

INSTALLATION GUIDE ByLine Systems Amtrax Systems

Electrical Requirements

Since low voltage electricity has little force, it needs larger diameter wires to travel, especially along long distances. If undersized wire is used to feed the system from the transformer, the increased resistance will cause excessive heat. This in turn will cause the wires to conduct poorly, increasing the heat even further, and ultimately will cause the circuit to fail.

Size the System

The system must be sized properly, with the correct number of fixtures per transformer and the correct number of zones per installation.

Do the Math

The formula used to determine the circuit load is: $\text{Amperage} = \frac{\text{Wattage}}{\text{Voltage}}$

$$\text{For 12 Volts: } \frac{250 \text{ Watts}}{12 \text{ Volts}} = 20.8 \text{ Amps}$$

$$\text{For 120 Volts: } \frac{250 \text{ Watts}}{120 \text{ Volts}} = 2.08 \text{ Amps}$$

Use this formula to determine transformer size, the number of fixtures per lighting zone, and the 120 volt amperage required to power the transformers.

An example:

It is determined that the cable system being installed will have two zones controlled by separate circuits. The number of required fixtures is ten.

- Always figure 50 watts per fixture to allow for transformer head room. Never exceed the transformer's listed rating.
- 5 fixtures x 50w each = 250 watts. 250 watts / 12 volts = 20.8 amps.
- Two 250 watt transformers would be required, one per zone.
- Two separate 120 volt circuits would be required. One per transformer. These circuits would only be using 2.08 amps at 120 volts to power each transformer.

Maximum System Loads

Maximum ByLine cable amperage per zone at 12 volts is 25 amps, or 300 watts. The maximum cable length per zone is 35 feet.

Safety

- Do not install fixtures closer than 6" from any flammable material.
- Check all electrical connections to make sure they are tight. This includes Amtrax connectors and ByLine fixtures. All screws must be tight for a good electrical connection.
- Have all final hookup to 120 volt circuits performed by a licensed electrician trained in low voltage systems.

- A licensed electrician should review all low voltage connection installations to assure that they meet all applicable local electrical codes.
- Do not install, move, or adjust fixtures while system is live.
- UL requirements for low voltage installations restrict wattage to 300 watts per electrical run.
- Transformers must be enclosed in J-box. The primary voltage connection must be in a separated enclosure from the secondary, or low voltage connection.

