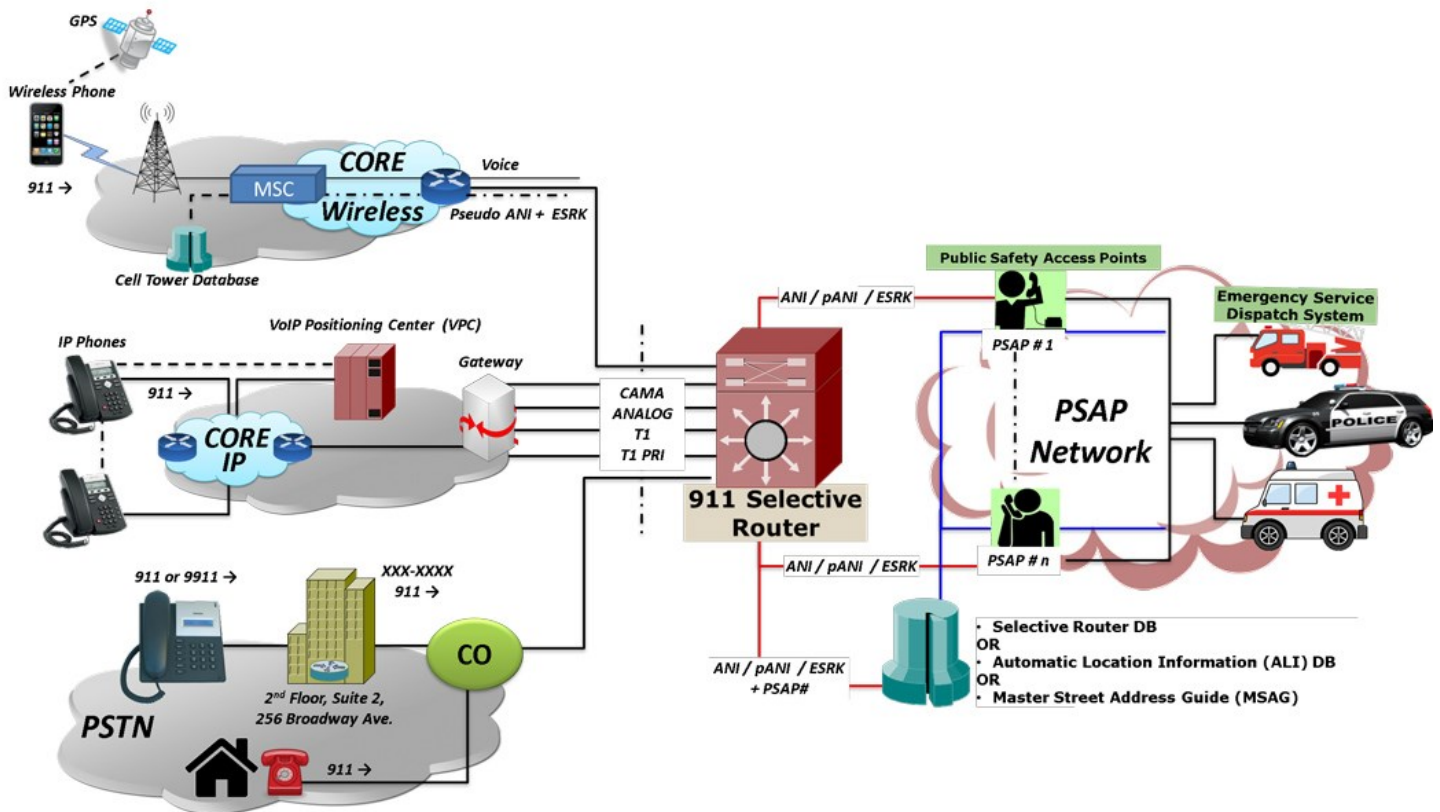


CAMA Simulation and Monitoring

(Centralized Automatic Message Accounting)



Overview

CAMA - Centralized Automatic Message Accounting is a special analog trunk originally developed for long-distance billing but is now mainly used for emergency call services: 911 and Enhanced 9-1-1 (E-911). CAMA trunk connects a carrier switch directly to the Selective Router (SR), a special 911 Switch that in turn connects to many PSAPs.

