

# **THE ROUTE OF THE BROADWAY LION**

## OPERATIONS AND MAINTENANCE MANUAL

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# ***Operation of Trains***

## **Crew Responsibilities**

Crews arrive in the dispatcher's office 15 minutes prior to the operation of their first run of the day, unless they are assigned to pull a train out of a lay-up or yard position, in which case they will arrive in the dispatcher's office 60 minutes prior to the operation of their first train. In either case the crew will check for bulletins, general orders and other memos pertaining to the operation of the railroad.

Crews will arrive in the dispatcher's office 5 minutes prior to the operation of subsequent runs on that shift.

In all cases the dispatcher will initial the crew sheets certifying that the crew is ready and able to perform their duties without impairments.

## **Inspection of Equipment (Put-in)**

### ***The Motorman***

Each train, when put into service for the day will undergo a full road inspection by the operating crew of the train. The Motorman will board the train at the head end, shall set up the air brakes, and will put the reverser in the forward position to assure that the head lamps work. He will center the reverser, and when the train has the correct pressure he will set the brakes.

The motorman will then walk through the train releasing the hand brakes in every car.

In the last car he will again inspect his air pressure will put the brakes in emergency and then check to see that his air reservoirs are correct. He will test the reverser to assure that the headlamps work on the rear end of the train.

The motorman will go down to the roadbed and walk completely around the train. He will check tail lights at both ends of the train. He will inspect that each wheel is properly seated on the tracks, that there is no hanging equipment, and that all brakes are properly applied. He will inspect the condition of the fore and aft trippers, and will assure that there are no stray marks on them.

When he returns to the front of the train he will assure that the destination signs and class lamps are correct for his first trip.

### ***The Conductor***

Each train when put into service for the day will be inspected by the conductor. He will walk through the train inspecting the roll signs to assure that they are set correctly. He will set lighting, heating and air conditioning according to the specifications for his trip. He will test the operation of the doors, and assure that the end doors are locked.

## **Inspection of Equipment (Running)**

### ***The Motorman***

Before boarding a train, the motorman will assure that the train is correctly signed for this trip, including the classification lights. He will inspect the trip cock for any stray marks. He will make a communications check with the conductor and with the tower or dispatcher. He will perform a brake test assuring that the brakes both apply and release. He will inspect the head lamps and the windshield wipers.

## ***The Conductor***

The conductor will inspect destination signs in the cars that he passes while reporting to his position, and will assure that the signs in his operation cars are set correctly. If these are correct he may assume that they all are correct. He will correct the cars that he is in if necessary, and if there is time he may correct others in the consist. If this is not possible he must make proper announcements at every station as to the identity of the train. He will assure that lights, heat and air are set according to the days specifications.

## **Inspection of Equipment (Lay-Up)**

### ***The Motorman***

Upon laying up a train after its last trip either in a yard or in a lay-up pocket en route. The motorman will set the brakes in emergency, remove his handles and keys, and lock the operator's door and the storm door. He will walk back through the train setting the specified number of handbrakes throughout the train. He will check to assure that the rear operating cab and storm doors are locked.

### ***The Conductor***

Upon Laying up a train after its last trip of the day the conductor will set the lights, heat, and air conditioning to it prescribed settings according to weather and location of the lay-up.

## **The Dispatcher**

The dispatcher shall not the arrival of each operating crewman, and will certify that they are fit for duty. He will satisfy himself that they have all of the latest notices, orders, general orders and other information pertaining to their service. He will initial the crew sign-in sheets for every crew member reporting for duty.

The dispatcher shall be responsible for the movement of all trains into and out of his terminal. He will record the lead motor number of each such train and the time that they left or entered the station.

## **The Tower Operator**

The tower operator will assure that trains run freely in and out of the terminal, using the interlocking machine to control the switch points and signals. In event of a machine failure, he must assure for manual operations of the switch points and must flag trains through the interlocking plant.

### ***242<sup>nd</sup> Street Tower***

Trains approaching Botanic Garden are unto the control of the 242<sup>nd</sup> Street Tower. Lever 3 must be in its normal position for a train to depart Botanic Garden for Dyckman Street. If it is not in this position an alarm will sound in the tower as a train approaches Botanic Garden.

Trains approaching Dyckman Street will sound an alarm in the tower if Lever 3 remains in its normal position. It is customary for the tower operator to align the plant for an incoming train while it is en route between Botanic Garden and Dyckman Street.

Lever 1 aligns the switch points between Dyckman Street and 242<sup>nd</sup> Street between terminal tracks 1 and 2. If the track that this switch is aligned for is already occupied by a train Lever 3 will lock in the Normal position and a clear or approach signal cannot be given to the train standing in the Dyckman Street Station

Lever 2 aligns departing trains from terminal tracks 1 or 2 to the southbound main line. Lever 35 will if aligned, give track 1 a departure signal. Lever 36 will if aligned give track 2 a departure signal. Departure levers are locked if not aligned.

### ***Coney Island Interlocking***

Levers 4, 5, 6, 7, 8. Lever 8 diverts north bound trains into the terminal, Lever 7 allows trains in the terminal to depart south bound. Either lever will set a red home signal to southbound trains on Track 2. Levers 4, 5, 6 select tracks 3,4, or 5, else 6.

### ***Smith-9<sup>th</sup> Street Interlocking***

Lever 9 Northbound Local to Express (not in service)  
Lever 10 Northbound Express to Local  
Lever 11 Southbound Express to Local (not in service)  
Lever 12 Southbound Local to Express

### ***Prospect Park Interlocking***

Lever 12 Prospect Northbound Local to Express  
Lever 13 Prospect Northbound Express to Local  
Lever 14 Prospect Southbound Express to Local  
Lever 15 Prospect Southbound Local to Express

### ***34<sup>th</sup> Street Interlocking***

Lever 21 Southbound Local divers to NYP Yard  
Lever 20 Tail to Track 7  
Lever 20 + 19 Tail to Track 5  
Lever 20 + 18 Tail to Track 6  
Lever 17 Yard Exit to Southbound Local Track

### ***14<sup>th</sup> Street / Union Square Interlocking***

Lever 27 Northbound Local to Union Pocket  
Lever 32 Signal Union Pocket North  
Lever 33 Signal Union Pocket Center  
Lever 34 Signal Union Pocket South  
Lever 22 Northbound Union Pocket to Local

Lever 23 14 St North LCL 2 EXP  
Lever 24 14 St North EXP 3 LCL  
Lever 25 14 St South EXP 2 LCL  
Lever 26 14 St South LCL 2 EXP

### ***Chambers Street Interlocking***

Lever 28 Chambers Pocket 2 Exit  
Lever 29 Chambers Pocket 2 Enter  
Lever 30 Chambers Pocket 1 Exit  
Lever 31 Chambers Pocket 1 Enter

# ***Railway Equipment***

## **R-15, R-17 and R-21 Type Cars**

### ***Preparation***

The R15 – R21 Series cars are Walthers / Life-Lile Proto 1000 cars made up into six car trains with either one or two tower cars per consist.

- Upon entering the property the circuit boards are removed from all cars, the plastic inserts are removed from all trailer cars but remain in the power cars to protect the drive train from friction.
- All couplers are removed, and replaced with draw bars provided by the manufacturer.
- Holes are drilled in the frame to the right of the coupler pocket to accommodate wiring.
- Four fine flexible stranded wires are routed from one end of the train to the other.
- One pair connects the wheel sets on each side of the train through the entire train allowing for 48 wheel power pick up.
- The second pair of wires is for the lighting system.

