K-12 SCHOOL DESIGN & APPLICATIONS GUIDE
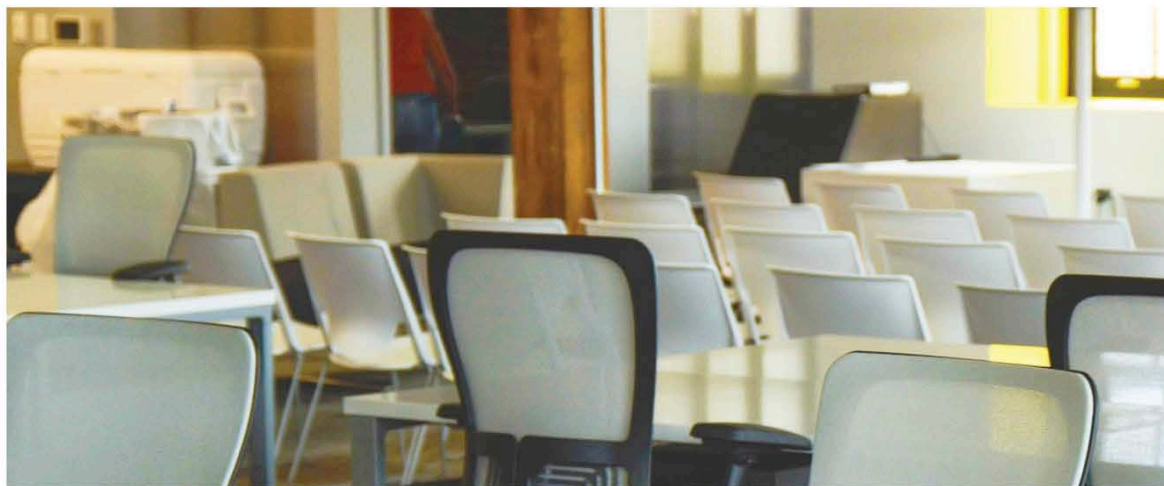
avi-on®

Bluetooth® Lighting Controls

TABLE OF CONTENTS

Non-Energy Benefits (NEBs)

Transforming the Learning Atmosphere

Immersing students in an environment of innovation, the combination of LED lighting and cutting-edge lighting controls optimizes learning environments for improved testing, reading, and concentration, as well as bolstering productivity, health, and well-being for both students and staff.

Embracing Flexibility & Adaptability

Avi-on Lighting Controls not only deliver the right amount of light precisely when needed but also offer dynamic adjustments for luminaire color temperature and light intensities throughout the day.

Adaptability is the key to future-ready classrooms. Imagine transforming today's standard classroom, into a dynamic space equipped for the future with LED lighting. Our innovative lighting controls pave the way for this evolution, ensuring that your learning spaces can seamlessly transition into specialized environments, meeting the unique needs of tomorrow's education landscape.

Studies reveal that controls, by producing light with cooler, bluer color temperatures and higher intensity, emulate the invigorating quality of the sun's daylight. This deliberate approach induces the release of neurotransmitters—dopamine, endorphins, and cortisol—enhancing students' cognitive functions while suppressing melatonin. The result? Elevated visual acuity and heightened mental focus for an enriched learning experience.

As the day winds down, our controls continue to create an atmosphere that fosters tranquility. By lowering the color temperature to a more soothing, yellowish tone and gently dimming the light, we mimic the serene spectrum of a sunset. This intentional modulation prompts calmer moods by naturally inducing melatonin, providing an ideal ambiance for relaxation and reflection.

Empowering Educators with Classroom Lighting Controls

With features like preset light levels and scene settings, educators can effortlessly recall their preferred light settings at the press of a button. Whether it's crafting an atmosphere conducive to testing, creating an engaging presentation setting, or facilitating various learning scenarios, the control is firmly in the hands of the educators.

A Commitment to Sustainability

Aligning with the sustainability goals of school districts, Avi-on lighting controls demonstrate a commitment to a cleaner environment. They not only transform the learning environment but also showcase the dedication of both educators and students to a more sustainable future.

Energy Efficiency & Operating Expenses

Maximize Savings on Energy Costs
Discover the significant energy-saving potential of Luminaire Level Lighting Controls (LLLC). A study by DLC reveals that LLLC can cut energy consumption by an impressive 63% compared to LED lighting without controls.

Illuminate Efficiency with Network Lighting Controls
In education buildings, lighting, cooling, and heating contribute to almost 70% of electricity usage. According to the U.S. Energy Information Administration, lighting alone accounts for nearly 25% of total energy consumption [source: https://www.eia.gov/consumption/commercial/data/2018/].

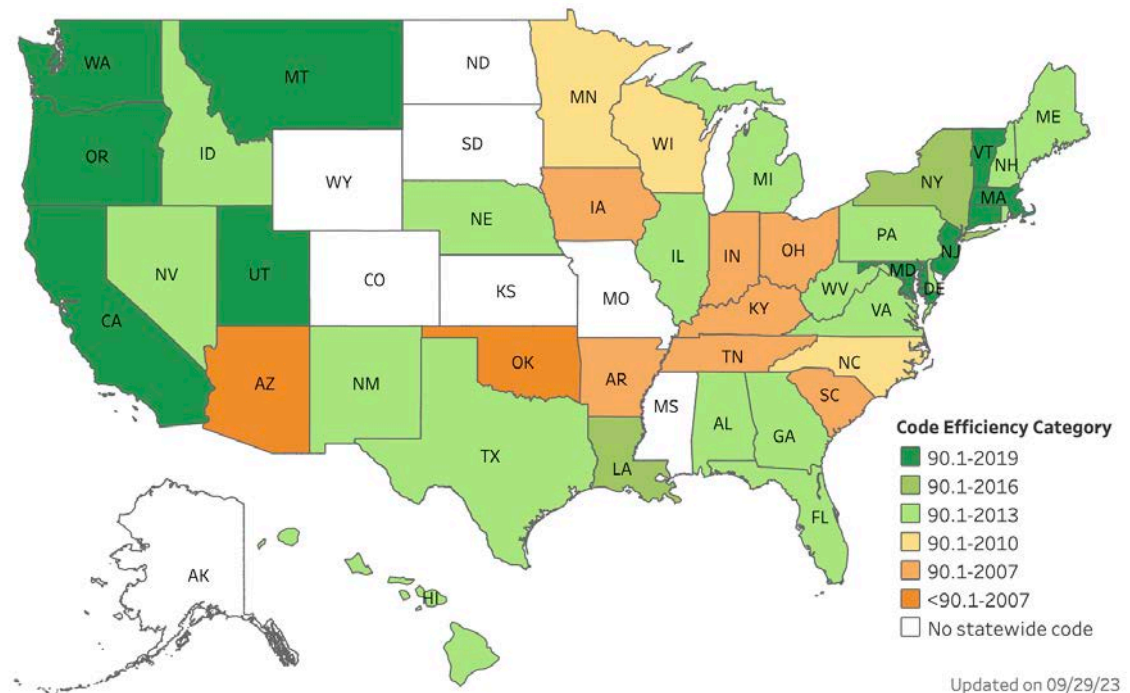**Stay Code Compliant for Efficiency**
Building energy codes set the standards for energy-efficient commercial designs. Recent versions of IECC, ASHRAE 90.1, and California Title 24 have driven the shift to Network Lighting Controls, rendering traditional controls obsolete.

Cut Maintenance Costs and Boost Budgets
K-12 schools often face limited funds, making maintenance a challenge. Lighting Controls help extend the life of LED lighting, freeing up funds for crucial activities like classroom renovations, security enhancements, and equipment purchases. Avi-on's platform offers cost-effective remote programming and support, saving time and resources.

Unlock Utility Rebates with Network Lighting Controls
Avi-on Lighting Controls qualify for the highest tiers of utility rebates. More utility companies now offer rebates, and Avi-on can guide you on obtaining additional information. Boost your energy efficiency and financial savings today!

Code Efficiency Category
- 90.1-2019
- 90.1-2016
- 90.1-2013
- 90.1-2010
- 90.1-2007
- <90.1-2007
- No statewide code

Updated on 09/29/23

https://www.energycodes.gov/state-portal

ENERGY **SAVINGS**

Lighting Control Strategies

Occupancy/Vacancy Sensing turns lights on when occupants are in a space and off when they vacate the space.

Daylight Harvesting dims electric lights when daylight is available to light the space.

Scheduling provides scheduled changes in light levels based on the time of day.

Load Shedding automatically reduces lighting loads during peak electricity usage times.

High-End Trim/Tuning sets the maximum light level based on customer requirements in each space.