CAMA Signaling Simulation and Monitoring is accomplished using GL's [MAPS™ CAS Emulator](#) and [MAPS™ FXO FXS Emulator](#) hardware and software applications. Similarly, [MAPS™ ISDN Emulator](#) and [MAPS™ SS7 Emulator](#) can perform 911 messaging and analysis over ISDN/PRI and SS7. All of these are strictly over a PSTN/TDM network.

GL's [MAPS™ CAS Emulator](#) can be used to simulate CAMA trunks connected to the 911 Selective Router. CAMA type signaling trunks are used to provide the calling party's Automatic Number Identification (ANI) to the Selective Router. The Selective Router then routes the call to the appropriate Public Safety Answering Point (PSAP) based on the calling party's location.

GL's [MAPS™ FXO FXS](#) application with T1 Analyzer unit (tProbe hardware) can simulate analog CAMA type trunks directly connecting tProbe FXO FXS ports to 911 selective router or PSAP on CAMA-type circuits. The application can also be used for non-intrusive monitoring of CAMA trunks. The tProbe™ FXO port can be tapped onto CAMA-type circuits for non-intrusive monitoring of 9-1-1 service.

CAMA simulation and monitoring capabilities include - seizure and wink start detection, onhook and offhook detection and MF digit (ANI) generation/detection.

Drive Test Voice, and Data Services for Quality (Emergency services)

The Wireless Drive-Test solution includes GL's [VQuad™](#) with [Dual UTA HD](#) supporting call control of variety of mobile device networks – from 2G to 4G LTE and beyond, including the capability of sending/recording voice, testing video conferencing, and testing a variety of data over the mobile devices, while analyzing their performance.

For more information, refer to [Testing Emergency Call Services: 911, Enhanced 911 \(E-911\) & NG-911](#) webpage.

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CAMA Simulation for 911 Systems

CAMA Trunks Connected to 911 Switch

CAMA type signaling is used for sending the calling party's Automatic Number Identification (ANI) to the 911 selective router.

The ANI in the form of MF digits can be defined as: KP-I-NXX-XXXX-ST where,

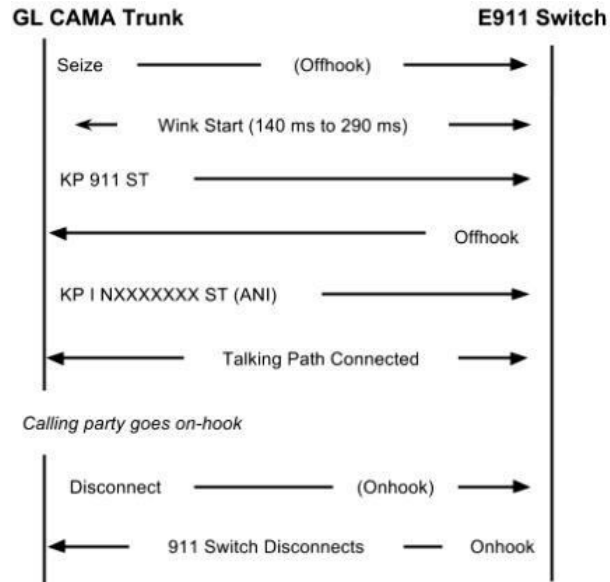
KP: indicates a KP (key pulse) signal

I: information digit

NXX: the prefix of the telephone number (exchange)

XXXX: the caller's PBX station number

ST: indicates a ST (start pulse)



CAMA Trunks Connected to the PSAP

As an alternative configuration in Private Exchange Branches (PBX), where the CAMA trunks are connected directly to the PSAP, the ANI is defined as: KP-NPD-NXX-XXXX-ST where,

