



Global Traffic  
Technologies

# Canoga™ Traffic Sensing System

## Canoga™ C922 and C924 Vehicle Detectors

**Matched Components of the Canoga™ Traffic Sensing System**

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### Description

Canoga™ C922 and C924 Vehicle Detectors measure vehicle presence, count and roadway occupancy with industry-leading accuracy and reliability through superior inductive vehicle detection. Canoga C922 is a two-channel vehicle detector and the Canoga C924 is a four-channel vehicle detector. Both are designed to meet U.S. control cabinet rack standards. They are configured using Canoga™ C900 Configuration Software. Through the Canoga C900-CS, users are able to easily change a detector's configuration, view binning data, monitor traffic real-time (including speed and length), and view detector status. Canoga C922 and C924 allow remote access through serial ports on the front of the detector and on the back panel connector.

### Operating Characteristics

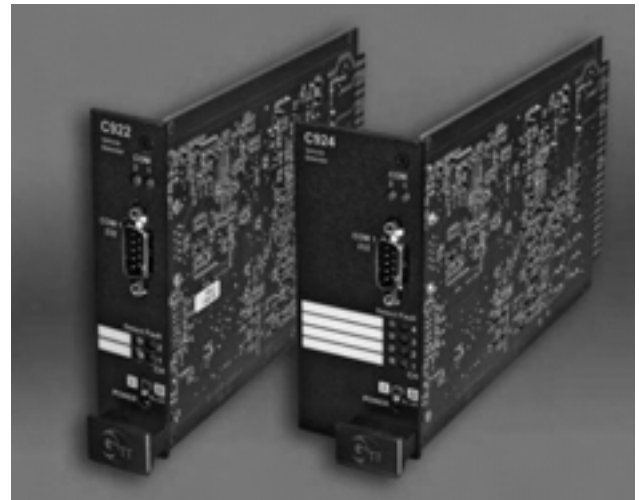
Canoga C922 and C924 have built-in protection against lightning-induced and other transients. User-programmed settings and vehicle detector-gathered data are stored in non-volatile memory.

### Communication

Two independent serial ports are available for local and remote communications:

- Front panel TIA232 (RS232) port
- Back panel transmit/receive pin connectors for multi-drop TIA485 (RS485) communication

Canoga C900-CS uses the ports for local or remote configuration of the detector and for disturbance identification, to monitor and retrieve real-time activity, and to access data logging and binning information.



Canoga™ C922 Vehicle Detector and  
Canoga™ C924 Vehicle Detector

### Tuning Range

20 to 2,500 microhenries.

### Sensitivity Setting

Sixteen sensitivity settings are available per channel:

- Eight "pulse" mode sensitivities, or
- Seven "presence" mode sensitivities, or
- "Off" mode

### Frequency Setting

Four frequency settings per channel.

# Matched Components of the Canoga™ Traffic Sensing System

## Sensitivity, Threshold and Typical Response Time Values

Sensitivity Level	Threshold in NanoHenries	Typical Loop System Response Time
C	1024	<5 milliseconds
1	512	<6 milliseconds
2	256	<6 milliseconds
3	128	<8 milliseconds
4	64	<12 milliseconds
5	32	<20 milliseconds
6	16	<34 milliseconds
7	8	<64 milliseconds

## Remote Reset Input

Input allows an external reset of the detector. When input voltage on pin C is pulled below 6 VDC for  $\geq 17$  milliseconds, the detector resets all active channels and establishes a new reference for each "On" loop within four seconds.

## Power On/Off Switch (Reset Switch)

Allows the unit to be disabled or reset while still in the card rack.

## Internal Loop Diagnostics

Records and stores type of loop fault and time of occurrence.

## Channel by Channel Programmability

All vehicle detection parameters are programmable separately for each channel. This includes the sensitivity, background adapt rate, recovery method, wash delay time and wash adapt rate.

## Status Output

Status output "on" when channel is okay.

## Switch Output

Opto-isolated darlington pair switch outputs.

