

# AUTOMATIC VEHICLE IDENTIFICATION

## AVI SYSTEM - LOW FREQUENCY INDUCTIVE COUPLED

### HANDS FREE PRIORITY VEHICLE ACCESS



Transmitters are Available with a Standard Single Code, Low Power Single Code, or Two Different Codes



Single Code Transmitter

**AVI-X1-n**

n Designates Transmitter Code Number

Two Code Transmitter

**AVI-X2-n1-n2**



**CR-100 AVI Code Reader**

Verifies Transmitter's Code



**Small Size**

Single Code Transmitter

**AVI-XS1-n**

n Designates Transmitter Code Number

Two Code Transmitter

**AVI-XS2-n1-n2**

## SINGLE CODE RECEIVERS

**AVI-B Receiver**



**Vehicle ID Presence Relay**

**AVI-BP Receiver**



**Vehicle ID Presence Relay, Pulse-on-Entry Relay, Sensitivity Control**

**BT-AVI Receiver**



**Vehicle Detection and Single Vehicle ID from the same Loop**

## MULTI CODE RECEIVERS

**BT-AVI-C Receiver**



**Vehicle Detection and Vehicle ID (all codes) from the same Loop**

**AVI-E Receiver**



**Two Channel AVI Receiver (all codes)**

User can validate or invalidate over 19,000 codes via the serial port



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Since 2000

**Overview**

The Reno A&E AVI System provides vehicles hands free access to automatic gates and doors. The transmitter is attached to the underside of a vehicle and connected to the vehicle's electrical system. When power is applied the transmitter emits a continuous coded signal. The transmitter is inductively coupled through standard roadway loops to a Reno A&E receiver. When the receiver recognizes a valid code the receiver provides a signal providing vehicle access. The AVI-X and AVI-XS transmitters are factory programmed with either one or two of 19,683 possible codes. The AVI-B, AVI-BP and BT-AVI are simple AVI single code receivers, which are factory programmed to identify a single code. The BT-AVI is an inductive loop detector and AVI receiver providing both normal detection and vehicle identification from the same loop. The BT-AVI-C and AVI-E receivers can be programmed, via the front panel serial port, to validate or invalidate any of the 19,683 possible codes. The BT-AVI-C is an inductive loop detector and single channel AVI receiver. The AVI-E is a two channel AVI receiver, and each channel can be programmed to accept or reject any of the 19,683 codes and provide output signals for valid codes. The AVI transmitter provides a low frequency coded signal, which is inductively coupled through an in ground loop, thus insuring a well defined detection zone.

**Model AVI-X and AVI-XS Transmitters**

**General Description:** The Model AVI-X and AVI-XS Vehicle Identification (AVI) Transmitters are self-contained devices that are easily installed on the underside of a vehicle. When power is applied the transmitter emits coded signal(s). The signal is picked up by a loop coil mounted in the roadway surface, which is connected to an AVI receiver capable of decoding the transmitted signal.

**Transmitter Codes:** 19,683 possible codes.

**Setup:** The transmitters are operational immediately upon application of power and do not require any adjustment.

**Fuse:** A one ampere (1A) slo blow fuse should be installed in the power lead.

**Power:** 12 VDC: 11.5 to 14.0 VDC, 100 milliamps maximum.

**Operating Temperature:** -40° F to +180° F.

**Power Cable:** 15 foot unterminated, two conductor, twisted pair cable. Red (+), Black (-)

**Ordering Information:**

Model AVI-X1 - n	single code transmitter
AVI-X2 - n1 -n2	two code transmitter
AVI-XS1 - n	small size single code transmitter
AVI-XS2 - n1-n2	small size two code transmitter
	n = codes

**AVI Receivers**

**Receiver Codes:** 19,683 possible codes.

**Setup:** The receiver does not require any adjustment or setup. The AVI-BP has a sensitivity adjustment.

**Receiving Range:** The transmitter must in close proximity, or over, the loop coil embedded in the roadway surface.

**Response Time:** The receiver will reliably recognize a valid coded transmitter remaining within the detection zone for a minimum of 100 milliseconds.

**Presence Time:** Once a valid coded transmitter has been recognized the receiver will output a signal as long as the transmitter is in the detection zone, and for a period of two (2) seconds after the transmitter leaves the detection zone.

