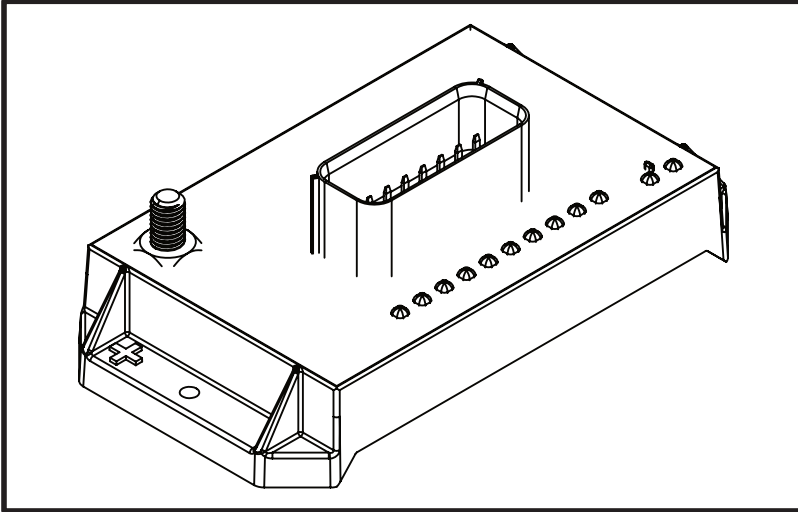


# bluePRINT<sup>®</sup>

## Remote Node with Magnetic ID

Part Number: ENGND04102



### ⚠ WARNING

- Reversing the power and ground connections will damage the unit and void the warranty.
- HIGH CURRENT interconnects must be properly terminated. Poor crimp quality can cause heat build-up and fire. Follow crimp connector manufacturer instructions. Always verify that the mating terminals for high current connectors use the same plating finish.
- DO NOT install this product or route any wires in the Air Bag Deployment Zone. Refer to vehicle Owner's Manual for deployment zones.
- DO NOT use system to disconnect headlights, brake lights or other safety equipment.
- Unit may become hot to touch during normal operation.
- Failure to properly install connectors, fuses or wiring may cause equipment or vehicle failure or fire.
- Installation must only be performed by trained technician. Installer must determine vehicle wiring configuration and proper integration of system.
- Use proper wire gauge. All power wires connecting to positive (+) or negative (-) battery terminal or local chassis ground (-) must be sized to supply at least 125% of max. current and properly fused at power source.
- Install protective grommets when routing wire through firewall or metal.
- It is the installer's responsibility to verify installation of special connectors or greases as listed in this installation manual. Neglecting to do so may result in product failure and/or warranty refusal.

#### NOTICE:

Installers and users must comply with all applicable federal, state and local laws regarding use and installation of warning devices.

Improper use or installation may void warranty coverage. To review our Limited Warranty Statement & Return Policy for this or any SoundOff Signal product, visit our website at <https://soundoffsignal.com/support-page/warranty/>. All returned items must be properly packed to prevent damage in transit.

If you have questions regarding this product, contact **Technical Services**, Monday - Friday, 8 a.m. to 5 p.m. at 1.800.338.7337 (press #4 to skip the automated message). Questions or comments that do not require immediate attention may be emailed to [techgroup@soundoffsignal.com](mailto:techgroup@soundoffsignal.com).

### INTRODUCTION

Thank you for choosing to equip your vehicle with SoundOff Signal's powerful, bluePRINT system. bluePRINT has been designed from the ground up as a complete solution for even the most advanced emergency vehicle needs. It is capable of managing multiple connected devices, including lightbars, control panels, and remote input and output modules.

The ENGND04102 Remote Node provides expansion to the already capable bluePRINT 500 Series Control System or Central Controller, including:

- Four solid state outputs capable of up to 10 amps
- Six solid state outputs capable of up to 5 amps
- Four positive or negative activated inputs, programmable through SoundOff Central.

The system's most advanced features are configurable using our SoundOff Central application for Windows. With SoundOff Central you can program input and output relationships, read vehicle data signals, build virtual inputs, and manage load-shed using voltage or timers. Additionally, you can use the diagnostics interface to validate your program and troubleshoot connections.

