VDC.

Press EXECUTE to enter the menu and set the mode for each analog input.

A01<NORM Displays the active analog input (A01) and current mode setting (NORM).
A04<NORM Press MENU ( ) to select the desired analog input to configure.
A04>SHED Press EXECUTE to toggle from normal (NORM) to load shed (SHED) mode.

Press ESCAPE to toggle the pointer (< >) to select another analog input.
Press ESCAPE to exit the menu and save the desired analog input modes.
Press RESET to exit the menu without saving.

The menu will automatically time out after 5 minutes of inactivity and save.

17. ANA PAT *Patch the analog inputs to any combination of control channels.*

Press EXECUTE to enter the menu and activate analog patch mode.

D01<A1 Displays the active Dimmer channel (D01) and analog input (A1).
D04<A01 Press MENU ( ) to select the desired analog input to patch.
D04>A01 Press EXECUTE to toggle the pointer (>) to select the control channel.
D04>A96 Press MENU ( ) to select the desired control channel from 01 to 96.
D04>A96 * Press EXECUTE to patch and flag (*) the control channel to the analog input.
D04<A96 * Press ESCAPE to toggle the pointer (< >) to select another analog input.

Press ESCAPE to exit the menu and save the desired analog patches.
Press RESET to exit the menu without saving.

The menu will automatically time out after 5 minutes of inactivity and save.

18. ANA TEST *View the control level for each of the analog inputs.*

The analog voltage level for the 4 analog inputs can be tested and viewed as a percentage of the incoming level. The level displayed is proportional to the 0-10VDC analog input where 5VDC is 50%.

Press EXECUTE to enter the menu and activate analog test mode.

A1 0% Displays the active analog input (A1) and the level (0%).
A1 0% Press MENU ( ) to select the desired analog input to test.
A1 100% Displays the analog input level from off (0%) to full-on (100%).

Press ESCAPE or RESET to exit the menu.

19. ANA BLOC *Enable or disable the analog inputs when DMX is being received.*

When analog blocking (ANA BLOC) is enabled, the analog inputs will be ignored when DMX is online. When analog blocking is disabled, the analog inputs will be merged/combined with the DMX inputs and functions in a highest-takes-precedence (HTP) mode of operation.

ENABLED Press EXECUTE to toggle analog blocking from ENABLED to DISABLED.
DISABLED Press EXECUTE to toggle analog blocking from DISABLED to ENABLED.

Any change in the configuration is automatically saved.

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.20. STANDBY *Enable or disable the power savings standby mode.*

When standby mode is enabled, the microcontroller goes to sleep within 5 seconds of inactivity on the control inputs. The microcontroller wakes up again when a programming switch is pressed or when control is sensed on the control inputs. Note that there is a delay of 150 milliseconds for the microcontroller to wake up and restart normal run mode.

ENABLED Press EXECUTE to toggle standby mode from ENABLED to DISABLED.

DISABLED Press EXECUTE to toggle standby mode from DISABLED to ENABLED.

Any change in the configuration is automatically saved.

21. S-ALARM *Select the level output and control channels triggered by the security alarm input.*

When a contact is sensed on the security alarm input, the selected control channels will cycle on and off at a 1 hertz rate. The level of the on cycle can be set from 0% to 100%. The security alarm input takes precedence over the DMX and analog inputs. The system will stay in security alarm mode until the contact is removed.

Press EXECUTE to enter the menu and configure the security alarm input.

C01>FL%* Displays the output level (L>FL) of 100% and control channel (01*).

C01>1%* Press MENU (⬍) to change the output level from 00% to 100% (FL).

C01>100* Press EXECUTE to toggle the pointer (>) and select the control channel(s).

C96>0%* Press MENU (⬍) to select the desired control channel from 01 to 96.

C96>FL% Press EXECUTE to toggle the flag (*) for each desired control channel.

Press ESCAPE to exit the menu and save the desired settings.

Press RESET to exit the menu without saving.

The menu will automatically time out after 5 minutes of inactivity and save.