## Detect and Fault LED Indicators

**Green Detect LED** indicators display channel output status and output timing.

- "On" during detection indicates that a vehicle is being detected
- "Flash" indicates that timing is active during delay or extension (with timing option) or direction detection
- Continuous "on" indicates fault condition exists

**Red Fault LED** indicators display coded messages of current or historical fault status and failure type.

- One long and one short pulse indicates a current open loop
- One long and two short pulses indicate a current shorted loop
- One long and three short pulses indicate current excess inductance change ( $\Delta L \geq 25\%$ )
- A 5-second long pulse followed by the flash code for a fault indicates historical fault status

## Power LED

- Indicates power is applied to the unit

## Comm Port Activity LEDs

- Rapidly flashing LED indicates data transmission
- COM 1 LED indicates front port communication
- COM 2 LED indicates rear port communication
- A 1-Hz flash by either LED indicates synchronization faults

## Environmental

**Temperature:** -29° F (-34° C) to +165° F (+74° C)

**Humidity:** 5% to 95% (non-condensing)

**Electrical:** 10.8 VDC to 37.8 VDC

≤50 milliamperes/channel at 24 VDC

110 milliamperes/unit typical at 12 VDC

55 milliamperes/unit typical at 24 VDC

## Physical Dimensions

**Net Weight:** (C922) 4.2 oz. (181 g)

(C924) 7.8 oz. (220 g)

**Width:** (C922) 1.13 in. (2.87 cm)

(C924) 1.91 in. (4.86 cm)

**Height PC board:** 4.5 in. (11.43 cm)

**Face plate:** 4.5 in. (11.43 cm)

**Depth:** 7.1 in. plus .55 in. for handle

(18 cm plus 1.4 cm for handle)

## Canoga™ C900 Configuration Software

Canoga™ C900 Configuration Software is a matched component of the Canoga™ Vehicle Detection System. The configuration software can be run on both PCs and handheld devices. It uses communication ports to access Canoga™ C922 and C924 Vehicle Detectors to read and change configuration settings, for disturbance or fault identification and verification, to monitor real-time activity, and to retrieve binned traffic data.

## Configuration of Canoga C922 and C924

Canoga C900-CS is used to completely configure Canoga C922 and C924 using the TIA232 serial port. The following parameters can be programmed per channel:

- Sensitivity/mode and operating frequency
- Delay or extend time
- Adapt parameters per channel: background adapt rate, recovery method, wash delay time, wash adapt rate
- Traffic sensor parameters
- Long loop counting parameters
- Directional vehicle detection parameters
- Detect LED, call output, fault LED and status output can be forced “on” or “off”
- Configure channel for traffic count and occupancy data selection

Canoga C900-CS is also used to set all other detector parameters:

- Field modem parameters
- Programmable address and password of detector
- Front and rear communication ports
- Synchronization mode
- Vehicle count period
- State of outputs for fault conditions
- Three types of noise filtering
- Pulse rephase time
- Configure schedule for traffic count and occupancy data collection

## Applications

### Real-time Activity Monitoring

The real-time activity monitoring application allows a traffic engineer to monitor detector activity in real-time from a remote location. The following parameters can be monitored: loop measurements (loop status, loop inductance, loop frequency, reference frequency), last fault or disturbance (type, time and date of occurrence), last vehicle (inductance change, duration of detection, and time and date of detection) and count (vehicle count, directional count and period remaining).

## Traffic Data Binning

Traffic data binning retrieves the binned data collected in the vehicle detector memory. Binned vehicle count and occupancy can be viewed by date and time for each channel. Since overall memory is limited in size, setting the end time to “indefinite” or too far into the future will eventually fill the memory of the detector. In this case, the first data collected will be replaced by new data. If longer binning duration is required, the Canoga™ 848 Memory Module is available as an option to increase the memory size.

The table below illustrates the binning duration depending on the indicated binning interval.