### ***Lighting System***

In the “north car” of each consist (an odd numbered car) a full wave rectifier is placed across the track power so that the lighting circuit will have a constant + and - wire regardless of which direction the consist is headed. This provides a lighting bus at track power (usually 10.2 volts.)

A bank of 5 (All Electronics Catalog CAT# CBC-18) 4.7 Farad, 2.5 volt capacitors are wired in series to operate at 4.7 Farads and at 12.5 volts are installed across the lighting circuit to provide continuing power when the train is stopped in stations. {Depending on current draw a second set of capacitors may be installed in each trainset.}

And LED module (CAT# CBC-18) is placed on the inside roof of each car and wired to the lighting bus.

### ***Head Lamps and Marker Lamps***

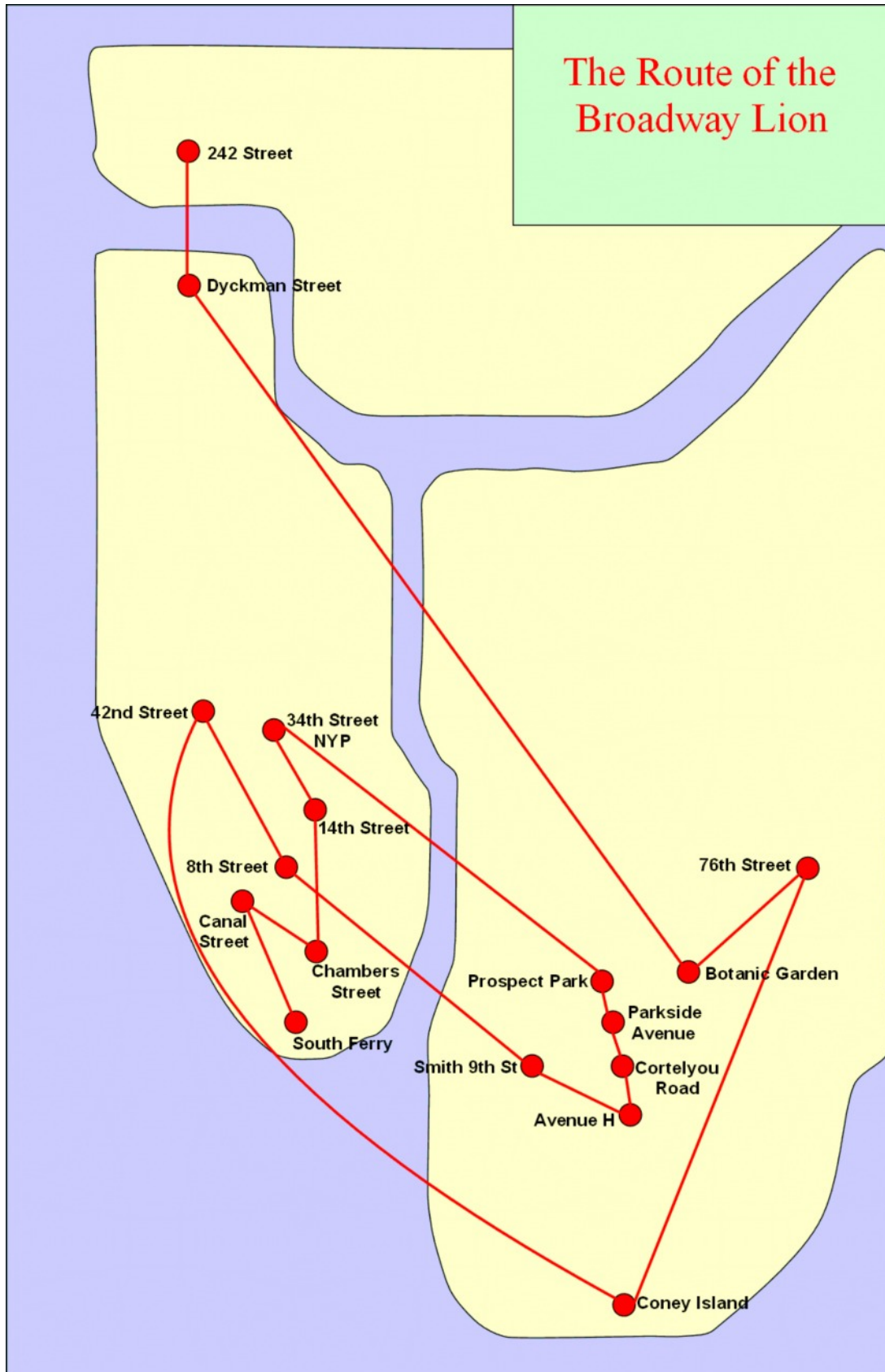
New head/tail lamps are fabricated from a pair of white LEDs and a single High Brightness red LED. These are mounted on a circuit board with 1K Ohm resistors for each LED. The Red LED is centered in the light tube while the white LEDs are on either side of it.

- The light tubes are removed and modeling clay is forced into the spaces above and outside of the light tube position.
- A piece of cardboard is placed on the inside roof of the car and the light tubes are replaced in the front of the car.
- The circuit board is held in place with modeling clay to prevent excess light from escaping from the Assembly
- The headlamp/marker assembly is wired to the Traction bus, not the Lighting Bus