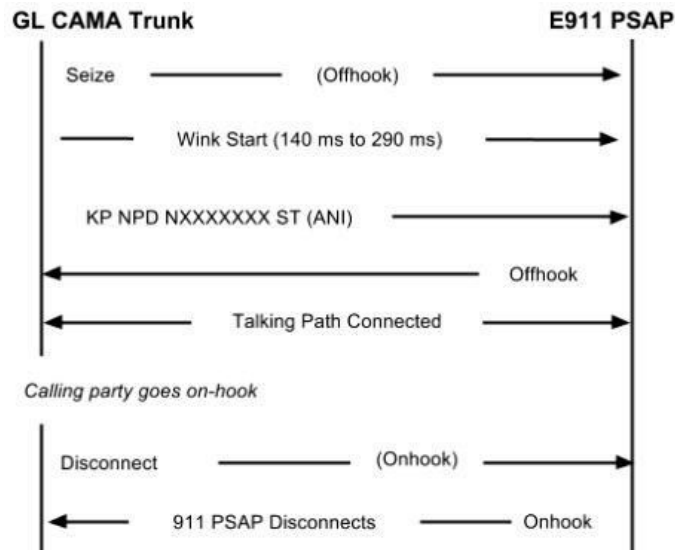
KP: indicates KP (key pulse) signal

NPD: numbering plan digit representing the area code of the PBX caller who originated the 9-1-1 call

NXX: the prefix of the telephone number (exchange)

XXXX: the caller's PBX station number

ST: indicates a SP (start pulse)



The below illustrates a typical FXO CAMA signaling scenario. The MAPS™ CAS can act as the CAMA trunk connected to the 911 selective router, and emulate all the signaling messages.

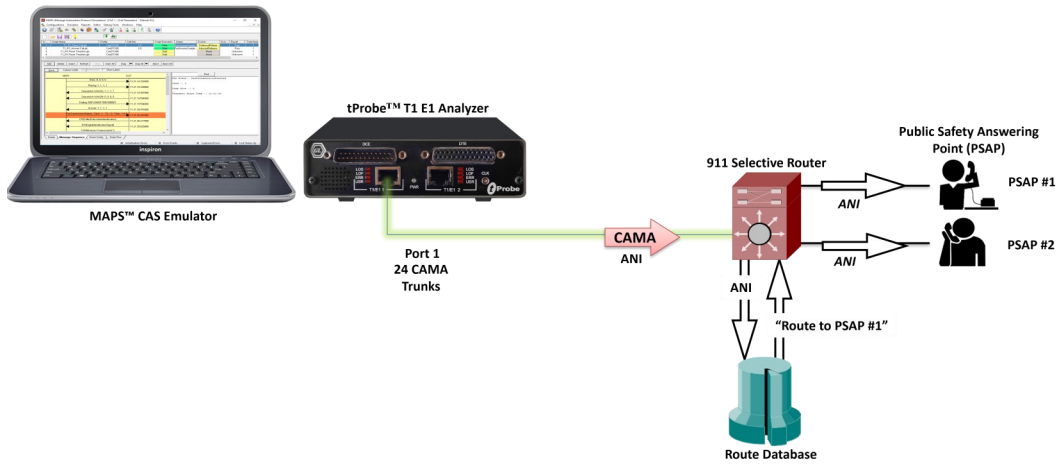
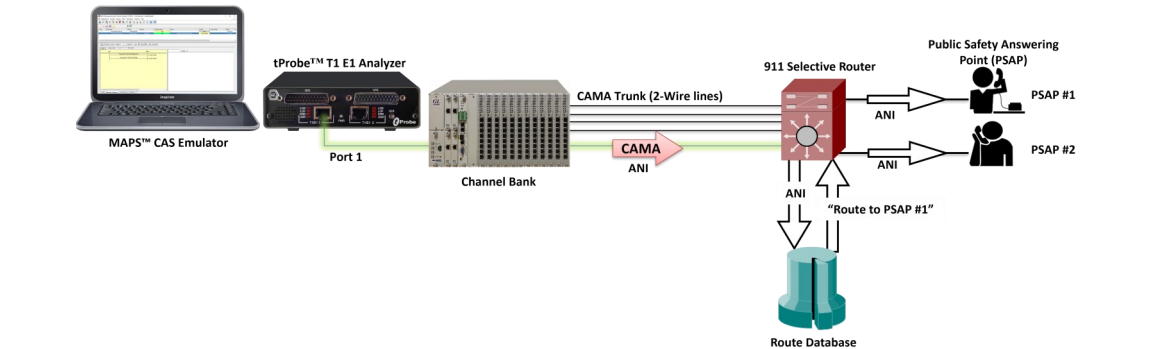