**Loop Coil Area:** The maximum recommended loop perimeter is 150 feet.

<b>Loop Coil Turns:</b>				
Loop Perimeter	10 to 13 Feet	14 to 26 Feet	27 to 45 Feet	46 + Feet
Number of Turns	5	4	3	2

**Loop Feeder Length:** The maximum length of loop feeder cable (lead-in cable) is 300 feet.

**Power Indicator:** A high-intensity green light-emitting diode (LED) indicates power is present.

**Detect Indicator:** A high-intensity red light-emitting diode (LED) indicates the presence of a valid coded transmitter.

**Relay Output Ratings:** The output relay contacts are rated for maximum continuous current of 3 amps, 300 VAC maximum, 150 VDC maximum, and 180 Watts maximum switched power.

**Operating Temperature:** -40° F to +180° F.

**Model AVI-B and AVI-BP Receivers**

**General Description:** The Model AVI-B and AVI-BP receivers identify vehicles equipped with a uniquely coded AVI transmitter. The receivers use a loop coil installed in the roadway surface to receive the transmitter's code. The receivers are factory programmed to identify one specific transmitter code and do not require any adjustments or setup. The receivers are operational immediately upon application of power. Separate LEDs on the front panel indicate the presence of power and the presence of a valid-coded transmitter. The Model AVI-B has a single relay indicating the presence of a transmitter code. The Model AVI-BP has a single relay indicating the presence and a second relay providing a 250 mSec pulse when the code is first identified. The Model AVI-BP also has a sensitivity adjustment that increases or decreases the distance the transmitter can be identified from the loop.

**Connector:** Front mounted, 10-pin, MS3102A-18-1P.

**Size:** 2.90 inches high x 1.60 inches x wide x 4.96 inches deep excluding connector. Connector adds 0.675 inches to the depth measurement.

**Weight:** 12.8 oz.

**Ordering Information:**

<b>Model AVI-B-y-n</b> or <b>AVI-BP-y-n</b>	y = power voltage	n = Receiver code
	1 = 120 VAC version, 89 to 135 VAC, 50/60 Hz, 3 Watts maximum	
	22 = 12.0 to 24.0 VAC, 3 Watts maximum	
	30 = 12.0 to 24.0 VAC, 1.5 Watts maximum	
	Presence Relay, Pulse Relay, and Sensitivity Control	
	Presence Relay Only	

**Model BT-AVI and BT-AVI-C (optional serial communications)**

**General Description:** The Model BT-AVI-n and BT-AVI-C are dual function units combining the features of an inductive loop detector with an Automatic Vehicle Identification (AVI) Receiver. Two LEDs on the front panel of the unit indicate vehicle presence and presence of a valid-coded transmitter. The loop detector provides an output relay contact closure for vehicle presence. The AVI receiver provides an output relay contact for recognition of a valid coded signal from an AVI transmitter. The units connect to a standard vehicle loop installed in the pavement. The BT-AVI is factory programmed to identify a single specific transmitter code. The Model BT-AVI-C has serial communications that can be used to validate or invalidate any one of the 19,683 codes.

**Power/ Detect / AVI Code / Loop Fail Indicators:** The unit is fully operational within two (2) seconds after application of power. The unit has one green and three red LED indicators. The LEDs indicate the detector's power status, vehicle detect output state, AVI code output state, and loop failure conditions.

**Sensitivity:** (Loop Detector) The eight-position rotary switch selects one of eight sensitivity levels. 0 is lowest and 7 is highest, with normal (default) being 3.

**Detect Output State - Loop Failure:** DIP Switch 1 configures the loop detector to operate in either Fail-Safe or Fail-Secure mode during loop failure or loss of power.

**Sensitivity Boost:** DIP switch 2 can be turned ON to increase sensitivity by two levels during the detect state without changing the sensitivity during the no detect state. This feature is useful in preventing dropouts during the passage of high bed vehicles. The sensitivity level during boost never exceeds a setting of 7

**Output Delay Time (Dip Switches 3 & 4):** Delay time is defined as: the time following the detection of a vehicle before the output relay changes to the "detect state". Delay times of zero, two, five, and ten seconds can be programmed.

**Output Extension Time (Dip Switches 5 & 6):** Extension time is defined as: the time following the loss of detection before the output relay changes to the "no-detect state". Extension times of zero, two, five, and ten seconds can be programmed.

**Loop Frequency (Dip Switches 7 & 8):** Four loop frequencies. When loops are located in close proximity it may be necessary to select different loop frequencies to avoid loop interference, commonly known as crosstalk.