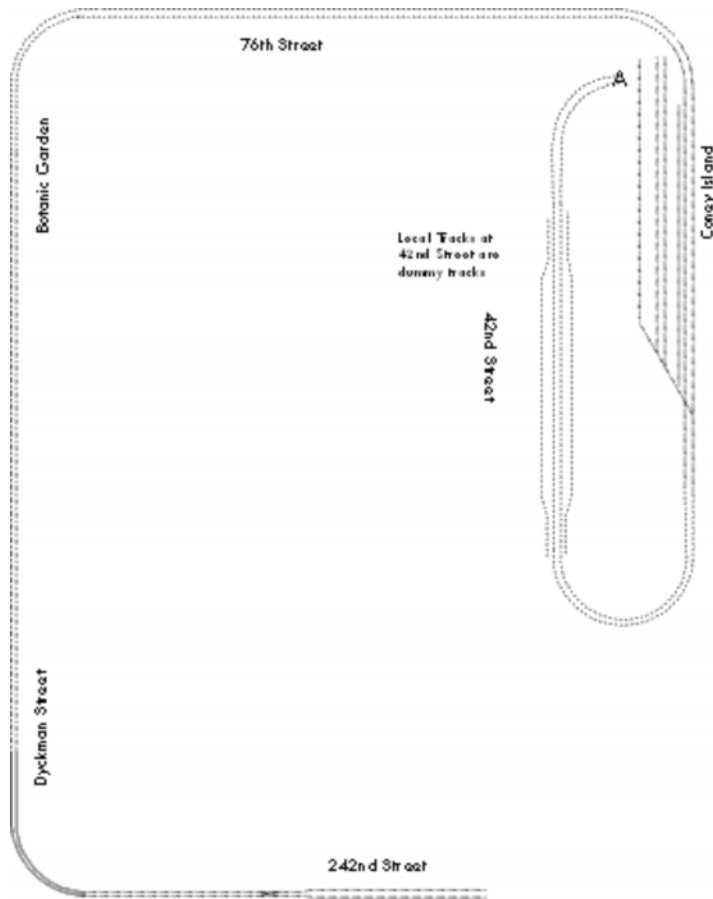
# Maps and Track Diagrams

## Geographical Map



# Layout Diagram

## Upper Level

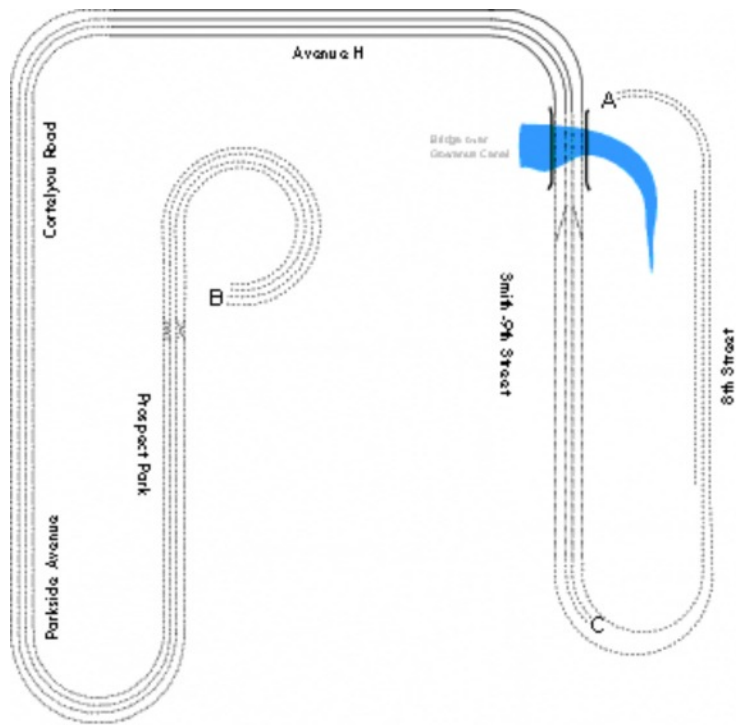


A: To 8th Street on the Middle Level

Name:	Route of the Broadway LION
Scale:	HO 1:87.1
Size:	22' x 27'
Prototype:	New York City Transit (NYCT)
Style:	Walk-In
Main Line:	570' (9.39 scale miles)
Min. Radius:	26"
Min. Turnout:	No. 4
Max. Grade:	
Height:	
Roadbed:	None
Track:	Flextrack
Control:	Automatic Train Control (ATC)
Operation:	GRS Type 5 Interlocking Machine

- Elevated Subway
- Deep Bored Tunnel
- Surface or Embankment Line
- ..... Open Cut Subway Line
- . - . - . Cut and Cover Subway

## Middle Level



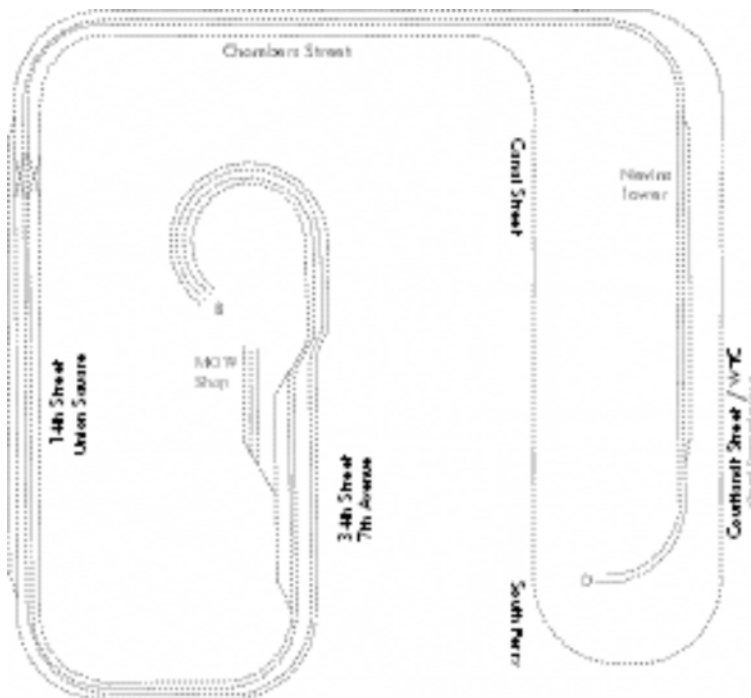
- A : From 42nd Street on the Upper Level
- B : To 34th Street on the Lower Level
- C : To Lenox Tower (Mezzanine Level)
- D : To Navis Tower (Lower Level)



Mezzanine Level

Lenox Tower

## Lower Level



- B : From Prospect Park on the Middle Level
- D : To Navis Tower on the Mezzanine Level

# ***Power Systems***

## **Ground**

There is a single ground or grounded common bus around the entire layout and represented in every control panel, power supply, and relay rack. This is a hard ground to the building grounding system.

The LEFT rail of each track is connected to this hard ground

If ground to the building ground fails, stray voltages on the common wire will cause unpredictable results.

## **600 Volt DC (Traction Power)**

Traction power is provided by a regulated variable voltage power supply capable of delivering 12 amps to the system. It is set for +10.2 volts as our standard traction circuit. The 600 volt bus is routed to all parts of the layout. In all normal locations this bus is connected to the RIGHT rail throughout the layout except for certain up grade locations.

## **750 Volt DC (Auxiliary Traction Power)**

Traction power for certain up grade sections of the layout is provided by a 12 volt, 5 amp regulated power supply (acquired from an old computer). A separate bus provides the layout with this voltage where needed, and it is isolated from the primary supply in such locations.

## **16 Volt DC Signal System**

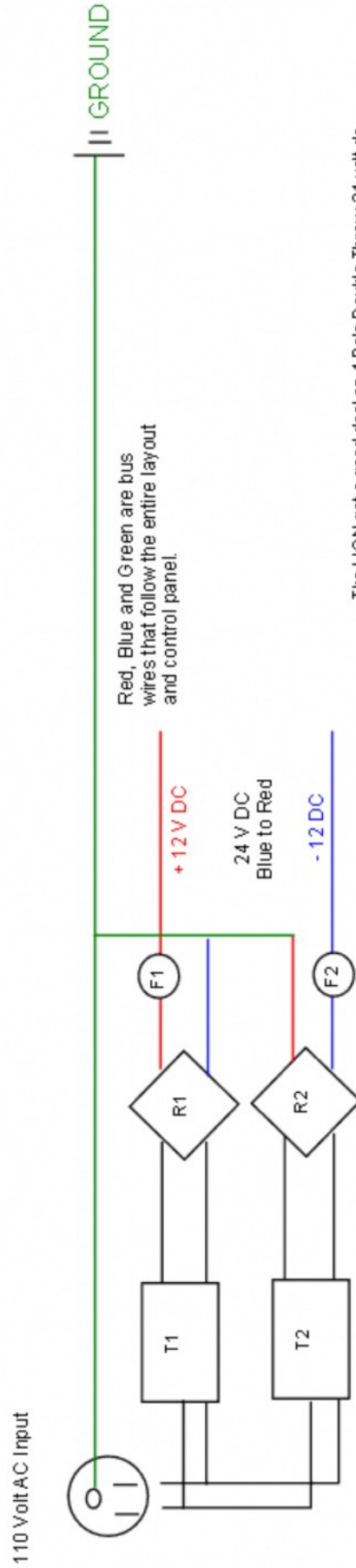
A regulated 16 volt DC wall wart provides power to the signal system and its associated relays. The Signal bus is distributed throughout the layout and is also used for any auxiliary LED lighting.

## **12/24 Volt DC Interlocking System**

Two 12 volt / 5 amp transformers provide + 12 volt; dc, - 12 volt dc; and 24 volt dc circuits for the Interlocking machines, the switch motors and their associated relay systems. Diagram and specifications are on the next page.