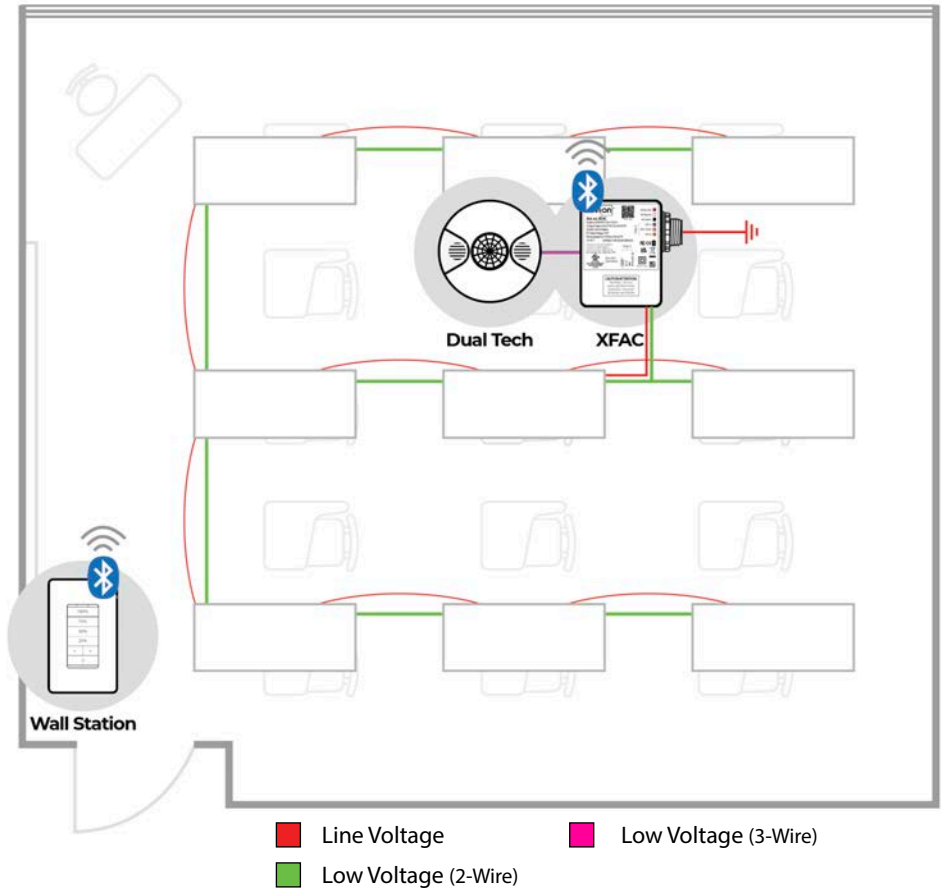**Personal Dimming Control** gives occupants the ability to set the light level.

HVAC Integration controls heating, ventilation, and air conditioning systems through a contact closure.

Color Tuning gives occupants the ability to manually dim light level and/or switch on/off.

Zonal Controls

Line Voltage

Low Voltage (2-Wire)

Low Voltage (3-Wire)

Wall Station

Dual Tech XFAC

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-XFAC-16A-1CH-CL1	16A external mount zone controller, 1-10v dimming	120~277VAC	1
	AVI-SEN-DUCM-24	Dual Technology, Ceiling mount occupancy sensor	24VDC	1
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	1

Note: See __LTE Bridge__ for installation and support instructions.

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on the lights
- Occupants use the wall dimmer to set desired light levels for all lights. The top 4 buttons recall specific light levels (100%-75%-50%-25%). Pressing and holding the 'raise/lower' buttons will further refine the light level, and the 'OFF' button will turn off all lights
- By default, the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized

Once the space is occupied,
- Upon detecting motion, the occupancy sensor keeps the lights on as long as motion is detected

Upon leaving the room,
- All lights automatically turn off after 20 minutes* or can be configured to drop to a low dim setting like 20%* for 5 minutes* before turning off after the last motion is detected

configurable values

CONTROL STRATEGIES

Occupancy/Vacancy Sensing

Hi/Low/Off

High-End Trim

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and **controlled as one group** using a junction box mounted power pack

- Occupancy Sensor is **ceiling mounted** (center of the room)

Hybrid Controls

| Line Voltage | | Direct Connect |
| Low Voltage | | To Panel |

Symbol	Part #	Description	Input Voltage	QTY
	AVI-LVFA-1CH or AVI-IFAC-5A	low voltage internal fixture adapter, 0-10v (dim-to-off) driver or* 5A internal fixture adapter, 1-10v driver, or…	12~24VDC or 120~277VAC	9
	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	1-2**
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	1

Note: *See* **LTE Bridge** *for installation and support instructions.*

*Depends on driver
**Depends on room dimensions

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on the lights
- Occupant use the wall dimmer to set desired light levels for all lights. The top 4 buttons recalls specific light levels (100%-75%-50%-25%). Pressing and holding the 'raise/lower' buttons will further refine the light level and the 'OFF" button will turn off all lights
- By default, the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized

Once the space is occupied,
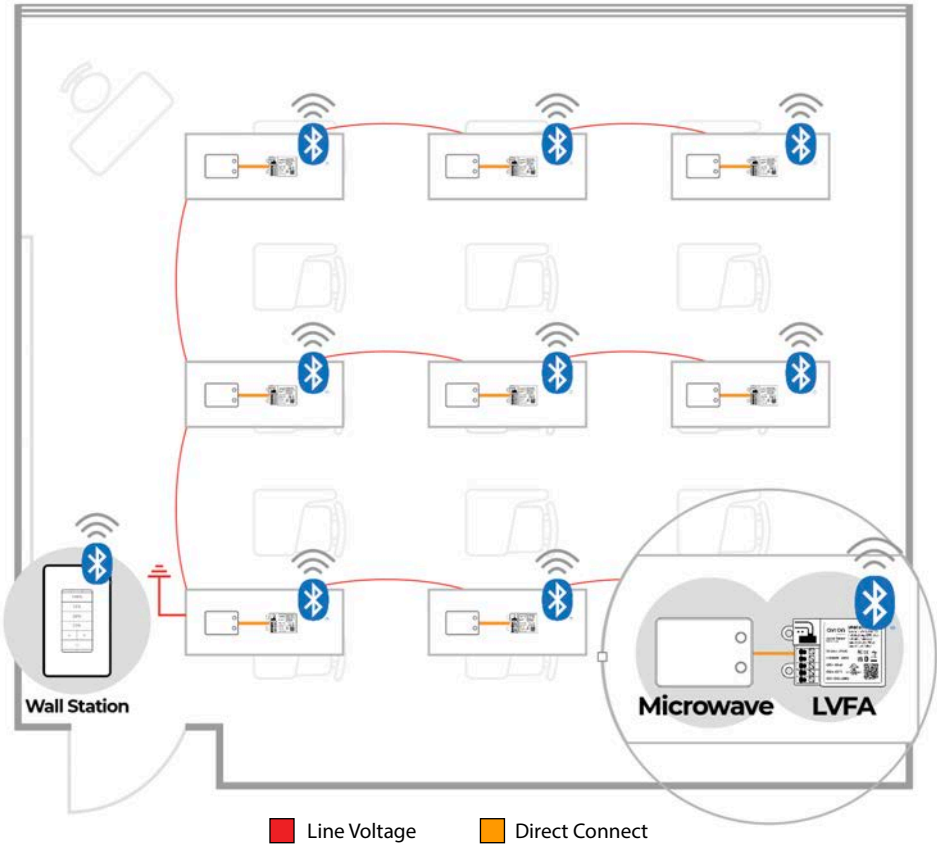- Upon detecting motion, the occupancy sensor keeps the lights on as long as motion is detected

Upon leaving the room,
- All lights automatically turn off after 20min* or can be configured to drop to a low dim setting like 20%* for 5min* before turning off after the last motion is detected

*configurable values

CONTROL STRATEGIES

- Occupancy/Vacancy Sensing
- High-End Trim

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and can be controlled **individually or as a group** using fixture integrated controllers
- Occupancy Sensors are **ceiling mounted** (center of the room and near teacher's desk)

LLLC Controls

Wall Station

Microwave   LVFA

- 🟥 Line Voltage
- 🟧 Direct Connect

CONTROL STRATEGIES

- Occupancy/Vacancy Sensing
- High-End Trim

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and **individually controllable** using fixture integrated controllers

- All occupancy sensors are **fixture integrated**

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-LVFA-1CH or AVI-IFAC-5A	low voltage internal fixture adapter, 0-10v (dim-to-off) driver or* 5A internal fixture adapter, 1-10v driver, or…	12~24VDC or 120~277VAC	9
	AVI-DC-MW	Microwave, fixture mount occupancy sensor	24VDC	9
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	1

Note: See __LTE Bridge__ for installation and support instructions.   *Depends on driver

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on the lights.
- Occupant use the wall dimmer to set desired light levels for all lights. The top 4 buttons recalls specific light levels (100%-75%-50%-25%). Pressing and holding the 'raise/lower' buttons will further refine the light level and the 'OFF" button will turn off all lights.
- By default, the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized

