



ACHIEVEMENT PROGRAM MODEL RAILROAD ENGINEER ELECTRICAL STATEMENT OF QUALIFICATIONS FORM May 2006

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Member's Name: Dwight Sherman

To qualify for this certificate you must:

- Construct and demonstrate on your own or a club layout, the satisfactory operation of an electrical control system on a model railroad capable of simultaneous and independent control of two mainline trains in either direction, and containing at least:
 - DC Power – 5 blocks that can be controlled independently
 - DCC/TMCC/Other Power – gaps, switches, phase for troubleshooting
 - Wye
 - Facilities for storing of at least two unused motive power units.
 - One yard with a minimum of three tracks and a switching lead independent of the mainline.
 - One power supply with protective devices (short indicator and/or circuit breaker) to ensure safe operation.
 - One passing siding
 - One reverse loop
 - Turntable
 - Transfer table.
- Wire and demonstrate the electrical operation of at least three of the following items:
 - Turnout
 - Crossing
 - Crossover
 - Double crossover
 - Single slip switch
 - Gauge separation turnout
 - Double junction turnout
 - Three way turnout
 - Gauntlet turnout
 - Spring switch
 - Operating switch in overhead wire
- Wire and demonstrate the satisfactory electrical operation of at least three of the following features:
 - Electrical turnout position
 - Track occupancy
 - Cab control
 - Engine terminal
 - Two turnout junctions
 - High-frequency lighting
 - Electronic throttle
 - Grade crossing
 - Two-way block signaling
 - Operating overhead wire
 - Computer control
 - Animated displays
 - Layout lighting displays
 - Command Control Receiver
 - Command Control Throttle Buss Line
 - Sound system
 - Signaling system
 - CTC system
 - Onboard video system
 - Computerized block detection
 - Computerized operation
 - Computer to railroad interface
 - Other: Diode-Matric for Yard Switches
- Prepare a schematic drawing of the propulsion circuitry of the model railroad in Section 1 showing the gaps, blocks, feeders, speed and direction control, electrical switches and power supplies. Prepare schematic drawings identifying the wiring and components of the six items in Requirements 2 & 3.



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5. Submit a completed Statement of Qualifications (SOQ) which shall include the following:

- Attachment showing the track plan required in Requirement 1.
- Description of the track work features, method of construction and identification of commercial components used in 2 & 3.
- The signed witness certification form showing that each of the above items are operational and meet all applicable NMRA Standards.

JUDGE'S NAME	SIGNATURE	NMRA #
ROBERT WEINHEIMER m m r	<i>Robert M. Weinheimer</i>	053330
William L. Wadsworth	<i>William L. Wadsworth</i>	112733
JOHN M. HARRIS	<i>John M. Harris</i>	089050

Member's Statement and Agreement:

I certify that I have completed all of the requirements for this Certificate of Achievement as listed above and that I will agree to assist other members in this subject whenever possible, whether or not they are participants in the Achievement Program.

NAME: Dwight Sherman SIGNATURE: *Dwight Sherman* Date: July 17, 2008

Certification of Regional Achievement Program Chair

As the NMRA Regional Achievement Program Chair of the _____, I certify that I have examined this SOQ and, having compared it to the stated requirements for this certificate, I am satisfied that the stated requirements have been met.

NAME: _____ SIGNATURE: _____ Date: _____

Region Cert #: _____

Approval by AP National Executive Vice-Chair

NAME: _____ SIGNATURE: _____ Date: _____

NMRA Achievement Program -- Model Railroad Engineer Electrical

Part 1

Schematic "A" represents the first phase of the current layout showing the elements required. The Layout control uses DCC NCE ProCab 5-amp unit. Power to the layout consists of two schemes. Most of the layout uses a small buss line (14 or 16 gauge) used with longer wires (18 gauge) branching to the different tracks for connection. There are several branch points located throughout the layout. In some case, a buss line is used with short connection to the rails. Throttles for operation can be plugged into one of several connectors located throughout the layout, connected by a "Throttle Buss" for control. (See below)

This layout has 5 reversing loops including one "WYE" (L1): and 4 Reverse Loops (L2-L5), controlled electronically by power reversal units. Gaps are indicated on the drawing. Some loops are included to insure that parallel crossovers have no phase problems – and no gaps are required. The main layout contains two Yards (at least 6 tracks each) and several industry locations, including a two track engine terminal. The two yards are each connected to a switching lead. The main track has a passing siding that can used as part of a continuous loop, if needed, or the layout can be treated as a "Dog Bone" with reverse loops on each end.

This initial layout has been modified to include a second level and additional yards and Industry and an engine terminal, with one additional reverse loop. The second level is accessed by a Helix. Two of the yards on the second level contain Diode-Matrix Controls to line tracks. This panel contains LED indicator lights to assure the right track is selected.

Part 2

Layout turnouts are all Atlas, powered by wiring at each rail. Turnouts are controlled by manual switches, Atlas Snap Machines and Tortoise Machines. The latter two machines are hooked to independent controls, a main panel control, or a Diode Matrix Panel.

Schematic "B" -- The Crossing is supplied by Atlas, with independent power routing. It is installed in two reverse loops, thus controlled electronically by power reversal units (L4 and L5).

Schematic "C" -- The Layout contains several crossovers, and one double Crossover (Schematic "D"). The power on each track is applied to eliminate any phase separation between tracks thus elimination of a need for gaps in the crossovers.

Part 3

Electric Turnout position is best described by the LED Indicator on the Diode Matrix Turnout control scheme. Turnouts in the Yard are wired to a 12-volt DC supply and the turnouts only transmit power when all are lined in the appropriate manner. See Discussion below and Schematic "H"

Command Control Throttle Buss Line -- The layout control uses DCC NCE ProCab unit. Throttles for operation can be plugged into one of several terminals located throughout the layout, connected by a "Throttle Buss" for control. The Buss line used a six conductor cable wired to UTP designed to use RJ-12 plugs attached to the throttles. The UTP Connectors are located on the edge of the layout for convenient operation.

Diode Matrix Control -- Schematic "E" through "H". There are at least two Yards (Kodiak Yard, 6-track, and Northwood Yards, 7 track) controlled by diode matrix systems to drive Tortoise Switch Machines. The contacts are used to power light emitting diodes (LED) to indicate Switch Machine position, hence track position.

- ❖ Schematic "E" -- North end of Second Level Layout.
- ❖ Schematic "F" -- showing Kodiak Yard and Tortoise Switch Machine routing.
- ❖ Schematic "G" -- showing hookups to switch machines with normal & reverse directions indicated.
- ❖ Schematic "H" -- Detailing power routing of indicator LEDS.

Photos

1. Helix from Level One to Two.
2. Showing original Control Panel for Level One of Layout.
3. Reverse of Diode Matrix Panel of Level two, Kodiak Yard.
4. Level One --showing Crossing to industrial yards.
5. Level One, Brandywine Yard (6 Tracks).
6. Diode Matrix turnout indicator lights for Northwood and Kodiak Yards.
7. Photo of Level Two above Sarahville Yard.
8. Engine Terminal at Northwood and Kodiak Yard.
9. Photo of terminal block for Diode Matrix Tortoise Switch Machine hookups.