# Diagram of the 12/24 volt Interlocking Power Supply System

## The Route of the Broadway LION Auxiliary Power Supply System

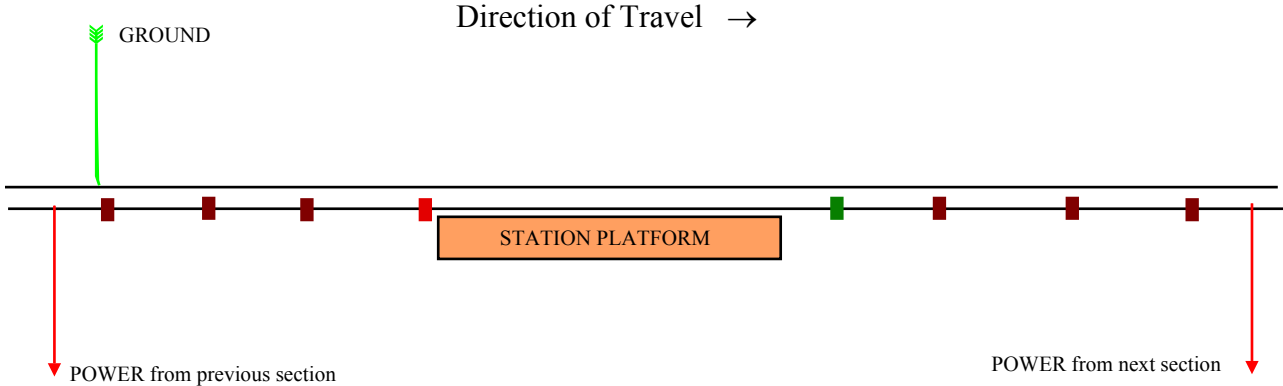


The LION got a good deal on 4 Pole Double Throw 24 volt dc ice cube type relays. For this the 24 volt bus does come in handy, most people would not need 24 volts, but this system was designed to power 60 Tortoise machines 46 station relays over 200 wayside signals and platform lighting for 36 stations, plus any building lighting or other applications that may arise. Even so there is more power available than I'll ever use. LIONS like to have extra power.

**DANGER  
HIGH VOLTAGE**  
**Qualified  
Engineers Only**

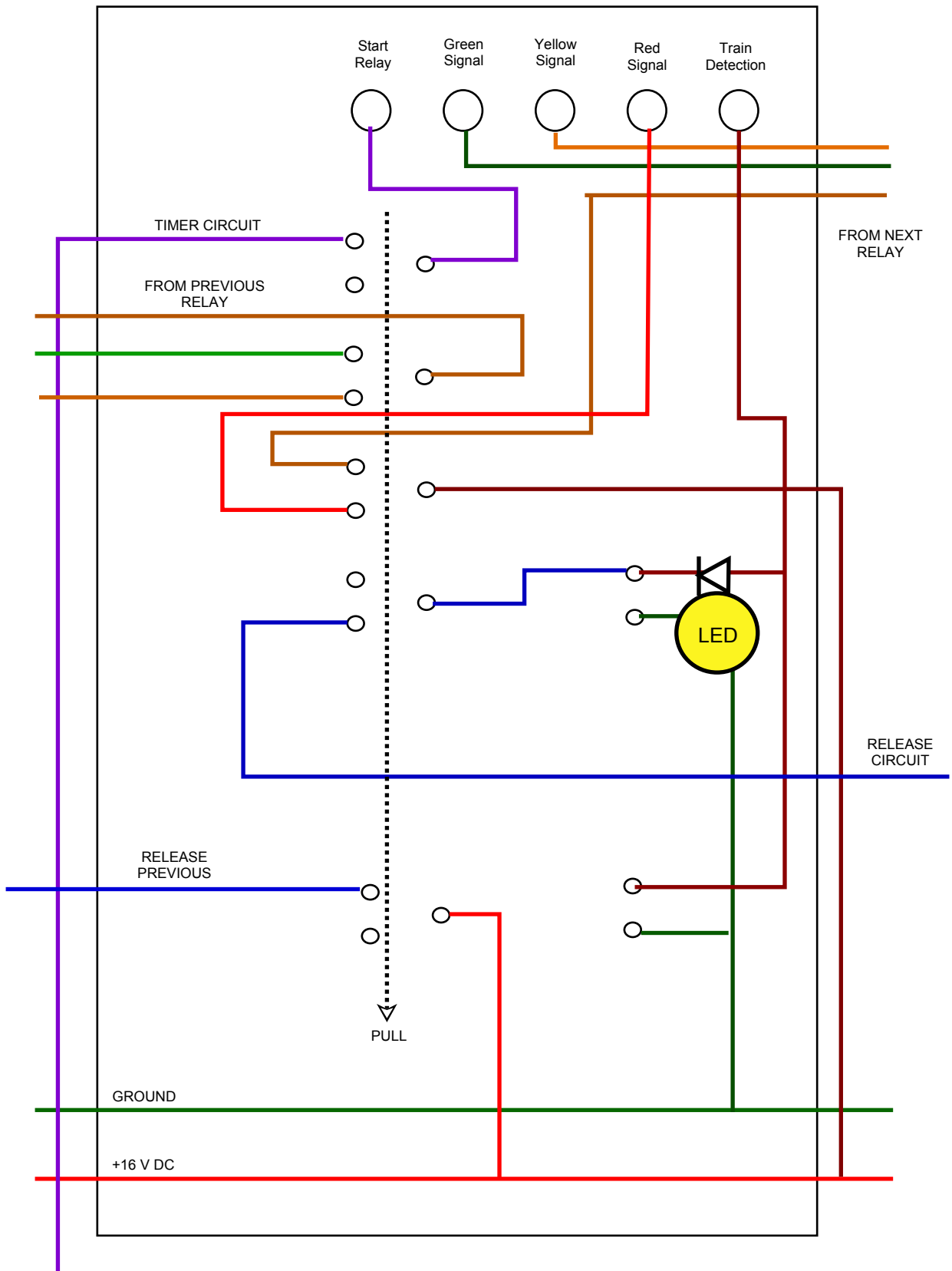
T1 Transformer 1, 120vac input; 12vac output; 5amp output	All Electronics Part Number TX-125 or similar	\$28.00
T2 Transformer 2, 120vac input; 12vac output; 5amp output	All Electronics Part Number TX-125 or similar	\$28.00
R1 Rectifier 1, Full Wave, 600 volt; 8 amps	All Electronics Part Number FWB-86	\$1.15
R2 Rectifier 2, Full Wave, 600 volt; 8 amps	All Electronics Part Number FWB-86	\$1.15
F1 Fuse Holder and 3 Amp Fuse	All Electronics Part Number FHPM-31	\$0.90
F2 Fuse Holder and 3 Amp Fuse	All Electronics Part Number FHPM-31	\$0.90
Fuses	All Electronics Part Number FS-3	5 for 0.75

# Diagram of Track Power Installation (Typical)



- TRACK GAPS Bridged with 5.1 Ohm Resistor
- OPEN TRACK GAP : Stops Train in Station
- TRACK GAP Bridged with relay operated by the central control clock : Starts Train.