Once the space is occupied,
- Upon detecting motion, the occupancy sensor keeps the lights on as long as motion is detected
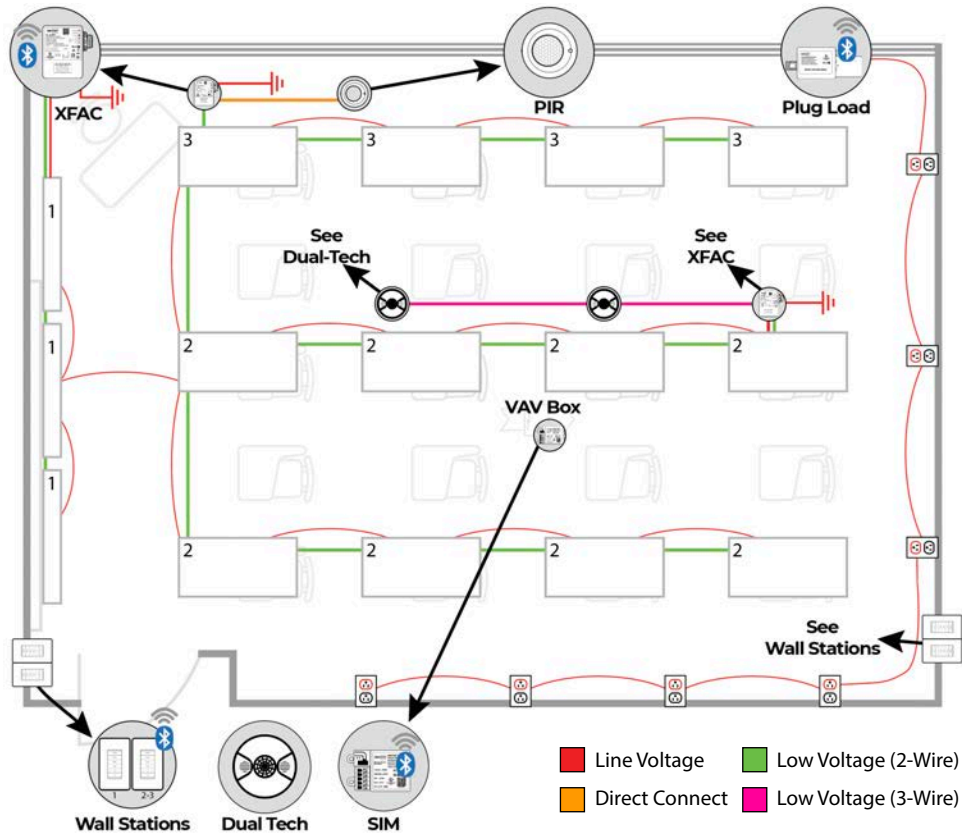
Upon leaving the room,
- All lights automatically turn off after 20min* or can be configured to drop to a low dim setting like 20%* for 5min* before turning off after the last motion is detected

*configurable values

LARGE-SIZE **CLASSROOM**

Zonal Controls

Wall Stations   **Dual Tech**   **SIM**

🟥 Line Voltage	🟩 Low Voltage (2-Wire)
🟧 Direct Connect	🟪 Low Voltage (3-Wire)

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-XFAC-16A-1CH-CL1	16A external mount zone controller, 1-10v dimming	120~277VAC	3
	AVI-SEN-DUCM-24	Dual Technology, Ceiling mount occupancy sensor	24VDC	2
	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	1
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	2 or 4*
	AVI-XPLC-20A	Plug Load Controller, 20A	120~277VAC	1
	AVI-SIM-12-24VDC-EA	Sensor Input Module (used to control the VAV box)	12~24VDC	1

Note: *See **LTE Bridge** for installation and support instructions.*

*Depends on entrances

CONTROL STRATEGIES

- Occupancy/Vacancy sensing
- High-End Trim
- Daylight Harvesting
- Plug Load Control
- VAV box Control

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and **controlled in groups** (3 total) using a junction box mounted power pack

- Occupancy & Daylighting Sensors are **ceiling mounted**

- Half receptacles are **controlled as a group** using a junction mount plug load controller

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on the lights for the white board (1) and general lighting (2 & 3)
- Receptacles (half) will be automatically energized upon sensor detection
- Occupant use the wall dimmer to set desired light levels for all lights
- VAV box turns to a high level (lower temperature)
- By default, the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized
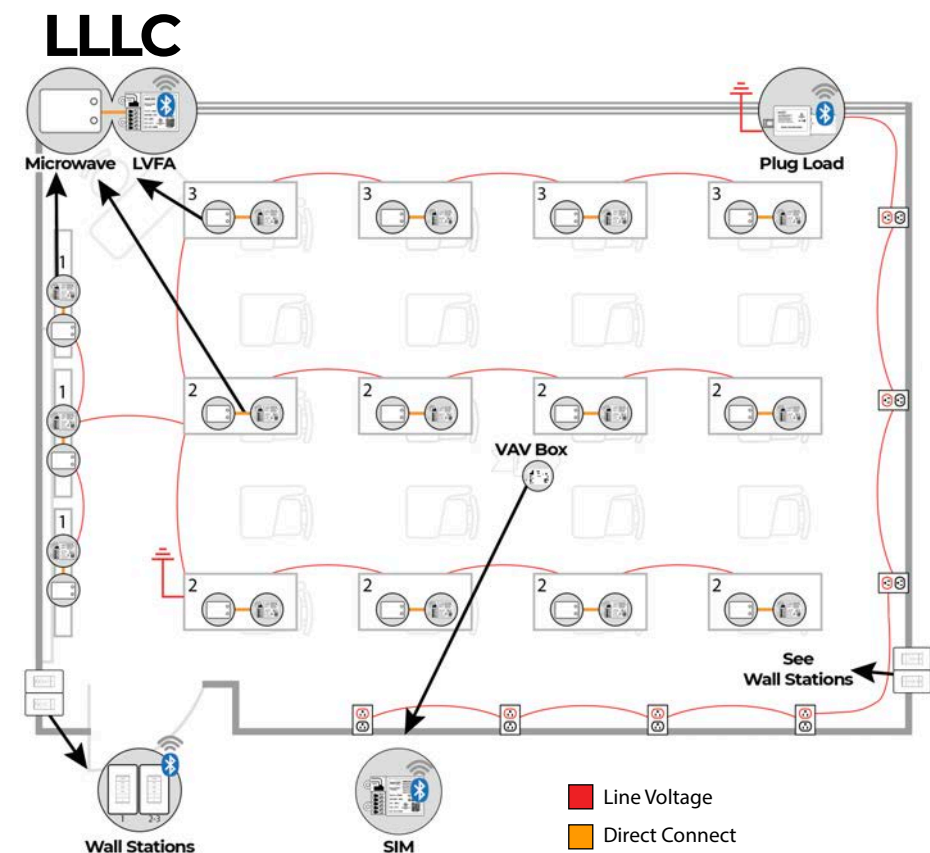
Once the space is occupied,
- Upon detecting motion, the occupancy sensor will keep all lights on as long as motion is detected
- All (4) fixtures in the daylighting zone (DZ1) will automatically dim/brighten based on how much daylight is in the room

Upon leaving the room,
- All lights will automatically turn off after 20min (by default) after the last motion is detected and receptacles (half) will be de-energized
- VAV box goes to a low level (higher temperature)

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Bluetooth® Lighting Controls

LARGE-SIZE **CLASSROOM**

Hybrid Controls

Line Voltage
Direct Connect

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-LVFA-1CH or AVI-IFAC-5A	low voltage internal fixture adapter, 0-10v (dim-to-off) driver or* 5A internal fixture adapter, 1-10v driver, or…	12~24VDC or 120~277VAC	15
	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	3
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	2 or 4*
	AVI-XPLC-20A	Plug Load Controller, 20A	120~277VAC	1
	AVI-SIM-12-24VDC-EA	Sensor Input Module (used to control the VAV box)	12~24VDC	1

Note: *See __LTE Bridge__ for installation and support instructions.*   *Depends on entrances*

CONTROL STRATEGIES

- Occupancy/Vacancy sensing
- High-End Trim
- Daylight Harvesting
- Plug Load Control
- VAV box Control

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and **individually controllable** using fixture integrated controllers
- Occupancy & Daylighting Sensors are **ceiling mounted**
- Half receptacles are controlled as a group using a **junction mount plug load controller**