	Binning Interval	Onboard Memory	Memory Module
Two Channel	1 Minute	42 Hours	180 Hours
	15 Minutes	26 Days	112 Days
Four Channel	1 Minute	21 Hours	90 Hours
	15 Minutes	13 Days	56 Days

## Real-time Vehicle Logging

Canoga C900-CS receives data from the vehicle detector serial port and displays the information in real-time. Users may select which channel to log and can enter location-specific descriptions. The following parameters are displayed in real-time calculated by Canoga C900-CS: vehicle speed, detection duration, loop duration and vehicle length. The real-time data may be stored in a file on a disk or printed for later analysis.

## Directional Vehicle Travel Detection

Canoga C900-CS can configure Canoga C922 and C924 for detection of vehicle travel direction. Two overlapping inductive loops are connected to either channels 1 and 2 (Canoga C922 or C924) or 3 and 4 (Canoga C924 only). The travel direction of a vehicle is identified by the directional vehicle count and the directional call in either the first or second channel of the channel pair, depending on the channel chosen for direction detection.

## Long Loop Counting

Canoga C900-CS can be used to remotely retrieve long loop counting information from Canoga C922 and C924.

## Canoga™ C922 and C924 Vehicle Detector Options

### Canoga™ 848 Memory Module

The Canoga™ 848 Memory Module is an optional accessory for Canoga™ C922 and C924 Vehicle Detectors and expands the memory used for traffic data binning. This module increases the standard available binning memory from 16KB to 64KB.

### Canoga™ 832 Communication Module

The Canoga™ 832 Communication Module changes the rear TIA485 port to a TIA232 port. The Canoga 832 module cannot be used when a Canoga 848 module is installed, and vice versa.

Canoga™ C922 AND C924 Vehicle Detector Board Edge Connector Terminations							
Pin	Function	C922	C924	Pin	Function	C922	C924
A	Common of +24VDC	•	•	1	Synchronize Conductor 1	•	•
B	+24VDC (+10.8VDC to 38VDC)	•	•	2	Synchronize Conductor 2	•	•
C	RESET External	•	•	3	NC		
D	Channel 1 Loop Input A	•	•	4	Channel 1 Redundant Loop Input A	•	•
E	Channel 1 Loop Input B	•	•	5	Channel 1 Redundant Loop Input B	•	•
F	Channel 1 Switch Output (C)	•	•	6	NC		
H	Channel 1 Switch Output (E)	•	•	7	Channel 1 Disturbance Signal (OC)	•	•
J	Channel 2 Loop Input A	•	•	8	Channel 2 Redundant Loop Input A	•	•
K	Channel 2 Loop Input B	•	•	9	Channel 2 Redundant Loop Input B	•	•
L	PE (Protective Earth)	•	•	10	NC		
M	NC			11	NC		
N	NC			12	NC		
P	Channel 3 Loop Input A		•	13	Channel 3 Redundant Loop Input A		•
R	Channel 3 Loop Input B		•	14	Channel 3 Redundant Loop Input B		•
S	Channel 3 Switch Output (C)		•	15	NC		
T	Channel 3 Switch Output (E)		•	16	Channel 3 Disturbance Signal (OC)		•
U	Channel 4 Loop Input A		•	17	Channel 4 Redundant Loop Input A		•
V	Channel 4 Loop Input B		•	18	Redundant Loop Input B		•
W	Channel 2 Switch Output (C)	•	•	19	EIA-485-A [RS-232 TX (M832 Option)]	•	•
X	Channel 2 Switch Output (E)	•	•	20	Channel 2 EIA Disturbance Signal (OC)	•	•
Y	Channel 4 Switch Output (C)		•	21	EIA-485-B [RS-232 RX (M832 Option)]	•	•
Z	Channel 4 Switch Output (E)		•	22	Channel 4 EIA Disturbance Signal (OC)		•

Shaded means this model has no connection to this pin.

(E): Emitter of Opto-coupler (C): Collector of Opto-coupler (OC): Open Collector/Open Drain NC = No Connection  
Pins 1 through 22 are on the top (component) side and pins A through Z are on the back (solder side).

Polarization keys are located at three positions: between B/2 and C/3, between M/11 and N/12, between E/5 and F/6.

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