# Station Control Circuits (Typical)



# ***GRS Interlocking Machine***

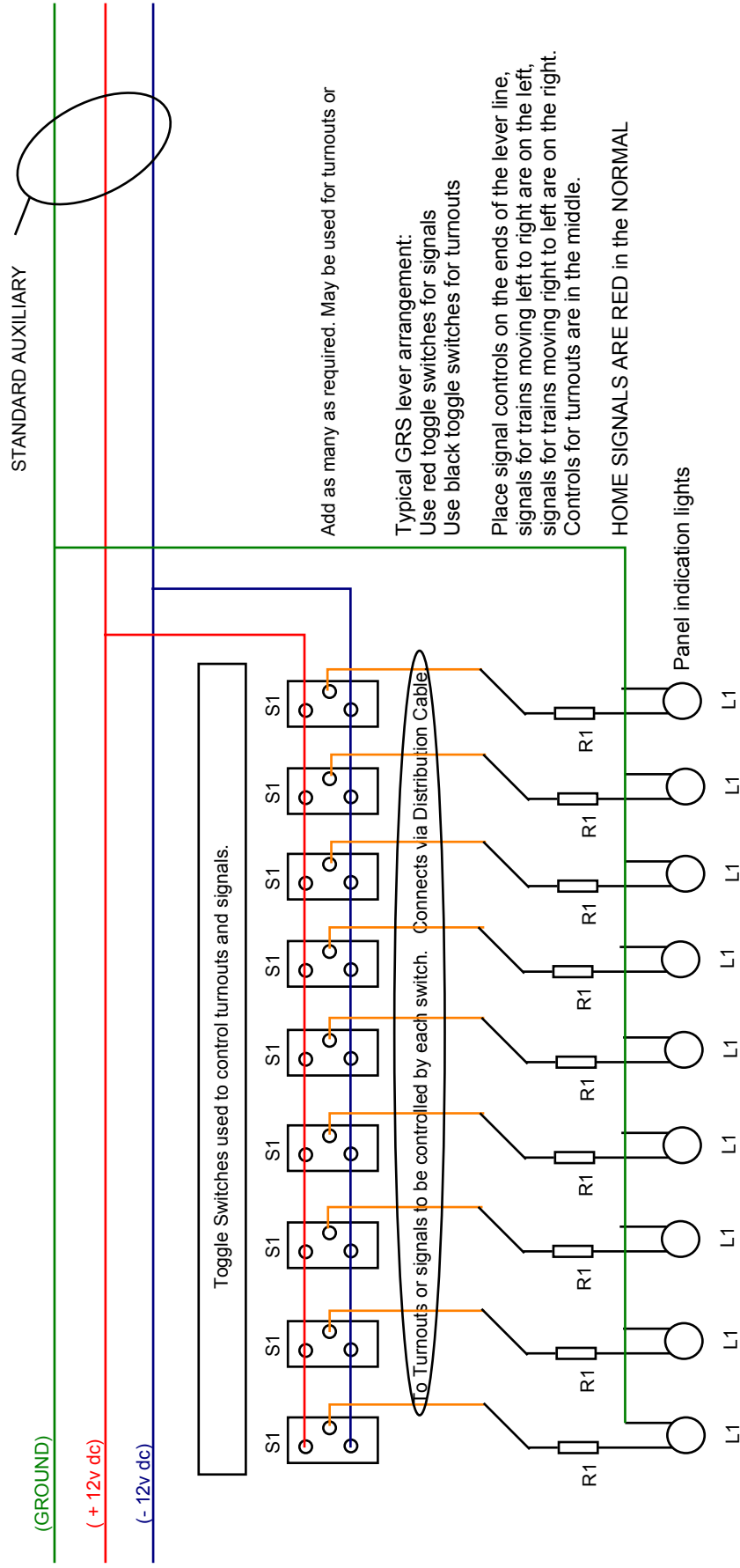
## **Lever Numbers and Cabling**

Lever	Action	Pin Number and Wire Color
1	VCP Inbound Switch X	
2	VCP Outbound Switch X	
3	SIGNAL – Dyckman North	
4	Coney Island Tk 5 Else 6	
5	Coney Island Tk 4	
6	Coney Island Tk 3	
7	Coney Island Exit South	
8	Coney Island – Enter North	
9	Smith-9 North Lcl 2 Exp	
10	Smith-9 North Exp 2 Lcl	
11	Smith-9 South Exp 2 Lcl	
12	Smith-9 South Lcl 2 Exp	
13	Prospect North Lcl 2 Exp	
14	Prospect North Exp 2 Lcl	
15	Prospect South Exp 2 Lcl	
16	Prospect South Lcl 2 Exp	
17	34 NYP - Exit South	
18	NYP Track 6	
19	NYP Track 5	
20	NYP Track 7	
21	34 NYP - Enter North	
22	14 Union Exit North	
23	Union North lcl 2 Exp	
24	Union North Exp 2 Lcl	
25	Union South Exp 2 Lcl	
26	Union South Lcl 2 Exp	
27	14 Union Enter South	
28	Chambers Pocket 2 Exit	
29	Chambers Pocket 2 Enter	
30	Chambers Pocket 1 Exit	
31	Chambers Pocket 1 Enter	
32	Spare	
33	Spare	
34	Spare	
35	242 St Tk 2 Exit Signal	
36	242 St Tk 1 Exit Signal	



# GRS Machine, Wiring, Typical

## The Route of the Broadway LION Interlocking Machine - Turnout Control Diagram GRS-2.0 Mar 4 2012



Add as many as required. May be used for turnouts or

Typical GRS lever arrangement:  
Use red toggle switches for signals  
Use black toggle switches for turnouts

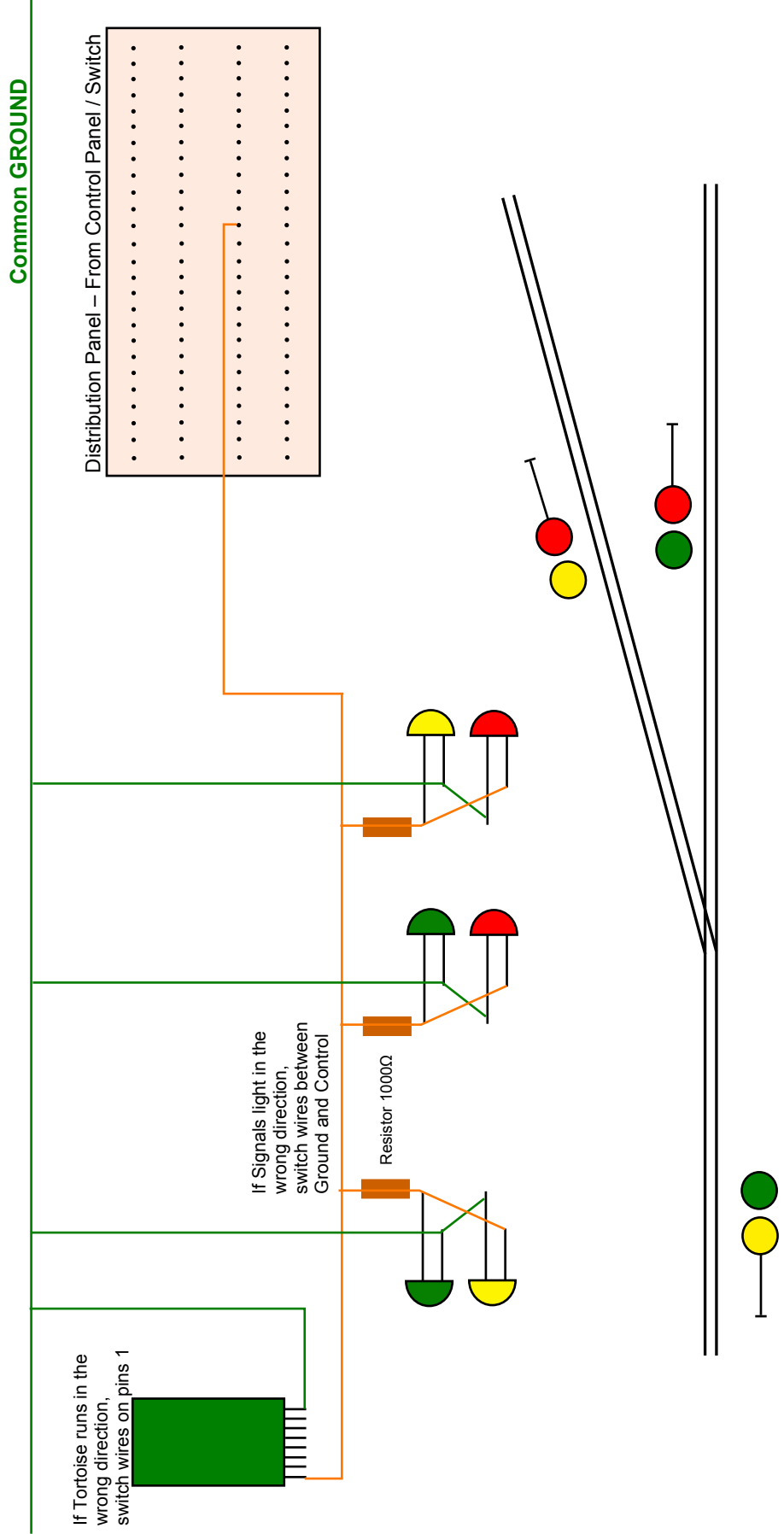
Place signal controls on the ends of the lever line.  
signals for trains moving left to right are on the left,  
signals for trains moving right to left are on the right.  
Controls for turnouts are in the middle.