**Ordering Information:**

BT-AVI-1 or 5-n	BT-AVI-C-1 or 5	1 = 89 to 135 VAC, 50/60 Hz, 6 Watts maximum
		5 = 10 to 30 VAC, 50/60 Hz, 6 Watts max or 10 to 30 VDC, 160 mA max
		With Serial Communication
		Receiver code. Leave blank for BT-AVI-C

**Model AVI-E Receiver**

**General Description:** The Model AVI-E Automatic Vehicle Identification (AVI) Receiver is a two channel card-rack type receiver that detects and identifies vehicles equipped with AVI transmitters. The AVI-E uses two loops (one per channel) installed in the roadway surface to receive the transmitter's code. Each receiver channel operates independently and identifies all 19,683 codes. Each channel can be programmed independently to set any code as either valid or invalid.

**Channel Enable / Disable Switch:** When the switch is in the **DISABLE** position, the channel will not recognize coded signals. When the switch is in the **ENABLE** position, the channel operates in a normal manner.

**Audible Detect Signal:** A front panel mounted push button is used to enable an audible detect signal (buzzer) that is emitted whenever a coded transmitter is present within the loop zone.

**Loop Fail Indicator:** Each channel has a front panel mounted high intensity red LED that indicates a current or prior loop failure condition.

**Communication Port:** The AVI-E receiver has a front panel mounted DB-9 RS-232 connector that allows data to be communicated to and from external equipment (e.g. a control system or PC). The RS-232 connector can be used to program each channel of the AVI-E receiver to accept or ignore coded input signals.

**Receiver Address DIP Switches:** A four-position DIP switch located on the PC board is used to select one of sixteen (16) possible address bit combinations for the AVI-E receiver.

**Solid State Outputs:** Optically isolated. 40 VDC maximum collector (drain) to emitter (source). 100 mA maximum saturation current. 2 VDC maximum transistor saturation voltage. The output is protected with a 47 volt Zener diode connected between the collector (drain) and emitter (source).

**Power:** 10.8 to 30 VDC, 160 milliamps maximum.

**Size:** 4.50 inches high x 1.12 inches wide x 6.875 inches deep (including connector, excluding handle). Handle adds 1.00 inch to depth measurement.

**Weight:** 6.0 oz.

**Ordering Information:** AVI-E

**AVI-B, AVI-BP, BT-AVI and BT-AVI-C Receiver / Wiring Harness Pin Assignments**

Pin	Wire Color	AVI-B Function	AVI-BP Function	BT-AVI-(C) Function
A	White	AC Neutral / DC Common	AC Neutral / DC Common	AC Neutral / DC Common
B	Brown	Relay A, Normally Open	Relay A, Normally Open	Detect and ID Relay Common
C	Black	AC Line / DC +	AC Line / DC +	AC Line / DC +
D	Red	Loop Input	Loop Input	Loop Input
E	Orange	Loop Input	Loop Input	Loop Input
F	Yellow	Relay A Common	Relay A and B Common	Detect Relay N.O. (Fail-safe) Detect Relay N.C. (Fail-secure)
G	Blue	Relay A, Normally Closed	Relay A, Normally Closed	Detect Relay N.C. (Fail-safe) Detect Relay N.O. (Fail-secure)
H	Green	Chassis Ground	Chassis Ground	Chassis Ground
I	Violet	No Connection	Relay B, Normally Open	ID Relay Normally Open
J	Gray	No Connection	No Connection	No Connection

**AVI-E Receiver Pin Assignments (2 x 22 Card Edge Connector)**

Pin	Function
A	DC Common
B	DC +
C	External Reset Input
D & 4	Channel 1 Loop Input
E & 5	Channel 1 Loop Input
F	Channel 1 Output, Collector (Drain) Relay Normally Open (N.O.)
H	Channel 1 Output, Emitter (Source) Relay Common
J & 8	Channel 2 Loop Input
9 & K	Channel 2 Loop Input
L	Chassis Ground
W	Channel 1 Output, Collector (Drain) Relay Normally Open (N.O.)
X	Channel 1 Output, Emitter (Source) Relay Common

**BT-AVI-C & AVI-E Receiver Pin Assignments (DB-9 RS-232 Communication Connector)**

Pin	Function	Pin	Function
1	No Connection	6	No Connection
2	Receive (RX)	7	No Connection
3	Transmit (TX)	8	No Connection
4	No Connection	9	No Connection
5	DC Common	Case	Chassis Ground

Pins not shown are No Connection