BYLINE CIRCUIT LAYOUT

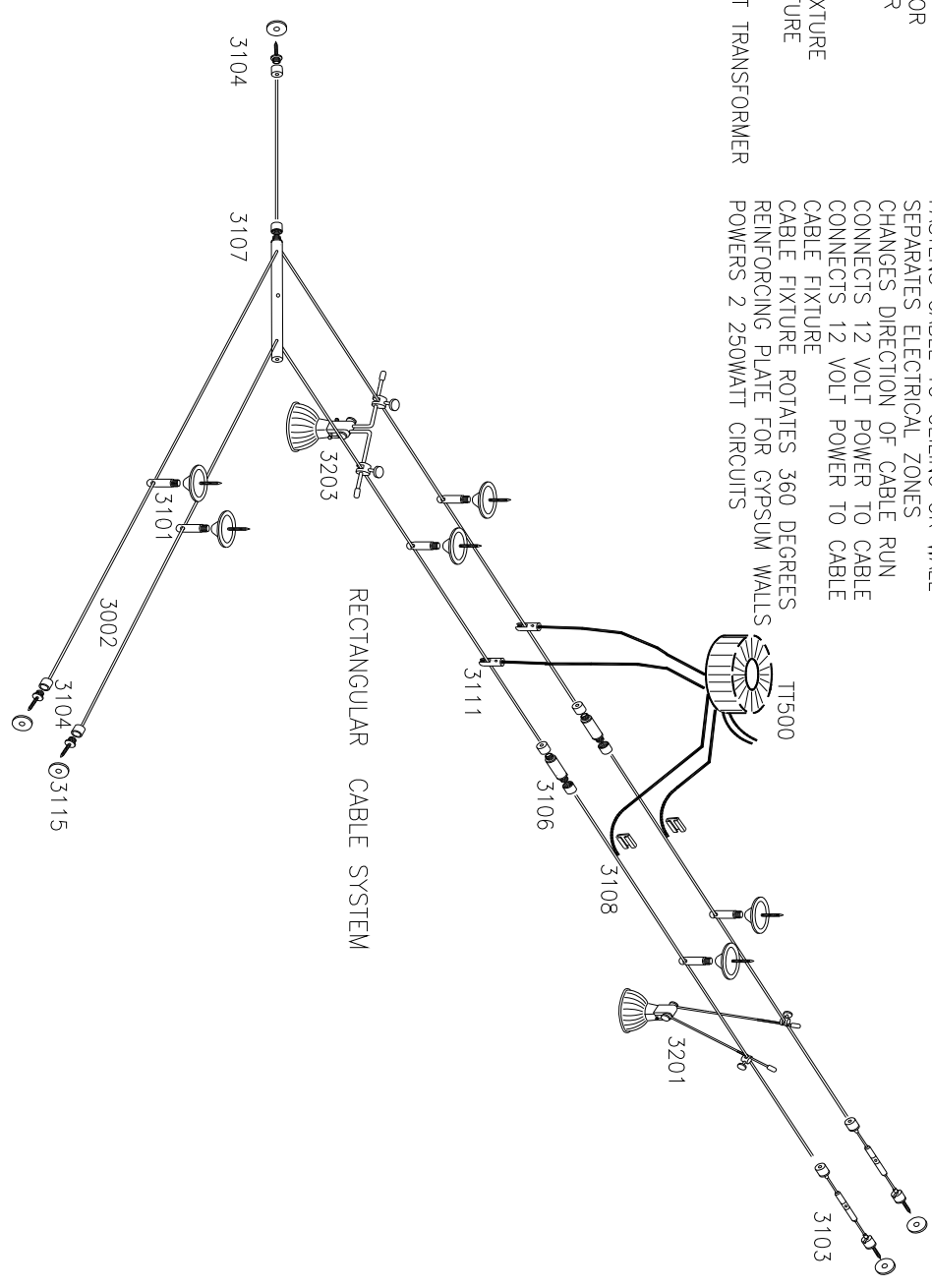
1. Determine the actual length of the installation. Keep each cable circuit to a maximum of 35 feet to avoid voltage drop. Use short runs whenever possible.
2. Determine the wattage required (the usage of 20 and 35 watt bulbs often makes a better installation). Get the light closer to the focal point.
3. Determine the transformer size and location.
 - a. Keep transformers located as close to the load as possible.
 - b. If you must locate the transformer away from the load, compensate for voltage drop by increasing the size of the wires feeding the system.
 - c. Center feed long runs to reduce voltage drop. Remember: a 70 foot cable run fed from the center appears electrically as two 35 foot runs.
4. WIRE SIZE (see conductor size chart for details)
 - a. Wires between the load and the transformer should never be smaller than the cable (#10).
 - b. You could think of low voltage wiring as a water pipe system. If you place a small pipe (e.g.:2") in line between two larger pipes (4"), you will never get more than 2" capacity past the reduction of pipe size.
5. INSTALLATION TIPS:
 - a. Make sure mechanical fastener used to secure dead end or tensor to wall or ceiling is strong enough to hold cable system once tensioning is complete.
 - b. Check all mechanical connections for strength.
 - c. Make sure all mechanical connections are electrically isolated (metal studs do conduct and can be a real problem).
 - d. In order to isolate mechanical connecting points use isolators (3106) or plastic plugs as anchors.
 - e. Use sleeve crimp connectors for no. 10 wire to secure ByLine cable to isolators, tensors, and dead end connectors.

WIRE SIZE FORMULA

Distance of 12 volt feed wire from transformer to rail or cable system.