HOME SIGNALS ARE RED in the NORMAL

- S1 Single Pole / Double Throw Toggle Switches (as many as required) \$1.00 each
  - L1 LED (Light Emitting Diodes), Bi Color \$0.50 each
  - R1 Resistors, ¼ Watt, 1KΩ \$3.00 / 100 pcs
- All Electronics Part Number MTS-90 (Typical)  
All Electronics Part Number LED-6  
All Electronics Part Number 291-1K

# Switch Machine, Typical

The Route of the Broadway LION  
 Tortoise Switch Machine and Signals  
 Diagram TSM-1. Mar 4 2012



# **Wire And Cable Assignments**

## **Model Board Patch Panel**

	Wire Color	Indication	Out Cable Colors
1	Orange/White	242 <sup>nd</sup> Street Track 1	
2	White/Orange	242 <sup>nd</sup> Street Track 2	
3	Green/Yellow	Dyckman Street South	
4	Yellow / Green	Botanic Garden South	
5	Green / White	76th Street South	
6	Green / White	Coney Island South (Tk 2)	
7	Green / Black	42 <sup>nd</sup> Street South	
8	Black / Green	Smith 9 <sup>th</sup> LCL Street South	
9	Green / Purple	Avenue H South	
10	Purple / Green	Cortelyou Road South	
11	Green / Red	Parkside Avenue South	
12	Red / Green	Prospect Park LCL South	
13	Blue / Yellow	34 <sup>th</sup> Street LCO South	
14	Yellow / Blue	14 <sup>th</sup> Street LCL South	
15	Blue / White	Chambers Street LCL South	
16	White / Blue	Canal Street	
17	Blue / Black	South Ferry	
18	Black / Blue	Cortland Street	
19	Blue / Purple	Chambers Street LCL North	
20	Purple / Blue	14 Street LCL North	
21	Blue / Red	34 <sup>th</sup> Street LCL North	
22	Red / Blue	Prospect Park LCL North	
23	Yellow / Gray	Parkside Avenue North	
24	Gray / Yellow	Cortelyou Road North	
25	Yellow / Brown	Avenue H North	
26	Brown / Yellow	Smith 9 <sup>th</sup> St LCL North	
27	Yellow / Orange	42 <sup>nd</sup> Street North	
28	Orange / Yellow	Coney Island North (Tk 1)	
29	Orange / Red	76 <sup>th</sup> Street North	
30	Red / Orange	Botanic Gardens North	

### **Model Board Patch Panel (Continued)**

	Wire Color	Indication	Out Cable Colors
31	Orange / Purple	Dyckman Street North	
32	Purple / Orange	Lenox Avenue South	
33	Orange / Black	Smith-9ths Street EXP South	
34	Black / Orange	Prospect Park EXP South	
35	Brown / Black	34 <sup>th</sup> Street EXP South	
36	Black / Brown	14 <sup>th</sup> Street EXP South	
37	Black / Gray	Chambers Street EXP South	
38	Gray / Black	Nevins Street South	
39	Gray / Purple	Nevins Street North	
40	Purple / Gray	Chambers Street EXP North	
41	Purple / Brown	14 <sup>th</sup> Street EXP North	
42	Brown / Purple	34 <sup>th</sup> Street EXP North	
43	Brown / White	Prospect Park EXP North	
44	White / Brown	Smith 9 <sup>th</sup> Street EXP North	
45	White / Gray	Lenox Avenue North	
46	Red / Brown – Pitkin 5	Chambers Pocket 1	
47	Brown / Red – Pitkin 6	Chambers Pocket 2	
48	Gray / White – Franklin 7	Union Pocket North	
49	Gray / Red – Franklin 8	Union Pocket Center	
50	Red / Gray – Franklin 9	Union Pocket South	
51	C5 Orange – Eighth 10	Coney Island 3	
52	C5- Or/W – Eighth 9	Coney Island 4	
53	C5 Green – Eighth 8	Coney Island 5	
54	C5 Gr/W – Eighth 7	Coney Island 6	
55	C5 Blue – Flatbush 33	NYP 5	
56	C5 GI/W – Flatbush 32	NYP 6	
57	C5 Brown – Flatbush 31	NYP 7	
58	C5 Br/W – Flatbush 30	NYP-Tail	
59			
60		GROUND	

## Eighth Street Cable

Pin No.	Wire Color	Indication
1	Black / Green	Coney Island, Downtown, Train Detection
2	Green / Black	Coney Island, Downtown, Green Signal
3	Black / Orange	Coney Island, Downtown, Yellow Signal
4	Orange / Black	Coney Island, Downtown, Red Signal
5	Black / Blue	Coney Island, Downtown, Start Relay
6	Blue / Black	Coney Island, Uptown, Train Detection
7	Black / Gray	Coney Island, Uptown, Green Signal
8	Gray / Black	Coney Island, Uptown, Yellow Signal
9	Black / Brown	Coney Island, Uptown, Red Signal
10	Brown / Black	Coney Island, Uptown, Start Relay
11	Red / Gray	South Ferry, Downtown, Train Detection
12	Gray / Red	South Ferry, Downtown, Green Signal
13	Red / Blue	South Ferry, Downtown, Yellow Signal
14	Blue / Red	South Ferry, Downtown, Red Signal
15	Red / Brown	South Ferry, Downtown, Start Relay
16	Brown / Red	Courtland, Uptown, Train Detection
17	Red / Green	Courtland, Uptown, Green Signal
18	Green / Red	Courtland, Uptown, Yellow Signal
19	Red / Purple	Courtland, Uptown, Red Signal
20	Purple / Red	Courtland, Uptown, Start Relay
21	Red / Orange	Lenox, Downtown, Train Detection
22	Orange / Red	Lenox, Downtown, Green Signal
23	Orange / White	Lenox, Downtown, Yellow Signal
24	White / Orange	Lenox, Downtown, Red Signal
25	Orange / Yellow	Lenox, Downtown, Start Relay
26	Yellow / Orange	Lenox, Uptown, Train Detection
27	Yellow / Brown	Lenox, Uptown, Green Signal
28	Brown / Yellow	Lenox, Uptown, Yellow Signal
29	Yellow / Gray	Lenox, Uptown, Red Signal
30	Gray / Yellow	Lenox, Uptown, Start Relay