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on the lights for the white board (1) and general lighting (2 & 3)
- Receptacles (half) will be automatically energized upon sensor detection
- Occupant use the wall dimmer to set desired light levels for all lights
- VAV box turns to a high level (lower temperature)
- By default, the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized
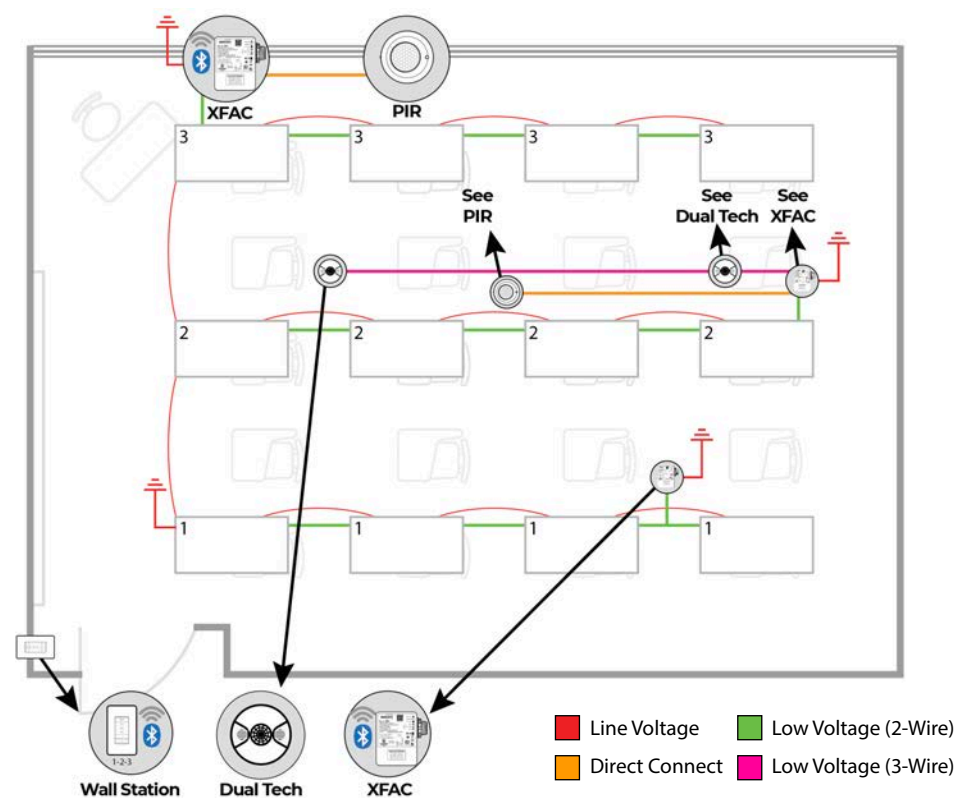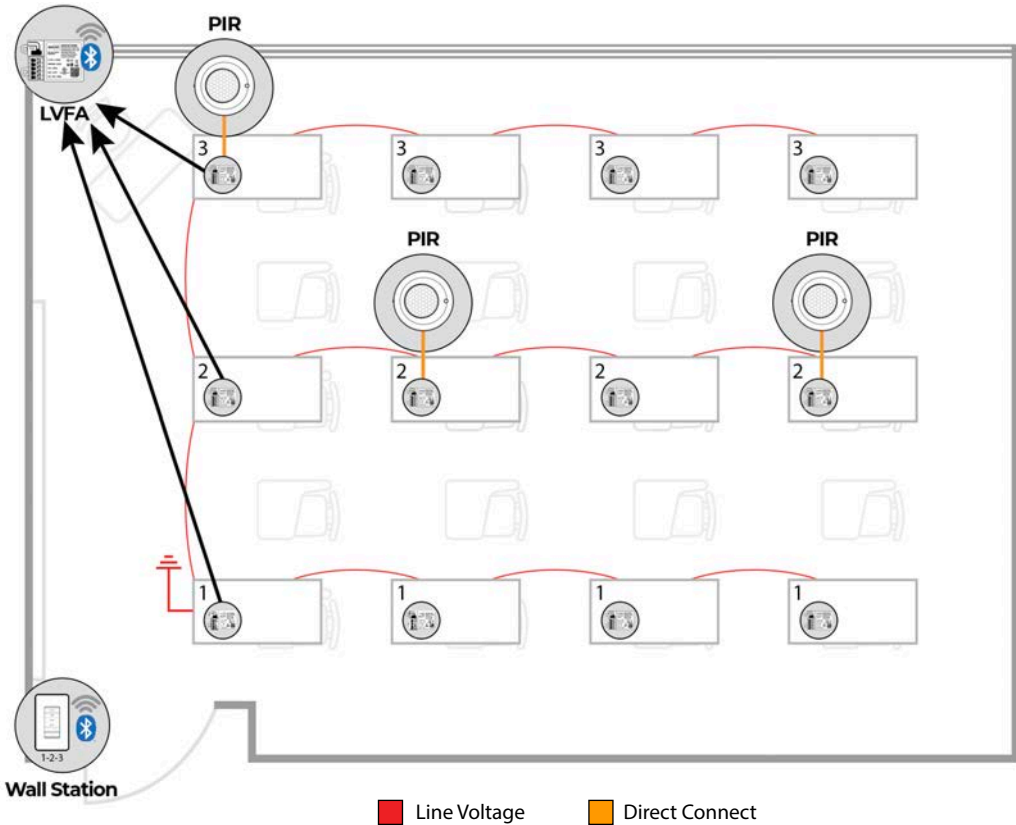
Once the space is occupied,
- Upon detecting motion, the occupancy sensor will keep all lights on as long as motion is detected
- All (4) fixtures in the daylighting zone (DZ1) will automatically dim/brighten based on how much daylight is in the room

Upon leaving the room,
- All lights will automatically turn off after 20min (by default) after the last motion is detected and receptacles (half) will be de-energized
- VAV box goes to a low level (higher temperature)

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LARGE-SIZE **CLASSROOM**

LLLC

Line Voltage
Direct Connect

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-LVFA-1CH or AVI-IFAC-5A	low voltage internal fixture adapter, 0-10v (dim-to-off) driver or* 5A internal fixture adapter, 1-10v driver, or…	12~24VDC or 120~277VAC	15
	AVI-DC-MW	Microwave, fixture mount occupancy sensor	24VDC	15
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	2 or 4*
	AVI-XPLC-20A	Plug Load Controller, 20A	120~277VAC	1
	AVI-SIM-12-24VDC-EA	Sensor Input Module (used to control the VAV box)	12~24VDC	1

Note: *See **LTE Bridge** for installation and support instructions.*   **Depends on entrances*

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on the lights for the white board (1) and general lighting (2 & 3)
- Receptacles (half) will be automatically energized upon sensor detection
- Occupant use the wall dimmer to set desired light levels for all lights
- VAV box turns to a high level (lower temperature)
- By default, the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized

Once the space is occupied,
- Upon detecting motion, the occupancy sensor will keep all lights on as long as motion is detected
- All (4) fixtures in the daylighting zone (DZ1) will automatically dim/brighten based on how much daylight is in the room

Upon leaving the room,
- All lights will automatically turn off after 20min (by default) after the last motion is detected and receptacles (half) will be de-energized
- VAV box goes to a low level (higher temperature)

CONTROL STRATEGIES

- Occupancy/Vacancy sensing
- High-End Trim
- Daylight Harvesting
- Plug Load Control
- VAV box Control

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and **individually controllable** using fixture integrated controllers

- Occupancy & Daylighting Sensors are **fixture integrated**

- Half receptacles are controlled as a group using a **junction mount plug load controller**

Zonal Controls

Legend:
- ■ Line Voltage
- ■ Direct Connect
- ■ Low Voltage (2-Wire)
- ■ Low Voltage (3-Wire)

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-XFAC-16A-1CH-CL1	16A external mount zone controller, 1-10v dimming	120~277VAC	3
	AVI-SEN-DUCM-24	Dual Technology, Ceiling mount occupancy sensor	24VDC	2
	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	2
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	1

Note: *See* **LTE Bridge** *for installation and support instructions.*

CONTROL STRATEGIES

- Occupancy/Vacancy sensing
- High-End Trim
- Daylight Harvesting

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and **controlled in groups** (3 total) using junction box mounted power packs
- Occupancy & Daylighting Sensors are **ceiling mounted**
- DZ sensors should be placed inside each daylighting zone
- Occupancy sensors should be spread out and at least 6ft away from air ducts

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on all 12 lights
- Occupant use the wall dimmer to set desired light levels for all lights
- **By default,** the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized

Once the space is occupied,
- Upon detecting motion, the occupancy sensor will keep all lights on as long as motion is detected
- All (4) fixtures in the daylighting zone (DZ1) will automatically dim/brighten based on how much daylight is in DZ1. Similarly, all (4) fixtures in the daylighting zone (DZ2) will also automatically dim/brighten independently of DZ1 based on how much daylight is in DZ2
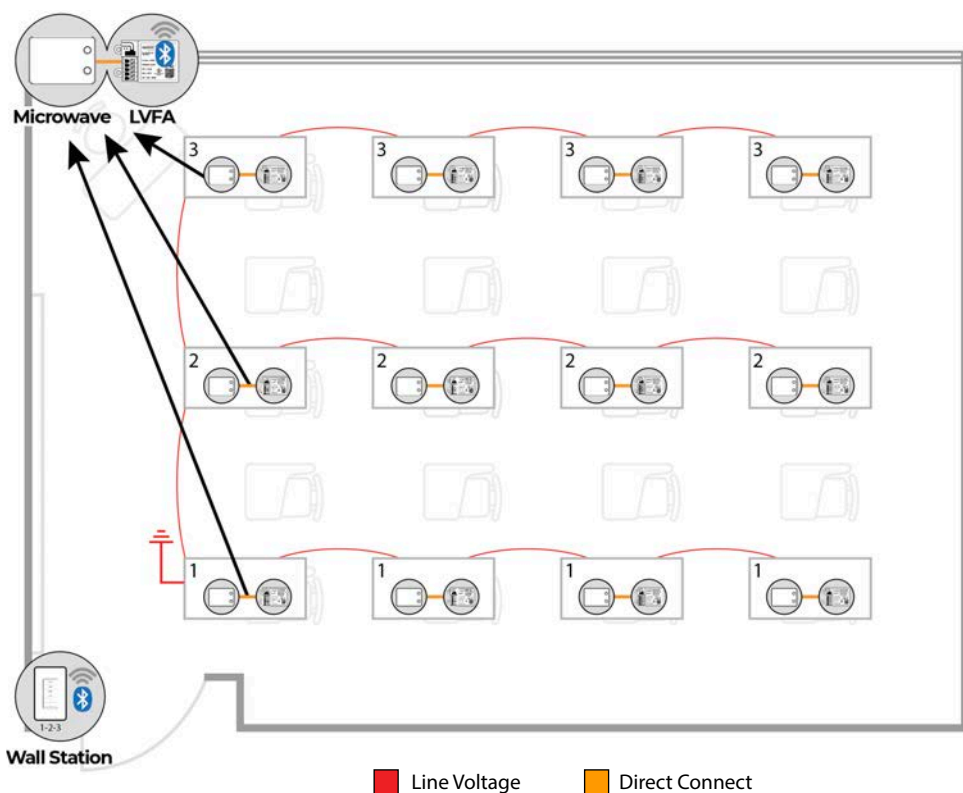- Occupants can temporarily override daylighting level using the raise/lower buttons on the wall station. The override period can a fixed time (configurable) or would last until 20min after the last detection

Upon leaving the room,
- All lights automatically turn off after 20min* or can be configured to drop to a low dim setting like 20%* for 5min* before turning off after the last motion is detected.

configurable values

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Hybrid Controls

Line Voltage   Direct Connect

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-LVFA-1CH or AVI-IFAC-5A	low voltage internal fixture adapter, 0-10v (dim-to-off) driver or* 5A internal fixture adapter, 1-10v driver, or…	12~24VDC or 120~277VAC	12
	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	3
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	1

Note: See **LTE Bridge** for installation and support instructions.

