MicroLok® II: E-Code™ Track Circuit Enhancement

When it was introduced in 1999, the ASTS USA MicroLok® II Wayside Control System was the first microprocessor-based controller to combine vital logic, data transmission, non-vital logic and electronic coded track circuits into a single package capable of controlling applications as complex as a double cross-over.

The benefits of the MicroLok II Wayside Control System, however, could not be realized in territory where Electrocode™ coded track circuits were installed because they were not compatible with the MicroLok II control system.

To enable the MicroLok II Wayside Control System to be compatible with Electrocode track circuits and to be economically applied in Electrocode-equipped territory, ASTS USA has developed the MicroLok II E-Code Coded Track Circuit.

General Description

The new ASTS USA MicroLok II E-Code Coded Track Circuit makes the ASTS USA MicroLok II system fully compatible with all versions of Electrocode coded track circuits. By enabling the MicroLok II system to be installed in territory equipped with current and past generations of Electrocode track circuits, the E-Code track circuit allows the benefits of the MicroLok II system’s diagnostic and maintenance tools, user-interface features and data-recording functions to be realized system-wide, without application constraints.

MicroLok II/E-Code supplements the MicroLok II system with two E-Code-specific elements: A Track PCB and a Track Interface Panel. The Track PCB interfaces with the CPU board, where the functions of track messaging and train detection are performed (see RSE-1D2.5 for additional information on the Track PCB). Both the Track PCB and the Interface Panel are dual-function units designed to handle two independent track circuits. The Interface Panel is designed for compatibility with highway crossing audio overlay equipment, and provides immunity to 60 Hz interference. The unit also provides secondary surge protection. It is functionally and mechanically equivalent to the Electrocode 5 (EC5) Track Interface Panel (TIP-2).

Advantages

- Track circuits are terminated at low impedance to minimize the effect of ballast variations.
- Reliable track communication and train detection.
- Provides reliable operation independent of received current above the operating threshold of 0.5 amperes.
- Shunt detection time of 6.3 seconds (maximum); track restore time is based on receipt of four messages.
- Slower restore time allows for proper operation of stick logic, which is dependent on an orderly progression of track circuit occupancy.
- Adjustment and performance of the track circuit can be reviewed easily without requiring instrumentation or a need to interrupt the track circuit.
- Transmitter output voltage can be adjusted without interrupting track circuit communications.
- Application programming using Boolean expressions or ladder logic diagrams.
- Reverse compiler and logic-comparison tools.
**Application**

The MicroLok II E-Code Track Circuit allows MicroLok II hardware and application software to support MicroTrax® and E-Code track circuit formats simultaneously. This provides a transitional bridge between Electrocode territory and MicroTrax territory without the need for additional hardware.

- Track circuit adjustments are easily made by one person and require no instrumentation.
  - A 10-position selector switch on the front panel of the MicroLok II E-Code PCB enables transmitter output voltage to be set in accordance with adjustment tables, which specify the voltage output for each increment of track circuit length.

- A menu-express push-button on the track board immediately changes the two 4-character displays on the CPU board to indicate the codes being transmitted and received.
  - Repeat pressing of the push-button cycles through displays indicating received current, transmitted voltage and transmitted current.

- A 3-position (STEADY, OFF and NORMAL) transmitter toggle-switch is available for each track circuit for trouble-shooting purposes.
  - STEADY position: Transmitter output steady 1V
  - OFF position: Transmitter is deactivated and receiver is activated continuously.

**Track Circuit-Related Specifications**

<table>
<thead>
<tr>
<th>Transmitter:</th>
<th>Output Voltage into 1.25 ohms: 1.0 to 2.5 volts DC.</th>
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<tbody>
<tr>
<td></td>
<td>Output Impedance: 0.15 Ohms.</td>
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<tr>
<td></td>
<td>Current Measurement Range: 0 to 6.0 Amps.</td>
</tr>
<tr>
<td>Receiver:</td>
<td>Input Impedance: 0.15 Ohms.</td>
</tr>
<tr>
<td></td>
<td>Current Measurement Range: 0 to 3.6 Amps.</td>
</tr>
</tbody>
</table>

**MicroLok II E-Code Track Circuit**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>N17063901</td>
<td>E-Code Track Circuit PCB</td>
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</tbody>
</table>

**Software Characteristics**

As a part of the MicroLok II product family, MicroLok II E-Code Track Circuit programming is performed using the ASTS USA MicroLok II Development System. This Windows®-based consists of a Maintenance Tool, an Application-Logic Compiler, a Reverse Compiler and an Application Logic Comparison Tool. These tools enable the user to retrieve system event and error logs and to compile, debug and upload an application-logic program from a PC into the i-Lok card file. For more information on the MicroLok II Development System, contact your ASTS USA Account Executive.

**Typical E-Code Track Circuit Status Screen**

![Typical E-Code Track Circuit Status Screen](image)

**Ordering and Information**

- For ordering and other information on the MicroLok II E-Code Track Circuit enhancement, contact your ASTS USA Account Executive.

- MicroLok II E-Code Track Circuit board part number shown at lower left.

- Refer to **RSE-1D2.5** for additional information on the ECode PCB.

- Request ASTS USA Service Manual 7101 for additional MicroLok II/E-Code system information.

- Refer to **RSE-1A5** for E-Code track circuit applications in the MicroLok II End Point system.

- Refer to **RSE-3J1** for ASTS USA’s portable Track Circuit Simulator, which provides convenient testing of Electrocode track circuits.