250 WATTS		500 WATTS	
<i>Length</i>	<i>Gauge</i>	<i>Length</i>	<i>Gauge</i>
1' to 13'	10	1' to 5'	10
14' to 21'	8	6' to 10'	8
		11' to 15'	6
		16' to 25'	4

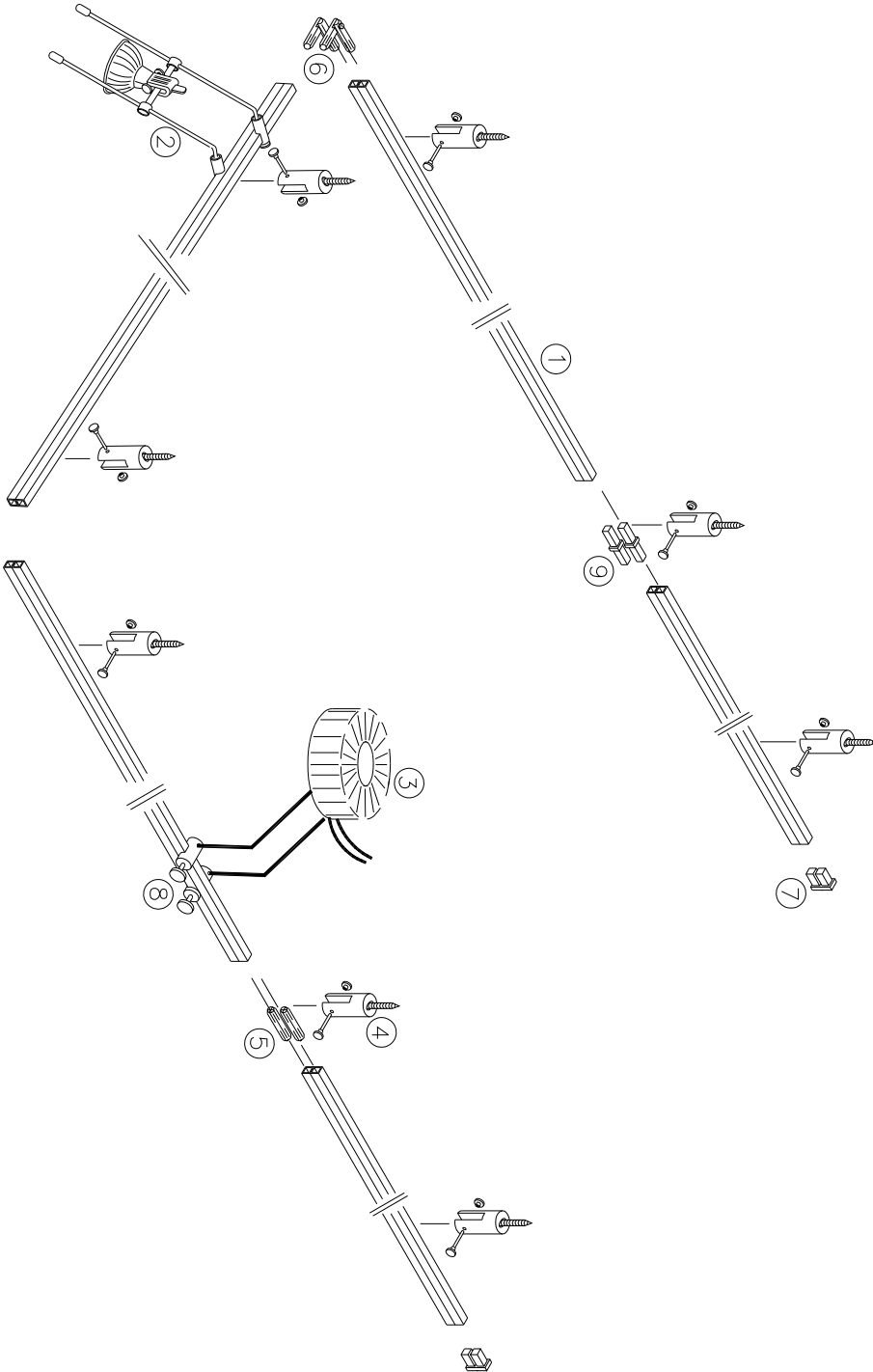
PART NO.	DESCRIPTION	FUNCTION
3002	INSULATED CABLE	CARRYS 12 VOLT POWER
3101	SHORT ANCHOR	SUPPORTS CABLE IN LONG RUNS AND CHANGES CABLE DIRECTION
3103	TENSION DEVICE	TENSIONS CABLE
3104	DEAD END CONNECTOR	FASTENS CABLE TO CEILING OR WALL
3106	ACRYLIC ISOLATOR	SEPARATES ELECTRICAL ZONES
3107	ACRYLIC SPACER	CHANGES DIRECTION OF CABLE RUN
3108	CRIMP	CONNECTS 12 VOLT POWER TO CABLE
3111	CABLE FEED	CONNECTS 12 VOLT POWER TO CABLE FIXTURE
3201	SHORT LEGS FIXTURE	CABLE FIXTURE ROTATES 360 DEGREES
3203	OMNI STAR FIXTURE	REINFORCING PLATE FOR GYPSUM WALLS
3115	GOOF PLATE	POWERS 2 250WATT CIRCUITS
TT500	500 W 12 VOLT TRANSFORMER	