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on the lights (1, 2 & 3)
- Occupant use the wall dimmer to set desired light levels for all lights
- By default, the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized

Once the space is occupied,
- Upon detecting motion, the occupancy sensor will keep all lights on as long as motion is detected
- All (4) fixtures in the daylighting zone (DZ1) will automatically dim/brighten based on how much daylight is in DZ1. Similarly, all (4) fixtures in the daylighting zone (DZ2) will also automatically dim/brighten independently of DZ1 based on how much daylight is in DZ2
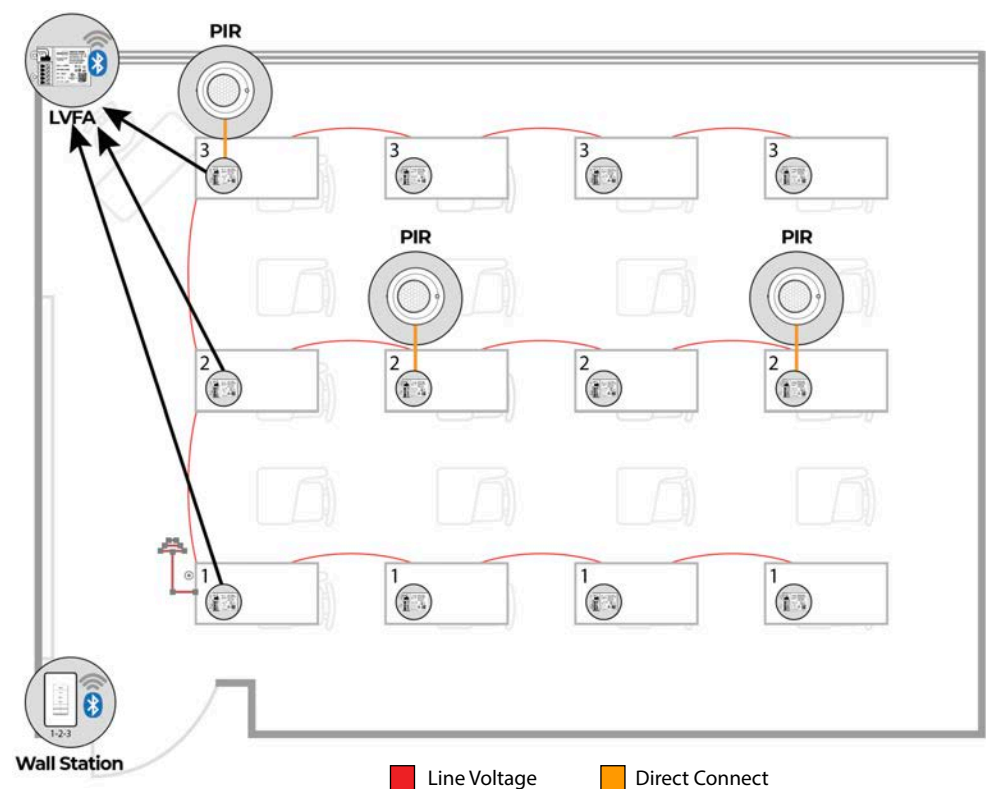
Upon leaving the room,
- All lights automatically turn off after 20min* or can be configured to drop to a low dim setting like 20%* for 5min* before turning off after the last motion is detected

configurable values

CONTROL STRATEGIES

- Occupancy/Vacancy sensing
- High-End Trim
- Daylight Harvesting

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and **individually controllable** using fixture integrated controllers

- Occupancy & Daylighting Sensors are **ceiling mounted**

LARGE-SIZE **CLASSROOM** Code Compliance

LLLC

Microwave   LVFA

Wall Station

■ Line Voltage   ■ Direct Connect

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-LVFA-1CH or AVI-IFAC-5A	low voltage internal fixture adapter, 0-10v (dim-to-off) driver or* 5A internal fixture adapter, 1-10v driver, or…	12~24VDC or 120~277VAC	12
	AVI-DC-MW	Microwave, fixture mount occupancy sensor	24VDC	12
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	1

Note: See **LTE Bridge** for installation and support instructions.

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on the lights (1, 2 & 3)
- Occupant use the wall dimmer to set desired light levels for all lights
- By default, the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized
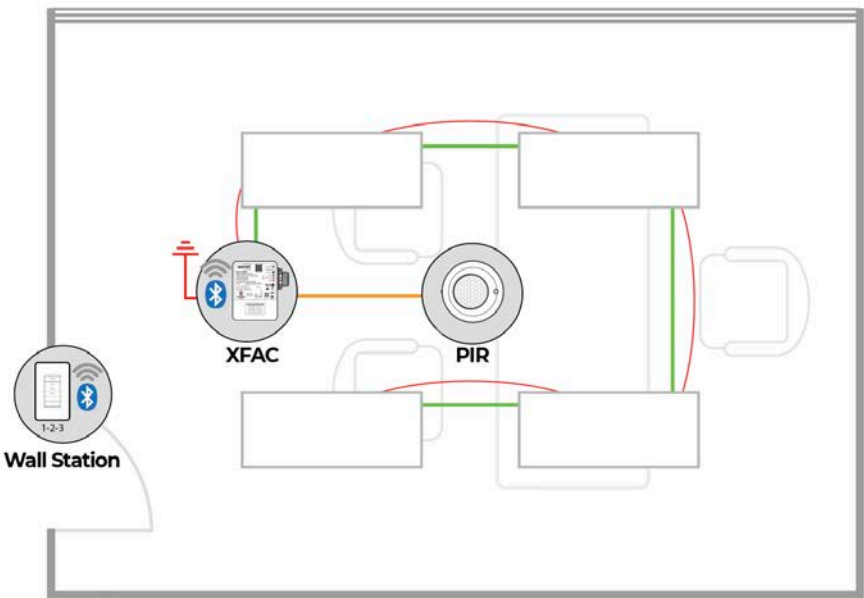
Once the space is occupied,
- Upon detecting motion, the occupancy sensor will keep all lights on as long as motion is detected
- All (4) fixtures in the daylighting zone (DZ1) will automatically dim/brighten based on how much daylight is in DZ1. Similarly, all (4) fixtures in the daylighting zone (DZ2) will also automatically dim/brighten independently of DZ1 based on how much daylight is in DZ2

Upon leaving the room,
- All lights automatically turn off after 20min* or can be configured to drop to a low dim setting like 20%* for 5min* before turning off after the last motion is detected

configurable values

CONTROL STRATEGIES

- Occupancy/Vacancy sensing
- High-End Trim
- Daylight Harvesting

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and **individually controllable** using fixture integrated controllers
- Occupancy & Daylighting Sensors are **fixture integrated**

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Hybrid Controls

| Line Voltage | Direct Connect |

Example CCT Schedule

6am-8am: 2,700K	**10am-2pm**: 5,000K	**4pm-6pm**: 2,700K
8am-10am: 3,500K	**2pm-4pm**: 3,500K	

CONTROL STRATEGIES

- Occupancy/Vacancy sensing
- High-End Trim
- Daylight Harvesting
- Automated Tunable White

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and **individually controllable** using fixture integrated controllers
- Occupancy & Daylighting Sensors are **ceiling mounted**

BILL OF MATERIALS

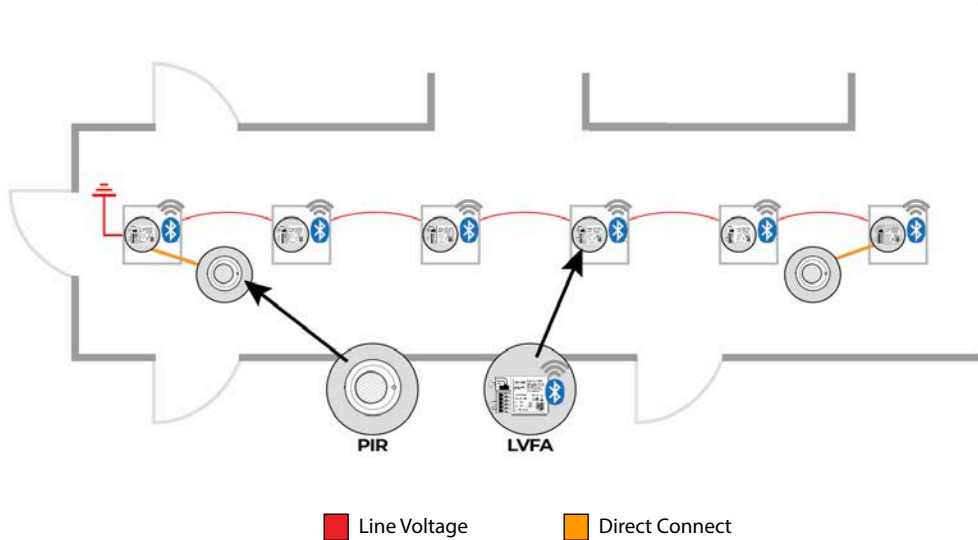| Symbol	Part #	Description	Input Voltage	QTY
	AVI-LVFA-1CH or AVI-IFAC-5A	low voltage internal fixture adapter, 0-10v (dim-to-off) driver or* 5A internal fixture adapter, 1-10v driver, or…	12~24VDC or 120~277VAC	12
	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	3
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	1

Note: See **LTE Bridge** for installation and support instructions.