## Rector Street Cable

Pin No.	Wire Color	Indication
1	Purple / Green	Times Square, Downtown, Train Detection
2	Green / Purple	Times Sqaure, Downtown, Green Signal
3	Purple / Gray	Times Square, Downtown, Yellow Signal
4	Gray / Purple	Times Square, Downtown, Red Signal
5	Purple / Brown	Times Square, Downtown, Start Relay
6	Brown / Purple	Times Square, Uptown, Train Detection
7	Brown / Black	Times Square, Uptown, Green Signal
8	Black / Brown	Times Square, Uptown, Yellow Signal
9	Brown / Yellow	Times Square, Uptown, Red Signal
10	Brown / Yellow	Times Square, Uptown, Start Relay
11	Green / Black	Smith 9 <sup>th</sup> St, Downtown, Train Detection
12	Black / Green	Smith 9 <sup>th</sup> St, Downtown, Green Signal
13	Green / Yellow	Smith 9 <sup>th</sup> St, Downtown, Yellow Signal
14	Yellow / Green	Smith 9 <sup>th</sup> St, Downtown, Red Signal
15	Green / White	Smith 9 <sup>th</sup> St, Downtown, Start Relay
16	White / Green	Smith 9 <sup>th</sup> St. Uptown, Train Detection
17	White / Blue	Smith 9 <sup>th</sup> St. Uptown, Green Signal
18	Blue / White	Smith 9 <sup>th</sup> St, Uptown, Yellow Signal
19	White / Gray	Smith 9 <sup>th</sup> St, Uptown, Red Signal
20	Gray / White	Smith 9 <sup>th</sup> St, Uptown, Start Relay
21	Orange / Yellow	Smith St Express, Downtown, Train Detection
22	Yellow / Orange	Smith St Express, Downtown, Green Signal
23	Orange / White	Smith St Express, Downtown, Yellow Signal
24	White / Orange	Smith St Express, Downtown, Red Signal
25	Orange / Black	Smith St Express, Downtown, Start Relay
26	Black / Orange	Smith St Express, Uptown, Train Detection
27	Black / Blue	Smith St Express, Uptown, Green Signal
28	Blue / Black	Smith St Express, Uptown, Yellow Signal
29	Black / Gray	Smith St Express, Uptown, Red Signal
30	Gray / Black	Smith St Express, Uptown, Start Relay





## Newkirk - Franklin Cable System

Pin No.	Wire Color	Indication
1	Dyckman 1	Dyckman Street, Downtown, Train Detection
2	Dyckman 2	Dyckman Street, Downtown, Green Signal
3	Dyckman 3	Dyckman Street, Downtown, Yellow Signal
4	Dyckman 4	Dyckman Street, Downtown, Red Signal
5	Dyckman 5	Dyckman Street, Downtown, Start Relay
6	Dyckman 6	Spare
7	Dyckamn 7	Spare
8	Dyckman 8	Spare
9	Dyckman 9	Spare
10	Dyckman 10	Spare
11	Dyckman 11	Spare
12	Newkirk 1	GRS Lever 22 : Union Square Pocket, Exit
13	Newkirk 2	
14	Newkirk 3	
15	Newkirk 4	
16	Newkirk 5	
17	Newkirk 6	
18	Newkirk 7	
19	Newkirk 8	
20	Newkirk 9	
21	Newkirk 10	
22	Newkirk 11	
23	Union Sq 1	Union Local, Downtown, Train Detection
24	Union Sq 2	Union Local, Downtown, Green Signal
25	Union Sq 3	Union Local, Downtown, Yellow Signal
26	Union Sq 4	Union Local, Downtown, Red Signal
27	Union Sq 5	Union Local, Downtown, Start Relay
28	Union Sq 6	Union Local, Uptown, Train Detection
29	Union Sq 7	Union Local, Uptown, Green Signal
30	Union Sq 8	Union Local, Uptown, Yellow Signal
31	Union Sq 9	Union Local, Uptown, Red Signal
32	Union Sq 10	Union Local, Uptown, Start Relay
33	Union Sq 11	Spare

## ***Newkirk - Franklin Cable System, Continued***

Pin No.	Wire Color	Indication
34	Union Sq 12	Union Exp, Downtown, Train Detection
35	Union Sq 13	Union Exp, Downtown, Green Signal
35	Union Sq 14	Union Exp, Downtown, Yellow Signal
37	Union Sq 15	Union Exp, Downtown, Red Signal
38	Union Sq 16	Union Exp, Downtown, Start Relay
39	Union Sq 17	Union Exp, Uptown, Train Detection
40	Union Sq 18	Union Exp, Uptown, Green Signal
41	Union Sq 19	Union Exp, Uptown, Yellow Signal
42	Union Sq 20	Union Exp, Uptown, Red Signal
43	Union Sq 21	Union Exp, Uptown, Start Relay
44	Union Sq 22	Spare
45	Franklin 1	Lever 27 - Union Pocket, Enter
46	Franklin 2	Lever 26 : Union North, LCL 2 EXP
47	Franklin 3	Lever 25 : Union North, EXP 2 LCL
48	Franklin 4	Lever 24 - Union South EXP 2 LCL
49	Franklin 5	Lever 23 - Union South, LCL 2 EXP
50	Franklin 6	Spare
51	Franklin 7	Pocket Indicator North
52	Franklin 8	Pocket Indicator Center
53	Franklin 9	Pocket Indicator South
54	Franklin 10	
55	Franklin 11	
56	Botanic 1	Botanic Garden, Downtown, Train Detection
57	Botanic 2	Botanic Garden, Downtown, Green Signal
58	Botanic 3	Botanic Garden, Downtown, Yellow Signal
59	Botanic 4	Botanic Garden, Downtown, Red Signal
60	Botanic 5	Botanic Garden, Downtown, Start Relay
61	Botanic 6	Botanic Garden, Uptown, Train Detection
62	Botanic 7	Botanic Garden, Uptown, Green Signal
63	Botanic 8	Botanic Garden, Uptown, Yellow Signal
64	Botanic 9	Botanic Garden, Uptown, Red Signal
65	Botanic 10	Botanic Garden, Uptown, Start Relay
66	Botanic 11	Spare