### TECHNICAL SPECIFICATIONS

General Information	
Module Dimensions	6.2" x 3.5" x 1.9" 156.9 x 89.5 x 47.7mm
Boxed Weight	471.5 grams
Operating Temperature	-40C to 105C, see "Ambient Heat to Maximum Current" section
Compatibility	500 Series Control System Central Controller
Diagnostic LEDs	Status Address Outputs 1 through 10
Address Setting	Magnet north or south pole
Input Voltage	9 to 16Vdc (Negative Ground)
Input Current	15 to 50A depending on operating temperature, must be fused, see: "Ambient Heat to Maximum Current" section
Standby Current	Ignition ON: 65mA typical Ignition OFF: < 0.6mA
Over Voltage Protection	Yes
Solid State Outputs	4 @ 10A 6 @ 5A
Diode Isolated Outputs	1 (Output 5)
Inrush Capable Outputs	4 (Outputs 2, 4, 7, and 9)

## CAUTION & NOTICE TO THE INSTALLER

Make sure to read and understand all instructions and warnings before proceeding with the installation of this product. Ensure the manual and all warning cards are delivered to the end-user of this equipment. It is your sole responsibility to install this product in accordance with known automotive electrical best practices. Vehicle modification is done at the sole risk of the modifier and should follow vehicle manufacturer guidelines.

## HARDWARE INSTALLATION & WIRE ROUTING

Locate a suitable mounting location. We recommend a cool, dry area. Before drilling holes, check for clearance to prevent damage to the remote node or any other components being installed. Check both sides of the mounting surface before drilling and be aware of any vehicle components or other vital parts that may be damaged during drilling. It is the installer's responsibility to verify this information.

**WARNING:** DO NOT MOUNT COMPONENTS IN OR ROUTE WIRING THROUGH AIR BAG DEPLOYMENT ZONES.

1. Mark the anchor points where the remote node is to be mounted.
2. Remove the remote node from the mounting area.
3. If necessary, pre-drill any mounting holes into the mounting surface.
4. Secure the remote node to the mounting surface with the included hardware. The mounting plate gets sandwiched between the remote node and the mounting surface.

**NOTICE:** PROPER INSTALLATION OF THE REMOTE NODE REQUIRES MOUNTING ON FLAT SURFACES.

## POWER, GROUND & FUSING

### Main Power & Fusing

**WARNING:** TO AVOID DAMAGE OR INJURY, DO NOT CONNECT POWER WHEN CIRCUIT IS LIVE. Install fuse only after all connections are verified to be correct and secure.

See image 2 on the following page. Connect 12 VDC power directly to the power stud as shown on the upper right. Install the lock washer and then the included 8mm nut. When making the connection, be sure to use an equal sized ring terminal (M8 / 5/16") designed for the size of wire being used to supply power. The included protective rubber boot should be installed onto the supply wire prior to termination.

The power stud should be torqued to 9Nm / 79.5 in/lbs. Slide the rubber boot over the stud after torquing for protection.

**NOTICE:** A SINGLE RING TERMINAL MUST BE USED. DO NOT STACK RING TERMINALS. DO NOT TIGHTEN THE NUT ON BARE WIRE. DO NOT OVER-TIGHTEN THE NUT.

The "Ambient Heat to Maximum Current" chart on the next page shows the maximum rated current based on mounting location and ambient temperature. The remote note should be fused accordingly. Additionally wire that supplies power to the remote node should be of proper size, as recommended by the table below.

For both fusing and determining wire gauge, calculate limits at 125% of the total switched current in your application.

**NOTICE:** TO PREVENT STRAIN ON ALL CONNECTORS AND TO ALLOW FOR EASE OF FUTURE SERVICEABILITY, WE RECOMMEND INSTALLERS LEAVE SUFFICIENT EXTRA LENGTH OF WIRE TO PROVIDE A SERVICE LOOP. THIS SERVICE LOOP SHOULD BE SECURED TO THE INSTALLATION PLATFORM OR A TIE DOWN POINT.

### Ground

Pin #14 of the main 16-pin connector serves as the remote node ground. Connect this wire to an OEM frame ground as close as possible to the remote node.

**NOTICE:** THE REMOTE NODE IS NOT REVERSE POLARITY PROTECTED. VERIFY POWER AND GROUND CONNECTIONS BEFORE ENERGIZING. REVERSING THE POWER AND GROUND CONNECTION WILL DAMAGE THE REMOTE NODE AND **VOIDS THE WARRANTY.**

## RETROFITTING A FIRST GENERATION REMOTE NODE

When replacing or retrofitting a first generation remote node, pay special attention to the changes on how they are connected (as shown in Image 1 below).