AMTRAX CIRCUIT LAYOUT

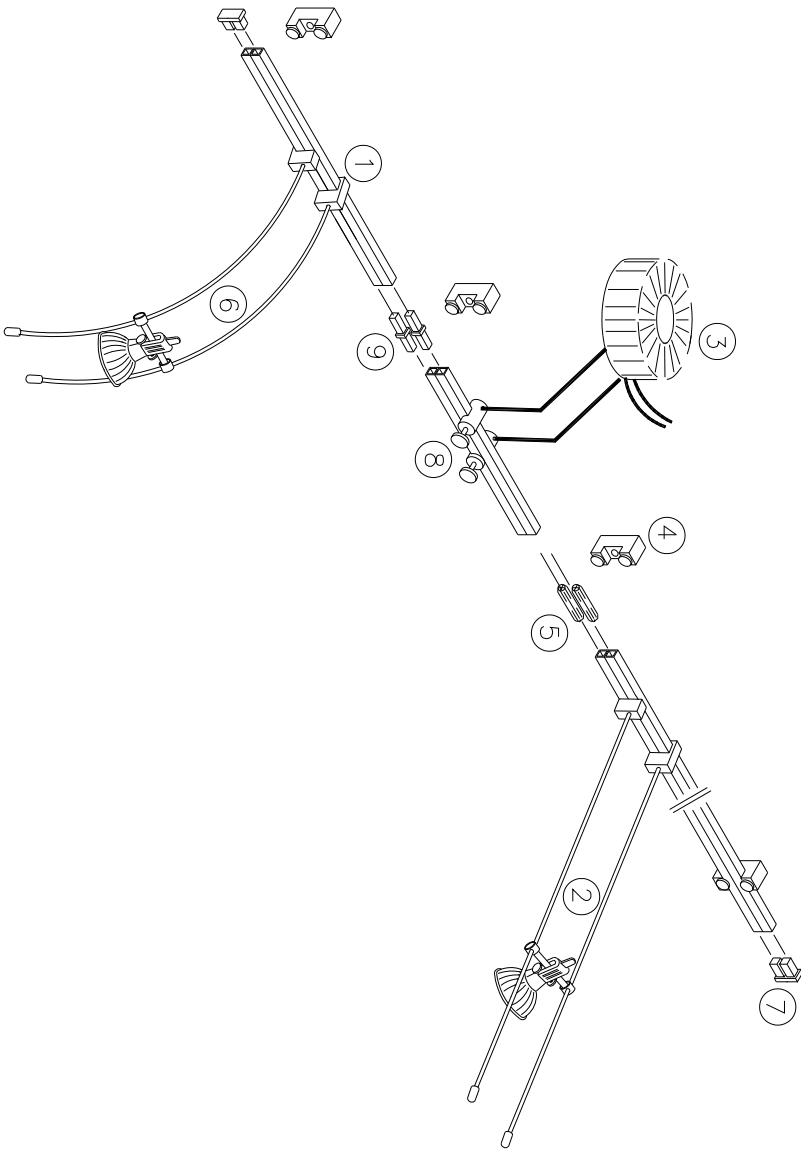
1. Determine the actual length of the installation. Keep each circuit to a maximum of 100 feet to avoid voltage drop. Use short runs whenever possible.
2. Determine the wattage required (the usage of 20 and 35 watt bulbs often makes a better installation). Get the light closer to the focal point.
3. Amtrax connectors provide electrical and mechanical connections. Be sure to set the screws tight on all locations.
4. You can feed a ByLine system from a Amtrax systems, while the reverse is not usually done (avoid small conductors feeding large conductors).
5. Determine the transformer size and location.
 - Transformers operate best at 80% of rated load.
 - Keep transformers located as close to the load as possible.
 - If you must locate the transformer away from the load, compensate for voltage drop by increasing the size of the wires feeding the system.
 - Center feed long runs to reduce voltage drop. Remember: a 70 foot cable run fed from the center appears electrically as two 35 foot runs.
6. WIRE SIZE (see conductor size chart for details)
 - Wires between the load and the transformer should never be smaller than the cable (#10).
 - You could think of low voltage wiring as a water pipe system. If you place a small pipe (e.g.: 2") in line between two larger pipes (4"), you will never get more than 2" capacity past the reduction of pipe size.
7. INSTALLATION TIPS:
 - End Feeds or Center Feeds will accommodate 12 V feeds. This allows you to feed from either end or center of system.
 - Check all mechanical connections for strength.
 - Make sure all mechanical connections are electrically isolated (metal studs do conduct and can be a real problem).
 - In order to isolate Circuits use isolating connectors 2110. Use caution when handling rail with isolating connectors inplace. Isolator can break with too much tension.
 - Always file and de-burr ends when cutting lite rail to size. Metal filings can cause a short between positive and neutral side of the rail.
 - Always check for shavings after driving straight connectors 2106 into ends of first rail, before joining the two rails together.
 - When installing corner connectors 2107, 2108 & 2109 into rails, use a wood block and drive the connectors in to ends of each rail evenly. Make sure screws line up at top and bottom, and screw holes face away from center of rail for access, once rail is in place on ceiling.
 - Always perform a continuity check once rail is in place and before connecting power to system and installing fixtures.
 - Make sure all electrical connections on 12 volt side are secure and tight.
 - Once system is powered up and fixtures are installed, check system for heat buildup. Heat buildup can be caused by a short, loose fixtures, loose screws at corner connectors and loose connections at center feed connected to rail. The system should run cool or slightly warm to the touch, with heat building up only on fixtures and points directly above mr16 bulbs.