Figure: Digital CAMA Simulation



Analog Bulk CAMA Simulation with Channel Bank

Below is the screenshot of [MAPS™ CAS Emulator](#) displaying a real-time signaling sequence of the CAMA type trunk connected to the 911 Selective Router.

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Result	Total Iterations	Completed Iterations
1	CAMA_Reset.gls	Line01		Start		None	Unknown	1	0
2	CAMA_Trunk.gls	Line01		Stop	Idle	Place Call	Unknown	1	0

```

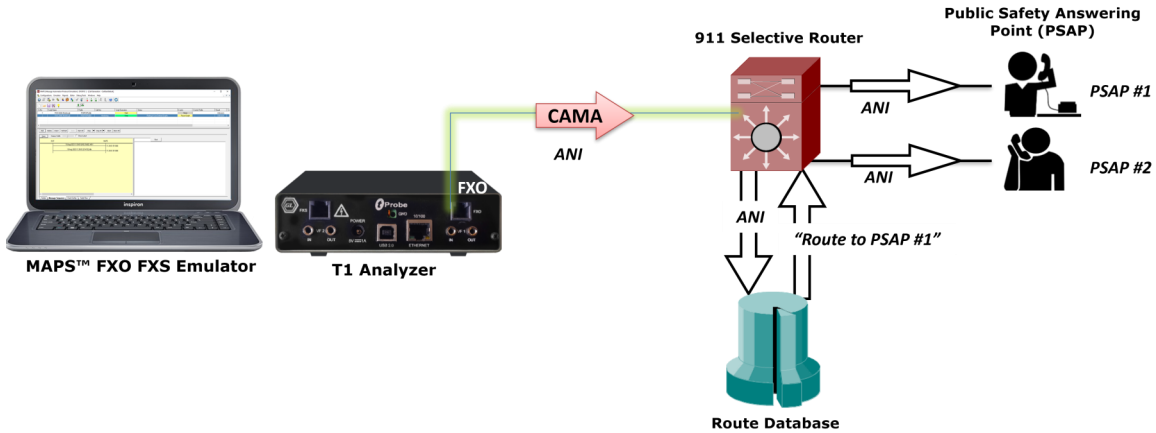
sequenceDiagram
    participant MAPS
    participant DUT
    MAPS->>DUT: Seize 5:26:50.313000
    DUT-->>MAPS: Wink Start 15:26:50.935000
    MAPS->>DUT: Sending ANI 5:26:50.935000
    DUT-->>MAPS: Offhook 15:26:53.301000
    
```