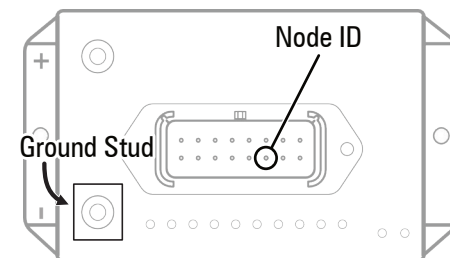
**Ground** - The first generation remote node has a second stud on the node for connecting ground. The second generation remote node uses PIN 14.

If using an ENGHNK02 or ENGHNK04 harness, Pin 14 is the white/black wire previously used for node ID. For the second generation remote node, connect this wire to ground.

**Node ID** - The first generation remote node used Pin 14 to set the remote node ID. This pin position is now ground on the second generation remote node.

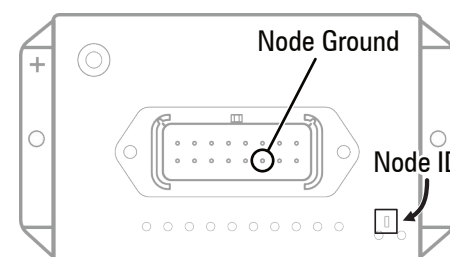
ID can instead be set using a magnet. This process is described on the next page.

### First Generation Remote Node



- Has a ground stud
- Node ID using Pin 14

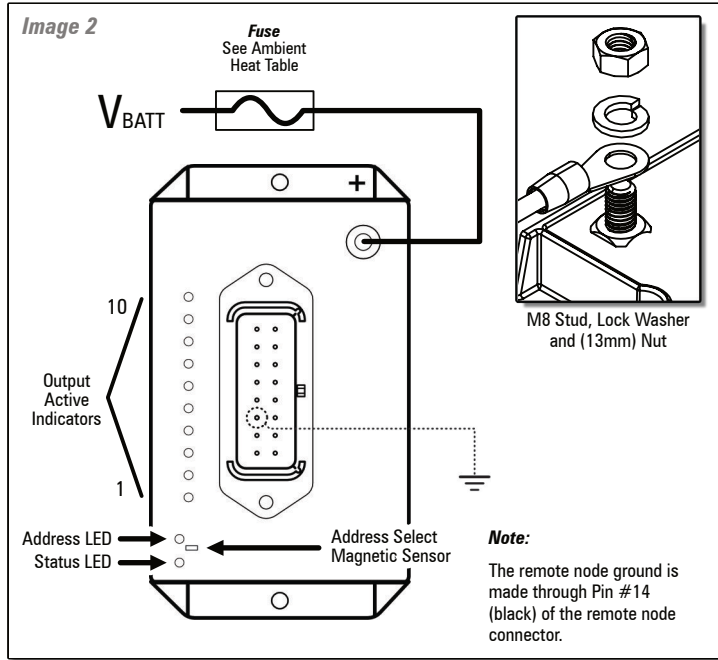
### Second Generation Remote Node with Magnetic ID



- No ground stud.
- Grounds through Pin 14.
- Node ID using a Magnet

Image 1

# REMOTE NODE WIRING DIAGRAMS, ID PROGRAMMING & ERROR CONDITIONS



## Address LED & setting the remote node ID

The address LED flashes one to five times followed by a ## second break to indicate the remote node's ID. Remote node ID can be set externally using a magnet. The sensor is omnipolar, either side of a magnet will work. To set the ID:

- Activate address change mode by holding a magnet to the device until the Status LED starts flashing rapidly, and then remove the magnet within 2 seconds. The Status LED will turn off when magnet is no longer sensed.
- Repeat step 1 one more time within 3 seconds. If no magnet is detected on this step, the device will go back to normal operating mode.
- The Status LED will continue to flash rapidly to notify the user that the device is in address change mode.
- The address will advance one position each time the magnet is "tapped" to the Address Select Magnetic Sensor for one second or less. Tapping and holding the magnet between one and two seconds goes back one address position. The Address LED will reflect the new setting and the flash sequence will restart each time the address is changed.
- The device will go back to normal operating mode once 10 seconds have elapsed after the new address as long as a new magnet "tap" is not detected.
- Additionally, the process will end if the magnet is sensed for 5 or more seconds.

## Status LED Operating Conditions

- Steady: the remote node is powered up and running with no errors. Communication through to the system controller is OK.
- Off: the remote node is off, in sleep mode, or does not detect the system controller.
- Flashing: The remote node is indicating a fault or the system is in firmware update mode. Fault conditions are read by counting the number of times the LED flashes on. The diagnostic LED will break 2.5 seconds between indicating another fault or repeating.