NOTE: *In the case of Fire/Security, the output level for all the dimmers is set to FL (100%) by default. But only the dimmers 1-12 are activated for the alarm. Users must configure the dimmer assignment and adjust the levels if necessary.*

22. F-ALARM *Select the level and control channels triggered by the fire alarm input.*

When a contact is sensed on the fire alarm input, the selected control channels are triggered onto the selected output level from 0% to 100%. The fire alarm input is merged with the DMX and analog inputs with the highest takes precedence (HTP). The system will stay in fire alarm mode until the contact is removed.

Press EXECUTE to enter the menu and configure the fire alarm input.

C01>FL%* Displays the output level (L>FL) of 100% and control channel (01*).

C01>1%* Press MENU (⬍) to change the output level from 00% to 100% (FL).

C01>100* Press EXECUTE to toggle the pointer (>) and select the control channel(s).

C96>0%* Press MENU (⬍) to select the desired control channel from 01 to 96.

C96>FL% Press EXECUTE to toggle the flag (*) for each desired control channel.

Press ESCAPE to exit the menu and save the desired settings.

Press RESET to exit the menu without saving.

The menu will automatically time out after 5 minutes of inactivity and save.

NOTE: *In the case of Fire/Security, the output level for all the dimmers is set to FL (100%) by default. But only the dimmers 1-12 are activated for the alarm. Users must configure the dimmer assignment and adjust the levels if necessary.*

23. Ø-PATCH   *Set the zero-cross AC phase reference for each dimmer control output circuit.*

Strand CD80® dimmer racks are typically powered by 3-phase, with the dimmer phase reference configured for AABBCC (dimmers 1 through 4 are powered by phase A, dimmers 5 through 8 are powered by phase B, dimmers 9 through 12 are powered by phase C, etc.). The default (DEFAULTS) menu is normally used to configure the phase patch for standard applications. However, this menu provides custom phase patching for non-standard applications or customized dimmer rack configurations.

If a dimmer control output is patched to the incorrect phase reference, the dimmer will not dim correctly.

Press EXECUTE to enter the menu and configure the dimmer phase patch.

CH 01 ØA   Displays the dimmer output channel (CH 01) and patched Phase A (ØA).

CH 96 ØA   Press MENU (⬍) to change the dimmer output channel to patch from 01 to 96.

CH 96 ØB   Press EXECUTE to toggle the patch to Phase B (ØB).

CH 96 ØC   Press EXECUTE to toggle the patch to Phase C (ØC).

Press ESCAPE to exit the menu and save the desired settings.

Press RESET to exit the menu without saving.

The menu will automatically time out after 5 minutes of inactivity and save.

24. POLARITY   *View the PWM output control polarity as selected by dip switch on the 3000+ Control Module.*

CD-3000+AE systems utilize a standard PWM signal with a negative common. CD-3000+SV and CD-3000+C21 systems utilize an inverted PWM output with a positive common.

Press EXECUTE to view the polarity mode for which the CD-3000+ control module is configurered.

25. LINE V   *View the RMS line voltage for each power phase.*

Press EXECUTE to enter the menu and view the line voltage of each phase.

ØA=120.0   Shows the line voltage of Phase A.

ØB=120.0   Press MENU (⬆) to view the line voltage of Phase B.

ØC=120.0   Press MENU (⬆) to view the line voltage of Phase C.

Press ESCAPE or RESET to exit the menu.

26. LINE F   *View the line frequency of phase A.*

60.0 Hz   Shows the frequency.

27. CTL TEMP   *View the temperature of the microcontroller.*

+91°F   Shows the temperature in degrees Fahrenheit.

+33°C   Press EXECUTE to toggle units to degrees Celsius.

NOTE! The OT (over-temp) LED on the face panel of the 3000+ Control Module will flash at 70°C and turn the fans to full. If the temperature reaches 75°C, the LED will go solid red and all PWM output signals will be disabled until the temperature recovers into a safe range.