SEQUENCE OF OPERATIONS

Upon entering the room,
- A schedule with automatically change the color temperature (CCT) throughout the day intending to follow circadian rhythm ltg'. CCT will vary from warm about 2700K to 6500K
- Lights will turn on automatically when any occupancy sensor detects motion (default mode) and go to the scheduled CCT based on time of the day/night
- By default, the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized.

Once the space is occupied,
- Upon detecting motion, the occupancy sensor will keep the all lights on
- The lights in the top row by the window (primarily daylighting zone 1-DL1) will automatically dim/brighten based on how much daylight is in the room aiming to maintain 35fc of light at the desk level in this zone. Similarly lights in secondary daylighting zone-DL2 will aim to remain around 35fc based on natural light contribution
- Occupants can temporarily override the CCT by pressing any of the 4 CCT preset buttons on the wall station. The manual override will last until the next schedule transition time
- Similarly, occupants can temporarily override the light level by using the arrow up/down button to brighten/dim the lights. Lights will stay at that level until the next schedule transition or will return to last state after the sensor time delay times out (space is vacant) and someone returns into the classroom

Upon leaving the room,
- All lights automatically turn off after 20min* or can be configured to drop to a low dim setting like 20%* for 5min* before turning off after the last motion is detected

configurable values

Zonal Controls

XFAC   **PIR**

1-2-3
Wall Station

🟥 Line Voltage	🟩 Low Voltage (2-Wire)
🟧 Direct Connect	

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-XFAC-16A-1CH-CL1	16A external mount zone controller, 1-10v dimming	120~277VAC	3
	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	2
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	1

Note: *See* **LTE Bridge** *for installation and support instructions.*

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on all 12 lights
- Occupant use the wall dimmer to set desired light levels for all lights
- **By default,** the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized

Once the space is occupied,
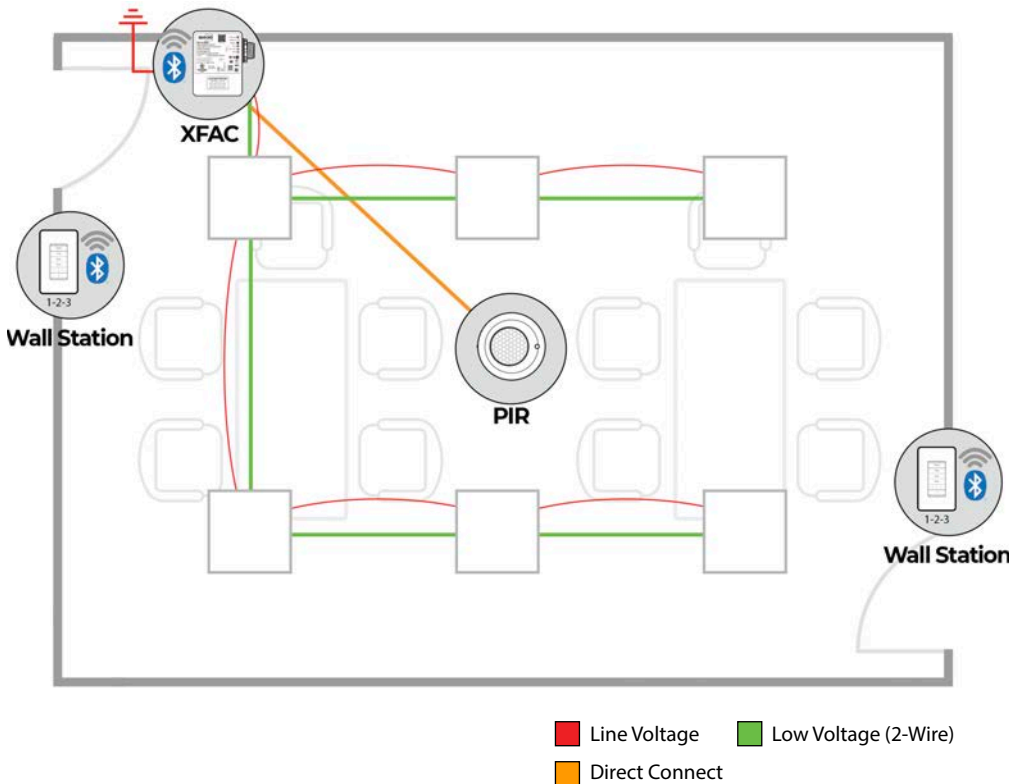- Upon detecting motion, the occupancy sensor will keep all lights on as long as motion is detected
- All (4) fixtures in the daylighting zone (DZ1) will automatically dim/brighten based on how much daylight is in DZ1. Similarly, all (4) fixtures in the daylighting zone (DZ2) will also automatically dim/brighten independently of DZ1 based on how much daylight is in DZ2
- Occupants can temporarily override daylighting level using the raise/lower buttons on the wall station. The override period can a fixed time (configurable) or would last until 20min after the last detection

Upon leaving the room,
- All lights automatically turn off after 20min* or can be configured to drop to a low dim setting like 20%* for 5min* before turning off after the last motion is detected.

configurable values

CONTROL STRATEGIES

🚶 Occupancy/Vacancy sensing

💡 High-End Trim

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and **controlled as one group** using a junction box mounted power pack
-
- Occupancy Sensor is **ceiling mounted** (center of the room)

Hybrid Controls

■ Line Voltage   ■ Direct Connect

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-LVFA-1CH or AVI-IFAC-5A	low voltage internal fixture adapter, 0-10v (dim-to-off) driver or* 5A internal fixture adapter, 1-10v driver, or…	12~24VDC or 120~277VAC	6
	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	2
	AVI-KIT-NTM	Network Time Manager+ power supply	12~24VDC	1*

* 1 per project

Note: See **LTE Bridge** for installation and support instructions.

CONTROL STRATEGIES

- Occupancy/Vacancy sensing
- High-End Trim
- Time Clock
- Normal Hour / After Hour

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and **individually controllable** using fixture integrated controllers
- Occupancy Sensors are **ceiling mounted**

SEQUENCE OF OPERATIONS

Upon entering the room,
During Normal Hours (8am-5pm)
- Lights will stay on at 80% light level regardless if the hallway sensors detection motion or not

During After Hours (5pm-8am)
- Lights turn on automatically based on motion detection
- The maximum light level of all lights is set to 20% for automatic energy savings. This high-end trim value can be personalized.

Once occupied (during after hours)…
- As long as either one of the occupancy sensor is detecting motion, all lights will stay on at 20%

Once vacant (during after hours)…
- All lights will automatically go down to 5% (value can be personalized) 5min after the last motion is detected.
- Lights will stay down at 5% light level for 2min and will eventually turn off if no further motion is detected. If motion is detected, light will return to 20%.

BREAK **ROOM**

Zonal Controls

Line Voltage   Low Voltage (2-Wire)
Direct Connect

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-XFAC-16A-1CH-CL1	16A external mount zone controller, 1-10v dimming	120~277VAC	3
	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	2
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	1 or 2

Note: *See **LTE Bridge** for installation and support instructions.*

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on the lights,
- To set the desired light level, the occupant can go to fixed light levels (100%, 75%, 50% or 25%), or use the raise/lower buttons to fine tune it
- **By default,** the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized.

Once the space is occupied,
- Upon detecting motion, the occupancy sensor will keep the all lights on.
- Occupants can use the wall stations to override and set desired light levels.

Upon leaving the room,
- All lights automatically turn off after 20min* or can be configured to drop to a low dim setting like 20%* for 5min* before turning off after the last motion is detected.

configurable values

CONTROL STRATEGIES

Occupancy/Vacancy sensing

High-End Trim

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and **controlled as one group** using a junction box mounted power pack
-
- Occupancy Sensor is **ceiling mounted** (center of the room)

Hybrid Controls

Avi-on Controls are NOT intended for use with theatrical lighting

- 🟥 Line Voltage
- 🟩 Low Voltage (2-Wire)
- 🟧 Direct Connect

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-LVFA-1CH or AVI-IFAC-5A	low voltage internal fixture adapter, 0-10v (dim-to-off) driver or* 5A internal fixture adapter, 1-10v driver, or…	12~24VDC or 120~277VAC	30
	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	10
	AVI-XFAC-16A-1CH-CL1	16A external mount zone controller, 1-10v dimming	120~277VAC	2
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	3-4
	2401AC-3	2 Button Wall Station (AC)	120~277VAC	1

Note: *See **LTE Bridge** for installation and support instructions.*

CONTROL STRATEGIES

- Occupancy/Vacancy sensing
- High-End Trim
- Daylight Harvesting

CONTROL OPERATION & MOUNTING

- All troffer fixtures are dimmable and **individually controllable** using fixture integrated controllers
- All track fixtures are controlled as one group
- Occupancy Sensors are **ceiling mounted** (center of the room and near teacher's desk)

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on the lights.
- To set the desired light level, the occupant can go to fixed light levels (100%, 75%, 50% or 25%), or use the raise/lower buttons to fine tune it
- By default, the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized.