## Status LED Fault Conditions

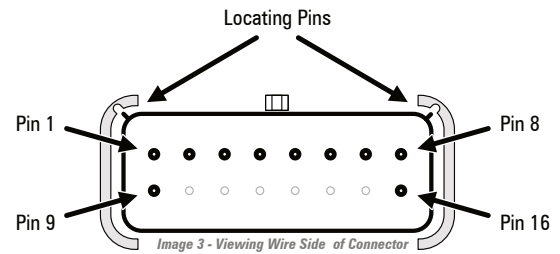
Flash Count	Error Condition
1	One or more outputs are faulted
2	LIN communication error with controller
3	Under-voltage condition
4	Over-voltage condition
5	Over-temperature condition
6	Reserved
7	Reserved
8	Reserved
9	Reserved

## Ambient Heat to Maximum Current:

Remote nodes should be mounted as far away from heat sources as possible. Always select a fuse size that is 125% of the expected total current and below the maximum current. Use the below table to determine the maximum current throughput and fuse size from the remote node:

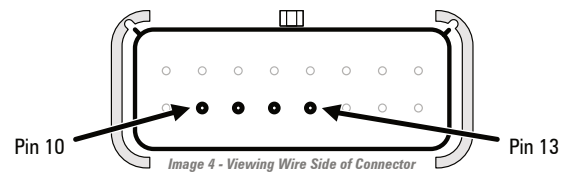
Temperature Operating Range	Maximum Current
-40C to 65C / -40F to 149F	50A Maximum Fuse
-40C to 85C / -40F to 185F	30A Maximum Fuse
-40 to 105C / -40F to 221F	15A Maximum Fuse
Above 105C / 221F	Not recommended for use

## Remote Node Input and Output Schematics



## Outputs

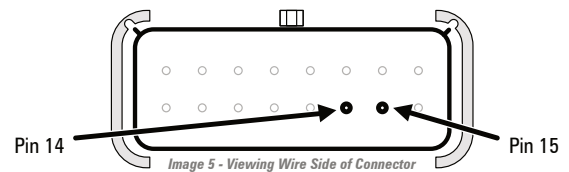
Pin #	Output Number	Amps	Special Notes	ENGHNK05 Harness Color	ENGHNK06 Harness Color
16	Output 1	5A		Brown	Red
8	Output 2	10A		Pink / Black	Orange
7	Output 3	5A		Pink	Pink
6	Output 4	10A		Blue / Black	Gray
5	Output 5	5A	Diode Isolated	Blue	Blue
4	Output 6	5A		Green	Brown
3	Output 7	10A		Green / Black	White
2	Output 8	5A		Orange	Green
1	Output 9	10A		Orange / Black	Red
9	Output 10	5A		Gray	Orange



## Inputs

Pin #	Input Number	Special Notes	ENGHNK05 Harness Color	ENGHNK06 Harness Color
10	Input 1	Ignition Input*	Orange / White	Pink
11	Input 2		Green / White	Gray
12	Input 3		Blue / White	Blue
13	Input 4		Purple / White	Brown

\* Input #1 is a general use input. It can be programmed as a normal high or low system input, or it can be set to an ignition input when set to high, using SoundOff Central bluePRINT software.



## Other Connections






Pin #	Function	ENGHNK05 Harness Color	ENGHNK06 Harness Color
14	Main Remote Node Ground	Black	Black
15	LIN Data to Controller	Yellow	Yellow

# REMOTE NODE CONNECTOR INFORMATION & OTHER MISCELLANEOUS

## SoundOff Signal Accessories

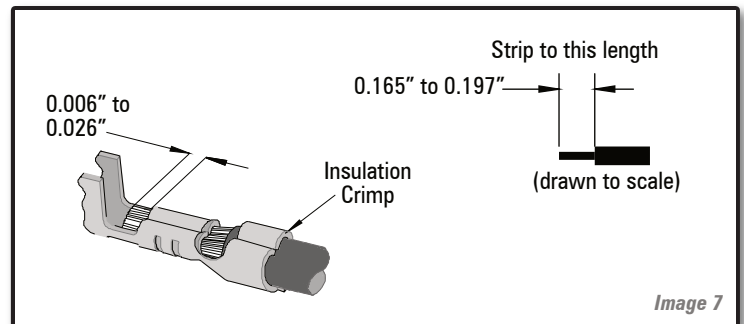
SOS Part Number	Description	Notes
ENGHNK05	SoundOff Signal 18" Harness Assembly for Remote Nodes with Magnetic ID	Pre-assembled harness.
ENGHNK06	SoundOff Signal 10' Harness assembly for Remote Nodes with Magnetic ID	Pre-assembled harness.
PNGNDHK01	Accessory Magnetic Screwdriver (for node ID)	