CEILING MOUNTED AMTRAX SYSTEM



- ① Part no. 2001 Lite rail, 1 meter
- ② Part no. 2204 Trapeze fixture
- ③ Part no. tt500 Toroidal transformer
- ④ Part no. 2101 Ceiling support. Secures rail to ceiling. Locate at rail joints and ends.
- ⑤ Part no. 2106 Straight connector. connects rails to each other.
- ⑥ Part no. 2108 L connector. Joins rails at an angle.
- ⑦ Part no. 2111 End cap, Decorative cap for rail ends.
- ⑧ Part no. 2105 Center feed. brings 12 volt power to rail from transformer feed.
- ⑨ Part no. 2110 Insulating connector. connects rails and isolates electrical zones.

①	Part # 2001	Lite rail, 1 meter
②	Part # 2202	Swing fixture connects to wall rail with allen key
③	Part # tt500	Toroidal transformer
④	Part # 2103	Wall support secures rail to wall at joints and ends
⑤	Part # 2106	Straight connector connects rails to each other
⑥	Part # 2206	Galleria fixture connects to wall rail with allen key
⑦	Part # 2111	End cap. decorative cap for rail end.
⑧	Part # 2105	Center feed. brings 12 volt power to rail from transformer feed
⑨	Part # 2110	Insulating connector. connects rails and isolates electrical zones



WALL MOUNTED RAIL SYSTEM