Once the space is occupied,
- Upon detecting motion, the occupancy sensor will keep the all lights on.
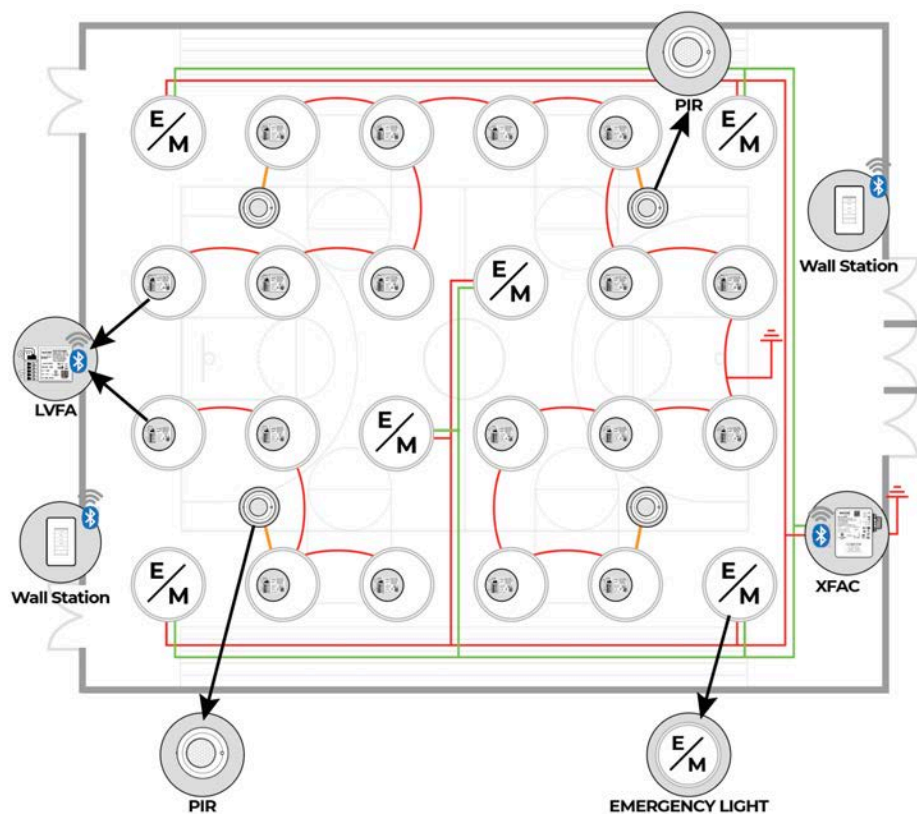- Occupants can use the wall stations to override and set desired light levels.

Upon leaving the room,
- All lights automatically turn off after 20min* or can be configured to drop to a low dim setting like 20%* for 5min* before turning off after the last motion is detected.

configurable values

LARGE-SIZE **GYMNASIUM**

Hybrid Controls

Upgrading to LLLC design would simply require to have 1 sensor per fixture

- 🟥 Line Voltage
- 🟩 Low Voltage (2-Wire)
- 🟧 Direct Connect

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-LVFA-1CH or AVI-IFAC-5A	low voltage internal fixture adapter, 0-10v (dim-to-off) driver or* 5A internal fixture adapter, 1-10v driver, or…	12~24VDC or 120~277VAC	18
	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	4
	AVI-XFAC-16A-1CH-CL1	16A external mount zone controller, 1-10v dimming	120~277VAC	1
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	2-4

Note: *See **LTE Bridge** for installation and support instructions.*

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on the lights
- To set the desired light level, the occupant can go to fixed light levels (100%, 75%, 50% or 25%), or use the raise/lower buttons to fine tune it
- By default, the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized

Once the space is occupied,
- The (18) lights in the office will automatically dim/brighten based on how much daylight is in the room
- Upon detecting motion, the occupancy sensor will keep the all lights on
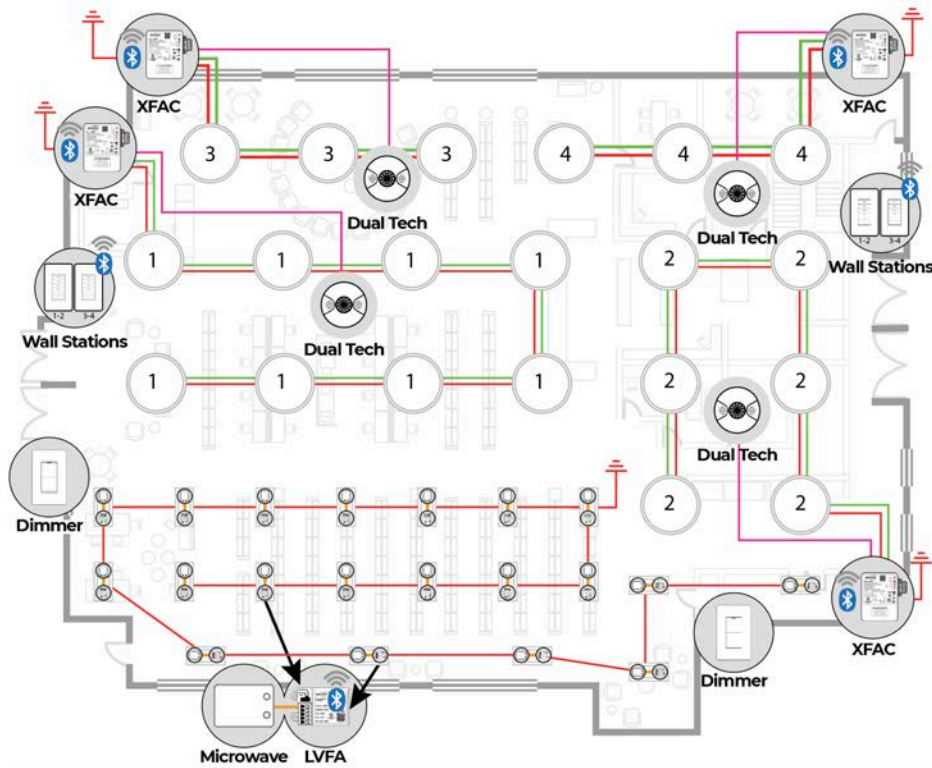- Occupants can use the wall stations to override and set desired light levels

Upon leaving the room,
- All lights will automatically turn off 20min* after the last motion is detected
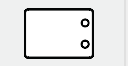
configurable values

CONTROL STRATEGIES

- 👤 Occupancy/Vacancy sensing
- 💡 High-End Trim

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and **individually controllable** using fixture integrated controllers
- Occupancy Sensors are **fixture integrated**

LARGE-SIZE **LIBRARY**

Hybrid Controls

Upgrading to LLLC design would simply require to have 1 sensor per fixture

🟥	Line Voltage	🟩	Low Voltage (2-Wire)
🟧	Direct Connect	🟪	Low Voltage (3-Wire)

CONTROL STRATEGIES

- Occupancy/Vacancy sensing
- High-End Trim
- Daylight Harvesting

CONTROL OPERATION & MOUNTING

- All suspended fixtures are dimmable and controlled individually using **fixture integrated** controls

- All other fixtures are dimmable and controlled in separate groups using junction box mounted power packs

- Occupancy Sensor is **ceiling mounted** (center of the room)

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-LVFA-1CH or AVI-IFAC-5A	low voltage internal fixture adapter, 0-10v (dim-to-off) driver or* 5A internal fixture adapter, 1-10v driver, or…	12~24VDC or 120~277VAC	20
	AVI-DC-MW	Microwave, fixture mount occupancy sensor	24VDC	20
	AVI-SEN-DUCM-24	Dual Technology, Ceiling mount occupancy sensor	24VDC	4
	AVI-XFAC-16A-1CH-CL1	16A external mount zone controller, 1-10v dimming	120~277VAC	4
	92402BAT-2	Wireless wall station with 4-button preset (%) and raise/lower	Battery-powered	2-4
	2401AC-3	2 Button Wall Station (AC)	120~277VAC	2

Note: *See **LTE Bridge** for installation and support instructions.*

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do not turn on automatically (default mode). Occupants must use the wall station to turn on the lights
- To set the desired light level, the occupant can go to fixed light levels (100%, 75%, 50% or 25%), or use the raise/lower buttons to fine tune it
- By default, the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized

Once the space is occupied,
- Upon detecting motion, the occupancy sensor will keep the all lights on
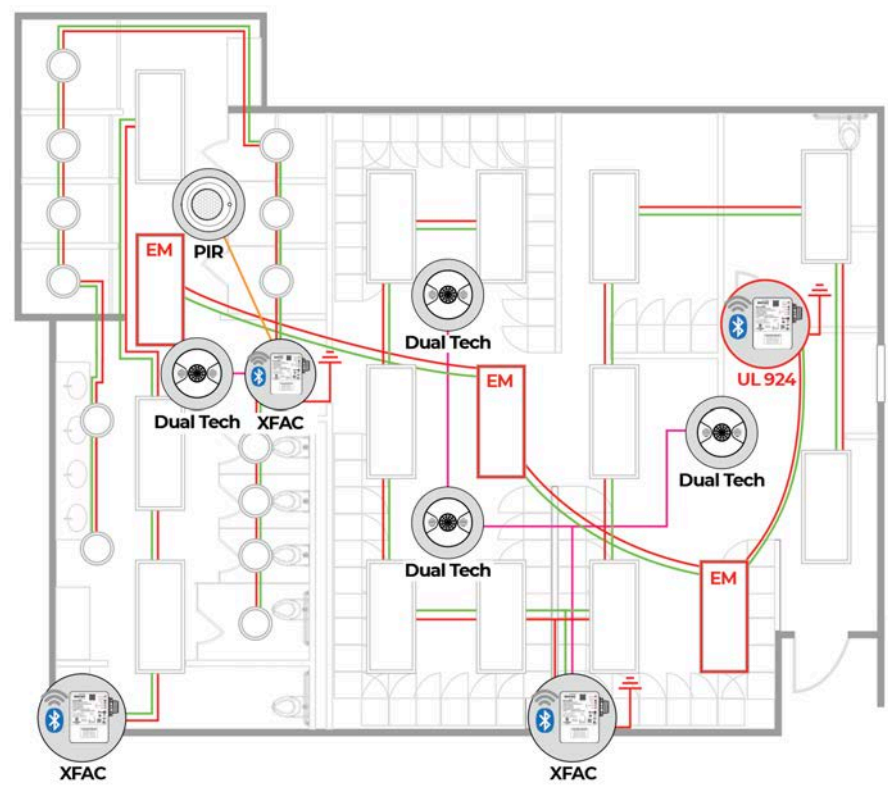- Occupants can use the wall stations to override and set desired light levels