### Build your own harness components:

Manufacturer Part Number	Description	Notes	Image
<b>MOLEX</b> - 19418-0030	MX 150L 16 Circuit Sealed Receptacle for 14-16 AWG Wire	MX 150L Assembly Instructions <a href="https://www.molex.com/pdm_docs/as/AS-19417-001.pdf">https://www.molex.com/pdm_docs/as/AS-19417-001.pdf</a>  *WARNING: Wire Diameter with insulation must be 0.113in to 0.139in to properly seal. This is equivalent to SXL Cross-link wire that is 16 AWG.	
<b>MOLEX</b> - 19420-0001	MX 150L Female Terminal for 14-16 AWG Wire, <i>TIN PLATED</i>	MX 150L Assembly Instructions <a href="https://www.molex.com/pdm_docs/as/AS-19417-001.pdf">https://www.molex.com/pdm_docs/as/AS-19417-001.pdf</a>  *WARNING: Wire Diameter with insulation must be 0.113in to 0.139in to properly seal. This is equivalent to SXL Cross-link wire that is 16 AWG.	
<b>MOLEX</b> - 19417-0119	MX 150L Socket Plug for 14-16 AWG Wire	MX 150L Assembly Instructions <a href="https://www.molex.com/pdm_docs/as/AS-19417-001.pdf">https://www.molex.com/pdm_docs/as/AS-19417-001.pdf</a>  *One plug is required for each unused pin location to ensure a water seal.	
<b>MOLEX</b> - 63811-4400	Molex Hand Crimp Tool for above MX 150L Female Terminal	Application Tooling Specifications Sheet <a href="https://www.molex.com/pdm_docs/ats/ATS-6381144HM.pdf">https://www.molex.com/pdm_docs/ats/ATS-6381144HM.pdf</a>  Molex Quality Crimping Handbook <a href="https://www.molex.com/pdm_docs/ats/TM-638000029.pdf">https://www.molex.com/pdm_docs/ats/TM-638000029.pdf</a>	
<b>MOLEX</b> - 63813-1500	Molex Pin Extraction Tool for above MX 150L Connector	Application Tooling Specifications Sheet <a href="https://www.molex.com/pdm_docs/ats/ATS-6381144HM.pdf">https://www.molex.com/pdm_docs/ats/ATS-6381144HM.pdf</a>	

## ⚠ WARNING

- HIGH CURRENT interconnects must be properly terminated. **Poor crimp quality can cause heat build-up and fire.** Follow crimp connector manufacturer instructions. Always verify that the mating terminals for high current connectors use the same plating finish.
- Do not stack ring terminals on the power stud. Ensure the lock washer is installed on top of the ring terminal, prior to installation of the retaining nut.
- Remote Nodes can switch up to the maximum amperage limits shown on the **Ambient Heat to Maximum Current** table shown on page 3. The maximum should be restricted based on higher ambient temperatures. **Fuse accordingly.**
- **The upfitter should ensure outputs do not exceed this total current.** This includes during planning, during physical installation of equipment, and while programming in SoundOff Central bluePRINT. Individual output switches are rated up to 5 or 10 Amps each, **but the total device current must not exceed the limit** as described on the Ambient Heat to Maximum Current table.
- Do not gang or parallel multiple outputs to drive a higher current load.



## WIRE AMPERAGE TABLE

Wire Gauge	AMPERAGE													
	1	2	3	4	5	7.5	10	15	20	25	30	40	50	
20	25.6	12.8	8.5	6.4	5.1									
18	40.7	20.3	13.6	10.2	8.1	5.4								
16	64.7	32.3	21.6	16.2	12.9	8.6	6.5							
14		51.4	34.3	25.7	20.6	13.7	10.3	6.9	5.1					
12			81.7	54.5	40.9	32.7	21.8	16.3	10.9	8.2	6.5	5.4		
10				86.6	65.0	52.0	34.7	26.0	17.3	13.0	10.4	8.7	6.5	5.2
8						82.7	55.1	41.3	27.6	20.7	16.5	13.8	10.3	8.3
6							87.6	65.7	43.8	32.9	26.3	21.9	16.4	13.1
4									69.7	52.2	41.8	34.8	26.1	20.9