## Pitkin Avenue Cable System

Pin No.	Wire Color	Indication
1	Pitkin Av 1	GRS Lever 31 - Chambers Street Pocket 1, Enter
2	Pitkin Av 2	GRS Lever 30 - Chambers Street Pocket 1, Exit
3	Pitkin Av 3	GRS Lever 29 - Chambers Street Pocket 2, Enter
4	Pitkin Av 4	GRS Lever 28 - Chambers Street Pocket 2, Exit
5	Pitkin Av 5	Chambers Street Pocket 1, Indication
6	Pitkin Av 6	Chambers Street Pocket 2, Indication
7	Pitkin Av 7	
8	Pitkin Av 8	
9	Pitkin Av 9	
10	Pitkin Av 10	
11	Pitkin Av 11	
12	Pitkin Av 12	
13	Pitkin Av 13	
14	Pitkin Av 14	
15	Pitkin Av 15	
16	Pitkin Av 16	
17	Pitkin Av 17	
18	Pitkin Av 18	
19	Pitkin Av 19	
20	Pitkin Av 20	
21	Pitkin Av 21	
22	Pitkin Av 22	
23	Chambers Local 1	Chambers Local Downtown, Train Detection
24	Chambers Local 2	Chambers Local Downtown, Green Signal
25	Chambers Local 3	Chambers Local Downtown, Yellow Signal
26	Chambers Local 4	Chambers Local Downtown, Red Signal
27	Chambers Local 5	Chambers Local Downtown, Start Relay
28	Chambers Local 6	Chambers Local, Uptown, Train Detection
29	Chambers Local 7	Chambers Local, Uptown, Green Signal
30	Chambers Local 8	Chambers Local, Uptown, Yellow Signal
31	Chambers Local 9	Chambers Local, Uptown, Red Signal
32	Chambers Local 10	Chambers Local, Uptown, Start Relay
33	Chambers Local 11	Spare

## ***Newkirk - Franklin Cable System, Continued***

Pin No.	Wire Color	Indication
34	Avenue H 1	Avenue H, Downtown, Train Detection
35	Avenue H 2	Avenue H, Downtown, Green Signal
36	Avenue H 3	Avenue H, Downtown, Yellow Signal
37	Avenue H 4	Avenue H, Downtown, Red Signal
38	Avenue H 5	Avenue H, Downtown, Start Relay
39	Avenue H 6	Avenue H, Uptown, Train Detection
40	Avenue H 7	Avenue H, Uptown, Green Signal
41	Avenue H 8	Avenue H, Uptown, Yellow Signal
42	Avenue H 9	Avenue H, Uptown, Red Signal
43	Avenue H 10	Avenue H, Uptown, Start Relay
44	Avenue H 11	Spare
45	76 <sup>th</sup> Street 1	76 <sup>th</sup> Street, Downtown, Train Detection
46	76 <sup>th</sup> Street 2	76 <sup>th</sup> Street, Downtown, Green Signal
47	76 <sup>th</sup> Street 3	76 <sup>th</sup> Street, Downtown, Yellow Signal
48	76 <sup>th</sup> Street 4	76 <sup>th</sup> Street, Downtown, Red Signal
49	76 <sup>th</sup> Street 5	76 <sup>th</sup> Street, Downtown, Start Relay
50	76 <sup>th</sup> Street 6	76 <sup>th</sup> Street, Uptown, Train Detection
51	76 <sup>th</sup> Street 7	76 <sup>th</sup> Street, Uptown, Green Signal
52	76 <sup>th</sup> Street 8	76 <sup>th</sup> Street, Uptown, Yellow Signal
53	76 <sup>th</sup> Street 9	76 <sup>th</sup> Street, Uptown, Red Signal
54	76 <sup>th</sup> Street 10	76 <sup>th</sup> Street, Uptown, Start Relay
55	76 <sup>th</sup> Street 11	Spare
56	Chambers Exp 1	Chambers Express, Downtown, Train Detection
57	Chambers Exp 2	Chambers Express, Downtown, Green Signal
58	Chambers Exp 3	Chambers Express, Downtown, Yellow Signal
59	Chambers Exp 4	Chambers Express, Downtown, Red Signal
60	Chambers Exp 5	Chambers Express, Downtown, Start Relay
61	Chambers Exp 6	Chambers Express, Uptown, Train Detection
62	Chambers Exp 7	Chambers Express, Uptown, Green Signal
63	Chambers Exp 8	Chambers Express, Uptown, Yellow Signal
64	Chambers Exp 9	Chambers Express, Uptown, Red Signal
65	Chambers Exp 10	Chambers Express, Uptown, Start Relay
66	Chambers Exp 11	Spare

## Flatbush Avenue Cable

Pin No.	Wire Color	Indication
1	Flatbush 1	GRS Lever 13 : Prospect Uptown, LCL 2 EXP
2	Flatbush 2	GRS Lever 14 : Prospect Uptown, EXP 2 LCL
3	Flatbush 3	GRS Lever 15 : Prospect Downtown, EXP 2 LCL
4:	Flatbush 4	GRS Lever 16 : Prospect Downtown, LCL 2 EXP
5	Flatbush 5	
6	Flatbush 6	
7	Flatbush 7	
8	Flatbush 8	
9	Flatbush 9	
19	Flatbush 10	
11	Flatbush 11	
12	Flatbush 12	
13	Flatbush 13	
14	Flatbush 14	
15	Flatbush 15	
16	Flatbush 16	
17	Flatbush 17	
18	Flatbush 18	
19	Flatbush 19	
20	Flatbush 20	
21	Flatbush 21	
22	Flatbush 22	
23	Flatbush 23	
24	Flatbush 24	
25	Flatbush 25	
26	Flatbush 26	
27	Flatbush 27	
28	Flatbush 28	
29	Flatbush 29	
30	Flatbush 30	
31	Flatbush 31	
32	Flatbush 32	
33	Flatbush 33	

## ***Flatbush Avenue Cable, Continued***

Pin No.	Wire Color	Indication
34	Penn Local 1	Penn Station Local, Downtown, Train Detection
35	Penn Local 2	Penn Station Local, Downtown, Green Signal
36	Penn Local 3	Penn Station Local, Downtown, Yellow Signal
37	Penn Local 4	Penn Station Local, Downtown, Red Signal
38	Penn Local 5	Penn Station Local, Downtown, Start Relay
39	Penn Local 6	Penn Station Local, Uptown, Train Detection
40	Penn Local 7	Penn Station Local, Uptown, Green Signal
41	Penn Local 8	Penn Station Local, Uptown, Yellow Signal
42	Penn Local 9	Penn Station Local, Uptown, Red Signal
43	Pen Local 10	Penn Station Local, Uptown, Start Relay
44	Pen Local 11	Spare
45	Penn Express 1	Penn Station Express, Downtown, Train Detection
46	Penn Express 2	Penn Station Express, Downtown, Green Signal
47	Penn Express 3	Penn Station Express, Downtown, Yellow Signal
48	Penn Express 4	Penn Station Express, Downtown, Red Signal
49	Penn Express 5	Penn Station Express, Downtown, Start Relay
50	Penn Express 6	Penn Station Express, Uptown, Train Detection
51	Penn Express 7	Penn Station Express, Uptown, Green Relay
52	Penn Express 8	Penn Station Express, Uptown, Yellow Signal
53	Penn Express 9	Penn Station Express, Uptown, Red Signal
54	Penn Express 10	Penn Station Express, Uptown, Start Relay
55	Penn Express 11	Spare
56	Prospect Exp 1	Prospect Express, Downtown, Train Detection
57	Prospect Exp 2	Prospect Express, Downtown, Green Signal
58	Prospect Exp 3	Prospect Express, Downtown, Yellow Signal
59	Prospect Exp 4	Prospect Express, Downtown, Red Signal
60	Prospect Exp 5	Prospect Express, Downtown, Start Relay
61	Prospect Exp 6	Prospect Express, Uptown, Track Detection
62	Prospect Exp 7	Prospect Express, Uptown, Green Signal
63	Prospect Exp 8	Prospect Express, Uptown, Yellow Signal
64	Prospect Exp 9	Prospect Express, Uptown, Red Signal
65	Prospect Exp 10	Prospect Express, Uptown, Start Relay
66	Prospect Exp 11	Spare







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