Upon leaving the room,
- All lights will automatically turn off after 20min* after the last motion is detected

configurable values

BASIC **LOCKER ROOM**

Zonal Controls

All Egress fixtures powered by their own power circuit/UPS (no BBU needed in each fixture)

Color	Legend	Color	Legend
Red	Line Voltage	Green	Low Voltage (2-Wire)
Orange	Direct Connect	Magenta	Low Voltage (3-Wire)

CONTROL STRATEGIES

- Occupancy/Vacancy sensing
- High-End Trim

CONTROL OPERATION & MOUNTING

- All fixtures are dimmable and controllable as groups using j-box mounted controllers
- All occupancy sensors are ceiling mounted

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-XFAC-16A-1CH-CL1	16A external mount zone controller, 1-10v dimming	120~277VAC	4
	AVI-SEN-DUCM-24	Dual Technology, Ceiling mount occupancy sensor	24VDC	4
	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	4
	AVI-SIM-12-24VDC-EA	Sensor Input Module (used to control the VAV box)	12~24VDC	1

Note: *See **LTE Bridge** for installation and support instructions.*

SEQUENCE OF OPERATIONS

Upon entering the room,
- Lights do turn on automatically (default mode)
- Only a Facility Manager or someone with special access can override lights to remain on for a fixed period (eg. 2hrs) using a key for the locking switch
- By default, the maximum light level of all lights is set to 80% for automatic energy savings. This high-end trim value can be personalized

Once the space is occupied,
- Upon detecting motion, the occupancy sensor will keep all lights on as long as motion is detected
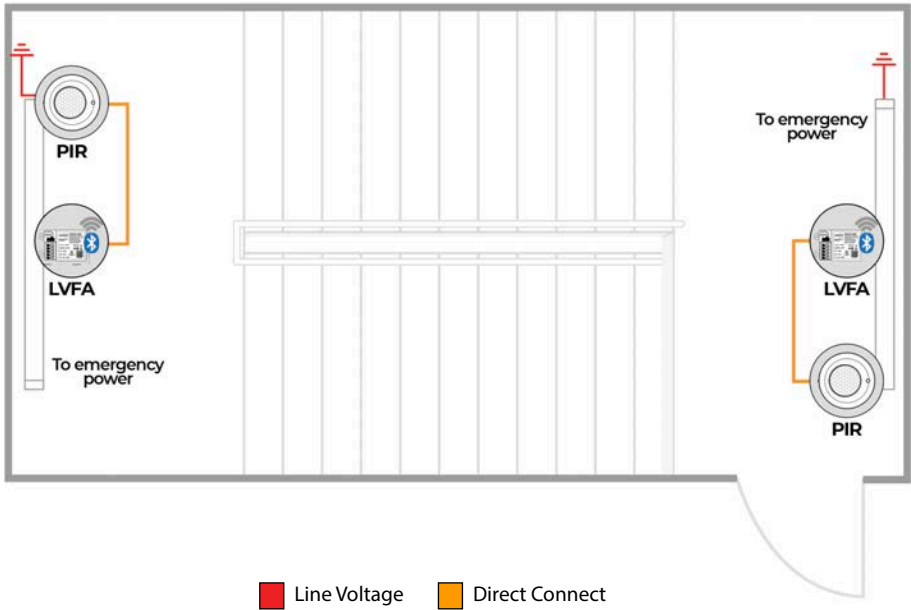
Upon leaving the room,
- All lights automatically turn off after 20min* or can be configured to drop to a low dim setting like 20%* for 5min* before turning off after the last motion is detected

*configurable values

BASIC **STAIRWELL**

LLLC

■ Line Voltage   ■ Direct Connect

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-LVFA-1CH or AVI-IFAC-5A	low voltage internal fixture adapter, 0-10v (dim-to-off) driver or* 5A internal fixture adapter, 1-10v driver, or…	12~24VDC or 120~277VAC	2*
◎	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	2*

***per floor**

Note: *See **LTE Bridge** for installation and support instructions.*

SEQUENCE OF OPERATIONS

Upon entering the room,
• Lights would turn on automatically to a maximum light output value set at 80% (adj. parameter)

Once the space is occupied,
• As long as either one of the occupancy sensor is detecting motion, all lights will stay on at 80%

Upon leaving the room,
• Lights will automatically go down and stay at a low light output set at 10% (can be personalized)

CONTROL STRATEGIES

Occupancy/Vacancy sensing

High-End Trim

CONTROL OPERATION & MOUNTING

• Each fixture is controllable individually

• Occupancy Sensors are mounted onto each fixture

PARKING & EXTERIOR

0-10v dimming fixtures

Zonal & LLLC

Parking lot with pole mounted lights

MASTER PHOTOCELL

Building with wall mounted wall packs

XFAC

LVFA   PIR

■ Line Voltage   ■ Direct Connect

BILL OF MATERIALS

Symbol	Part #	Description	Input Voltage	QTY
	AVI-LVFA-1CH or AVI-IFAC-5A	low voltage internal fixture adapter, 0-10v (dim-to-off) driver or* 5A internal fixture adapter, 1-10v driver, or…	12~24VDC or 120~277VAC	1*
	AVI-DC-PIR	PIR, Ceiling mount occupancy sensor	24VDC	1*
	AVI-XFAC-16A-1CH-CL1	16A external mount zone controller, 1-10v dimming	120~277VAC	2*
	AVI-SEN-PHOTOCELL	Master Photocell	N/A	1

*per area light
**2 per floor

Note: See __LTE Bridge__ for installation and support instructions.

CONTROL STRATEGIES

- On/Off Wall Packs on Sunrise/Sunset
- Area Lights on Photocell during Normal Hours and Hi/Low Occupancy sensing during After Hours
- High-End Trim on Area Lights

CONTROL OPERATION & MOUNTING

- Wall Packs are controlled as a group
- Area Lights are controlled individually
- Occupancy Sensors mounted inside each area light
- Master Photocell mounted on building facade

SEQUENCE OF OPERATIONS

Upon entering the room,
- Area Lights would turn on automatically to a maximum light output value set at 80% (adj. parameter)

Once the space is occupied,
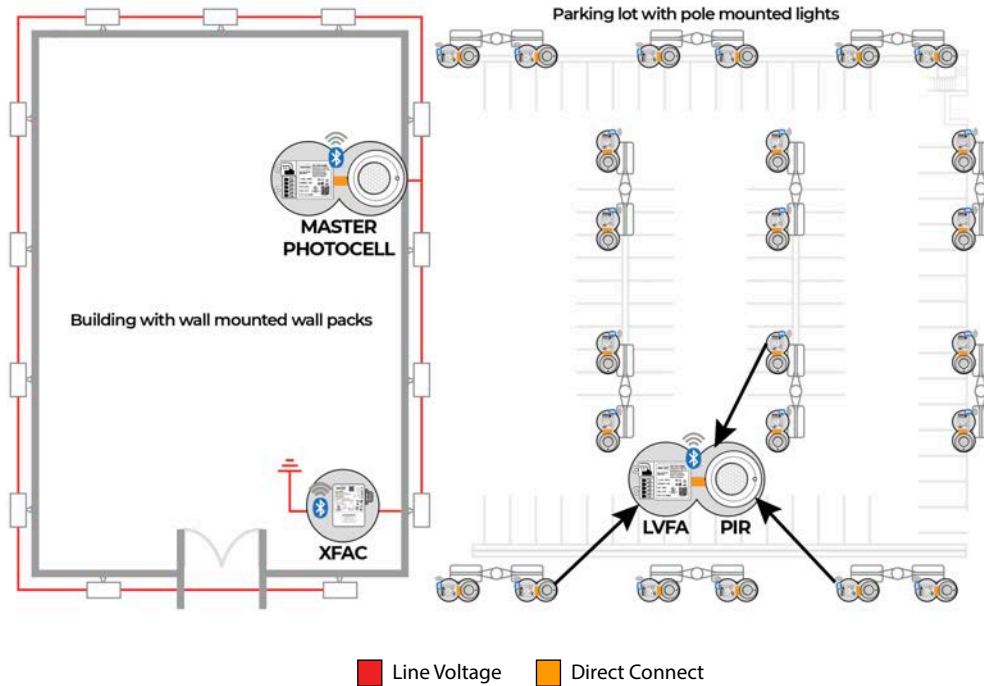- As long as either one of the occupancy sensor is detecting motion, all lights will stay on at 80%

Upon leaving the room,
- Lights will automatically go to and stay at a low light output set at 10% (can be personalized)

*Depends on distance between buildings