28. RTIME   *View the total run time of the microcontroller.*

The run time counter keeps track of the total time the microcontroller is powered up.

RTIME SS   Shows the number of seconds (SS) of run time.

HHHHH:MM   Shows the number of hours (HHHHH) and minutes (MM) of run time.

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29. HARD-KEY *View the microcontroller's unique six-character HARD-KEY code.*

3000+ Series retrofit control systems may be shipped with an invalid HARD-KEY code for new credit accounts or accounts with poor payment history. A valid HARD-KEY must be entered before the run time (RTIME) counter reaches 2160 hours (90 days). If the run time expires without a valid HARD-KEY all the LCD dimmer control outputs will be disabled until a valid HARD-KEY is entered into the system.

HARD-KEY VALID	On the LCD represents a valid HARD-KEY.
HARD-KEY ‾‾‾‾	On the LCD represents an invalid HARD-KEY.
[X]XXXXXX	Shows the unique six-character hard-key code (XXXXXX).
[X]XXXXXX	Follow the procedure below to enter the menu and modify the hard key.
[X]XXXXXX	A bracket indicates the character that is being modified.
[X]XXXXXX	Press MENU (⬍) to modify the first hard-key character.
X[X]XXXX	Press EXECUTE to advance to the second hard-key character.
[X]XXXXX	Press MENU (⬍) to modify the second hard-key character.
XX[X]XXX	Press EXECUTE to advance to the third hard-key character.
[X]XXXXX	Press MENU (⬍) to modify the third hard-key character.
XXX[X]XX	Press EXECUTE to advance to the fourth hard-key character.
[X]XXXXX	Press MENU (⬍) to modify the fourth hard-key character.
XXXX[X]X	Press EXECUTE to advance to the fifth hard-key character.
[X]XXXXX	Press MENU (⬍) to modify the fifth hard-key character.
[X]XXXXX	Press EXECUTE to advance to the sixth hard-key character.
XXXXX[X]	Press MENU (⬍) to modify the sixth hard-key character.
XXXXXX	Press EXECUTE to apply the HARDKEY code.
DISABLED	Upon the entry of valid HARDKEY code, this menu option will be indefinitely disabled.
[X]XXXXX	Upon the entry of invalid HARDKEY code, user needs to repeat the attempt.
	Press ESCAPE to exit the menu and save the desired hard-key code.
	Press RESET to exit the menu without saving.

NOTE: Be sure to record and file the hard-key code on page 42 for future reference.

30. SERIAL# *View the microcontroller's unique six-character silicone serial number.*

XXXXXX Shows the unique six-character serial number. Please provide this number when contacting the factory for any reason.

31. VERSION *View the microcontroller's software version.*

VER X.X Shows the microcontroller's software version.

WARNING! Firmware upgrades MUST be done via the USB-C Tech Port.

32. RESTORE *Restore configuration parameters saved in the EEPROM memory module.*

All the configuration setting parameters can be restored from the EEPROM memory module if they have been inadvertently changed or corrupted. This feature can also be used to load configuration setting parameters into a different or new control module. This reduces the configuration time for multi-system applications that require similar settings or when a replacement control module is required.

Press EXECUTE to enter the menu.

PROCEED?	Press EXECUTE to proceed.
SURE ???	Press EXECUTE to proceed.
WAIT!	Will display when a BACKUP attempt is in progress.
DONE!!	Displays on the LCD for 2 seconds to confirm the RESTORE from EEPROM.
	All the added notes from BACKUP.

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33. BACKUP   *Backup configuration parameters to EEPROM memory module.*

All the configuration setting parameters can be backed up to the EEPROM memory module for ease of restoring later. This feature can also be used to load configuration setting parameters into a different or new control module. This reduces the configuration time for multi-system applications that require similar settings on multiple CD-3000+ control modules or when a replacement control module is required.

Press EXECUTE to enter the menu.

SURE ???   A secondary security command is required for this function as an over-write of all EEPROM memory will occur. Press EXECUTE to proceed.

WAIT!   Will display when a BACKUP attempt is in progress.

