The Challenges… Install & Diagnose

- Detector technology has seen major improvements
  › Modern detectors use sophisticated technology and are reliable
- **Challenge - Installing Equipment**
  › Equipment is not installed properly (loops, lead-in, mechanical)
  › Equipment is programmed inadequately
  › Out-of-box default settings are seldom adequate
- **Challenge - Diagnosing Problems**
  › Awareness of equipment tools & capabilities
  › Collecting clues from all sources
  › Making sense of the clues to design a remedy
Inductive Loop Detectors

- Having the right tools makes installing and operating a loop detector easier.
- Two categories of product in the marketplace
  - High-end, many programmable features, LCD display
  - Commodity level, low cost, does the job

Loop Detection

- Installation Issues
  - Loop detectors often work well “out-of-the-box”.
  - To more accurately configure a detector such that ALL vehicle classes are reliably detected takes some effort.
  - Conventional **DIP switch** detectors use an iterative series of vehicle experiments to arrive at the correct configuration.
    - Thus, correct DIP Switch setup can ONLY be verified by an actual test of the vehicle class.
Primary Detector Installation Tools

- Minimum Set of tools
  - Call Strength indicator
  - Dynamic sensitivity programming
  - Frequency Meter
- LCD based detectors offer these tools and much more, but at a cost and complexity.
- This presentation focus is on “commodity level” products such as the LMD series to get the job done.

Primary Detector Installation Issues

- Setting the sensitivity level for each loop such that all vehicle classes are reliably detected from high-bed trucks to mopeds.
- Setting the nominal frequency such that cross-talk issues are avoided rather than resolved later when trouble occurs.
  - Two channels set to high and low frequency with identical loops with can end up tuning to the same frequency.
  - A rule of thumb is at least 5 KHz separation on adjacent 6 foot loops.
What is the DEFLECTOMETER?

- The LMD Series uses an intuitive push-button interface with a 7-segment **DEFLECTOMETER™** display for each channel.
  - The **DEFLECTOMETER** display shows the relative **strength of the call** while a vehicle is in the detection zone. This provides feedback that the unit is optimally tuned to detect vehicles of all sizes.
  - **Call Strength** is analogous to the volume of the music from a radio. It is not the number on the dial that matters, but the volume of the music that hits your ears.

- Don’t leave motorcycles stranded
- Saves agencies time, trouble, and money!

One Set-up Step for Sensitivity

- Using Call Strength to *indirectly* set the Sensitivity Level ensures that vehicles of all sizes are optimally detected.
  - The **DEFLECTOMETER** display provides feedback to achieve the optimal sensitivity setting in a single programming step.
  - Adjust the sensitivity for each channel until the unit reliably generates a Call Strength value.

- The Call Strength display is dynamically adjusted as sensitivity is changed to achieve the desired Call Strength value without moving the vehicle in and out of the detection zone.
Let’s See the LMD622T in Action…

Setting the Sensitivity Level (Auto)

• With a vehicle in the detection zone the DEFLECTOMETER will display the Call Strength value of 1 through 9. The optimum value for a typical mid-sized vehicle is 5.

  › If a mid-size vehicle shows the Call Strength value 7 on the DEFLECTOMETER, the “sensitivity” should be lowered two levels (7-2 = DEFLECTOMETER reading 5). This is done by pressing the front panel SENS▼ (down) button two times.

  › If a mid-size vehicle shows the Call Strength value 2 on the DEFLECTOMETER, the “sensitivity” should be raised three levels (2+3 = DEFLECTOMETER reading 5). This is done by pressing the front panel SENS▲ (up) button three times.

• The DEFLECTOMETER dynamically updates after each level change, allowing changes to the sensitivity setting while the vehicle remains in the detection zone.

• Note that the Call Strength value is different than the actual Sensitivity Level setting, though they increase or decrease in step.

• The Sensitivity Level can also be set directly if desired.
Setting the Mode

• The Operational mode can be set to Short Presence, Long Presence, Pulse, Call or Off mode.
  › Short Presence mode is 30 minutes
  › Long Presence mode is 120 minutes
  › Pulse mode produces a 125 ms pulse
  › Call mode will set the output to the True state continuously
    • This is a useful mode for testing detector channel to CU mapping and hardware without cabinet test switches
  › Off mode disables the channel when not used

Output Modes (Channel 1)

<table>
<thead>
<tr>
<th>Short Presence (S)</th>
<th>Long Presence (L)</th>
<th>Pulse (P)</th>
<th>Call Continuous (C)</th>
<th>Channel Off (-)</th>
</tr>
</thead>
<tbody>
<tr>
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<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
<td><img src="image5.png" alt="Image" /></td>
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Primary Detector Installation Issues

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- Setting the nominal frequency such that cross-talk issues are avoided rather than resolved later when trouble occurs.
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Setting the Reference Frequency

- The Frequency Level setting can be set to one of four values.
- Pressing the FREQ button once will display the Frequency Level and tuned frequency without changing the setting:
  - "3" ⇒ "-" ⇒ "4" ⇒ "7" ⇒ "-"
  - This sequence would indicate Frequency Level "3" and a loop reference frequency of 47 KHz

_greater than 5 KHz separation is recommended between adjacent 6ft loops on different detectors to prevent crosstalk problems._
Loop Frequency Display

This sequence indicates Frequency Level 3 and a Loop Reference Frequency of 47 KHz for Channel 1

LMD Loop Fault Monitor

- **Challenge - Diagnosing Problems**
  - Open loop, Shorted loop, Large Change of Inductance

- Separate Color-coded Detect and Fault LED Indicators
  - Red for the Detect LED and Yellow for the Fault LED

- Loop Faults Indicated by Unique LED Flash Sequence
  - Shorted Loop, Open Circuit Loop and Excessive Inductance Change.
  - The DEFLECTOMETER displays an “F” during a current fault.

- Fault Memory
  - The Fault LED flash sequence indicates the last loop fault that was detected.
  - This feature can indicate the failure mode of an intermittent suspect loop.
Introducing a Better Handle Assembly

- Revolutionary New Design
  - Manufactured from durable GE Lexan™ Polycarbonate
  - Designed for Durability, Protection and Convenience
  - Integrated Handle, Faceplate, and Component Cover
    - Strengthens and Protects the PCB Assembly.
    - Temperature Stability of Critical Components is greatly increased.
    - Larger handle provides more room for gloved hands. Makes insertion and extraction much easier and less stressful on the PCB assembly.
  - Quick Reference Instructions are conveniently attached on the side. No need for usually missing "cheat sheets”.

LMD Series Loop Monitor

- Built-in DEFLECTOMETER Technology
  Provides Users With:
  - Call Strength Indicator for Optimum Sensitivity Programming
  - Frequency Meter for immediate analysis of loop frequency, avoiding loop cross-talk problems
  - Push Button Programming

  Why guess when you can know your detector is optimally programmed and performing for all vehicle classes!
Signal Monitors & Loop Detectors

The Right TOOLS Always Make the Job EASIER

- Understand how to correctly install and use your equipment.
- Use the tools that the equipment provides.
- ‘Easy’ does not always sacrifice accuracy or sophistication.
- Procure equipment that has the right tools.

Thank You…

Setting the Standard for Quality and Reliability

Eberle Design Inc.

www.EDItraffic.com