DONE!!   Displays on the LCD for 2 seconds to confirm the BACKUP to EEPROM.

MEM ERR!   Will display if the BACKUP attempt fails or the EEPROM module is not inserted. Check for the EEPROM module and repeat.

NOTE: *It is always recommended to BACKUP all CD-3000+ Series retrofit control systems when configuration is complete.*

34. PRINTOUT   *Print various system configuration settings using a handheld infrared printer.*

All CD-3000+ Series retrofit control systems come equipped with an infrared (I/R) LED that provides the ability to print out all the system configuration settings when used in conjunction with a handheld infrared printer (Johnson System Inc., Part Number: JS-IP). Point the handheld printer I/R LED directly at the CD-3000+ Control Module PRINTER I/R LED within 3 ft (1m).

Press EXECUTE to enter the menu.

Press MENU ( ) to scroll through and select which item(s) to print out.

SYSTEM?   Prints general system information and configuration settings.

ANALOGS?   Prints the channel patch for all 4 analog inputs.

PH-PATCH?   Prints the phase patch for all 96 dimmer outputs.

CURVES?   Prints the dimmer curves for all 96 dimmer outputs.

F-ALARM?   Prints the configuration settings for the fire alarm input.

S-ALARM?   Prints the configuration settings for the security alarm input.

DCPATCH?   Prints the configuration settings for the dimmer to channel patch.

2 ROOM?   Prints the two-room assignment for each of the 96 dimmer outputs.

DMXAPAT?   Prints the DMX A patch for each of the 96 dimmer outputs.

DMXBPAT?   Prints the DMX B patch for each of the 96 dimmer outputs.

ND-LEVEL   Prints the non-dim trigger level threshold setting for each of the 96 dimmer outputs.

PRINTING   Press EXECUTE on any item to begin printing.

Press ESCAPE or RESET to exit the menu.

35. DEFAULTS   *Set various system configuration settings to the factory default.*

Press EXECUTE to enter the menu.

Press MENU (⬍) to scroll through and select which item(s) to default.

3-PHASE?   Sets the dimmer phase patch to AABBCC. **This is the factory default setting.**

1-PHASE?   Sets the dimmer phase patch to AAAAAA.

CURVES?   Sets all 96 dimmer curve profiles to Direct Drive digital curve.

ALL DD?   Press MENU (⬍) to toggle between the different curves.

ANA-OFF?   Clears the control channel patch for all 4 analog inputs.

DC-PATCH?   Clears the dimmer to channel patch and configures it for 1:1 operation.

2 ROOM?   Sets the two-room assignment to room "A" on all 96 dimmer outputs.

ND-LEVEL   Sets the non-dim trigger level threshold to 10% on all 96 dimmer outputs.

SURE???   Press EXECUTE to select the item to default. Are you sure?

DONE!!!   Press EXECUTE to set the selected default.

Press ESCAPE or RESET to exit the menu.

36. LCD VIEW   *Adjust the contrast of the LCD Display for optimum viewing.*

Press EXECUTE to enter the menu.

ADJUST   Press MENU (⬍) to adjust the contrast.

Press ESCAPE to exit the menu and save the desired LCD view.

Press RESET to exit the menu without saving.

The menu will automatically time out after 5 minutes of inactivity and save.

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Important Hard-key Information

CD-3000+ Series retrofit systems may be shipped with an invalid hard key code of 000000. A valid hard key must be entered before the run time (RTIME) counter reaches 2160 hours / 90 days. If the run time expires without a valid hard key, the LCD will show a runtime counter error (RTC ERR!) and all dimmer control outputs will be disabled.

Refer to the menu item "HARD-KEY" on page 42 of the user manual for detailed instructions on how to enter a valid hard-key code.

Manufacturing Madness!

**This manual is accurate at time of printing
and subject to revisions and technical updates
as required without prior notice.**

Please visit www.johnsonsystems.com for applicable updates.

User Manual
CD-3000+ Series Retrofit Control System
Rev 12

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