MAPS™ CAS simulating CAMA type trunk

911 CAMA Signaling Simulation (FXO FXS)

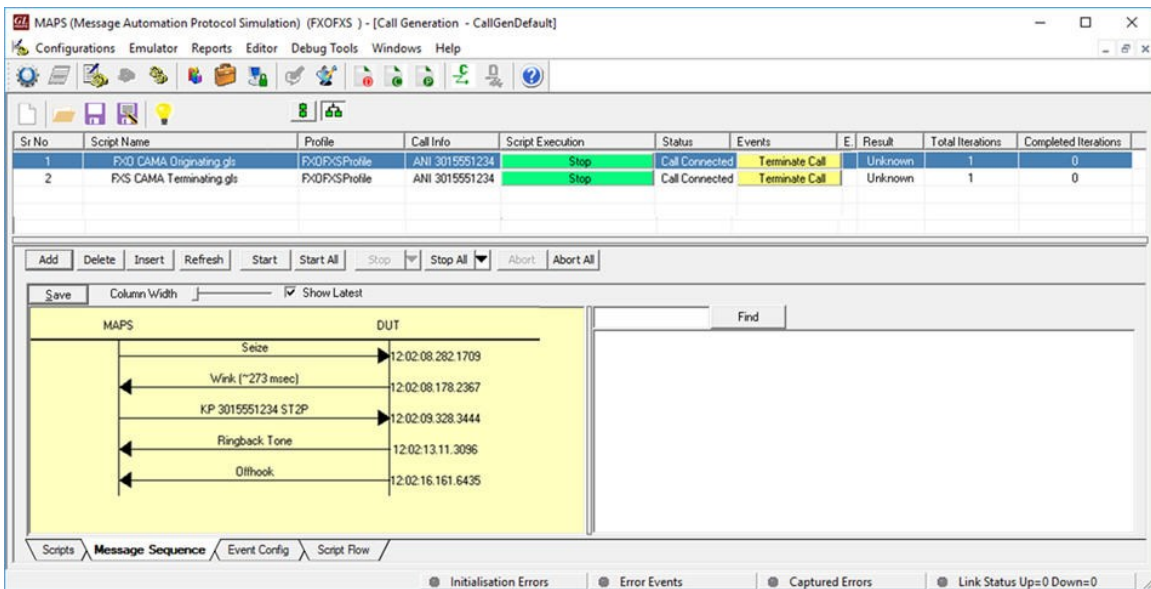
CAMA (Centralized Automatic Message Accounting) is a special analog trunk, originally developed for long-distance billing, but now mainly used for emergency call services (911 and E911 services).

The below illustrates analog CAMA simulation via tProbe™ FXO and FXS. The tProbe™ FXO port can be directly connected to 911 selective router or PSAP on CAMA-type circuits for simulation of CAMA calls to the selective router or PSAP. The script will seize the line, wait for wink, dial ANI and wait for call connect.



Analog Bulk CAMA Simulation with tProbe™ FXO

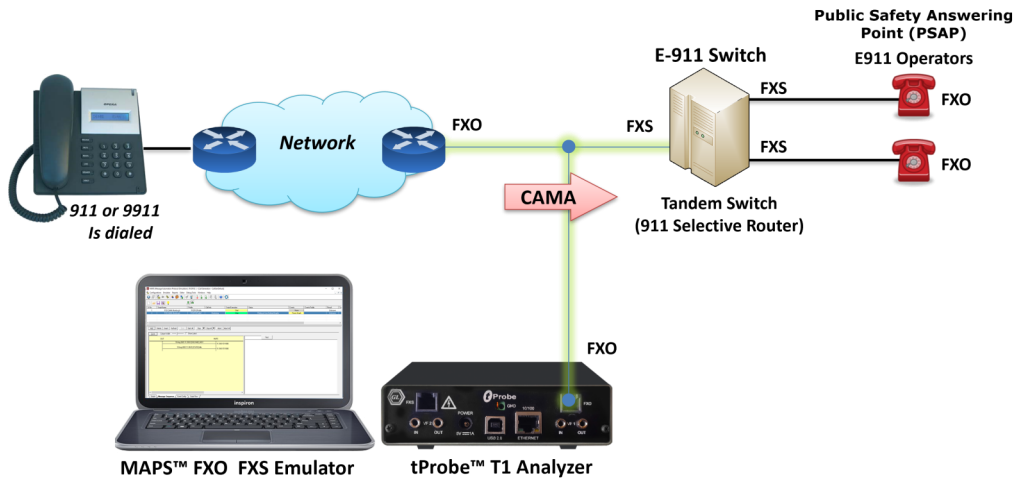
The MAPS™ FXO FXS Emulator application displays a real-time signaling sequence of the CAMA type trunk connected to the 911 Selective Route as shown below



Originating (FXO) and Terminating (FXS) CAMA Call Simulation

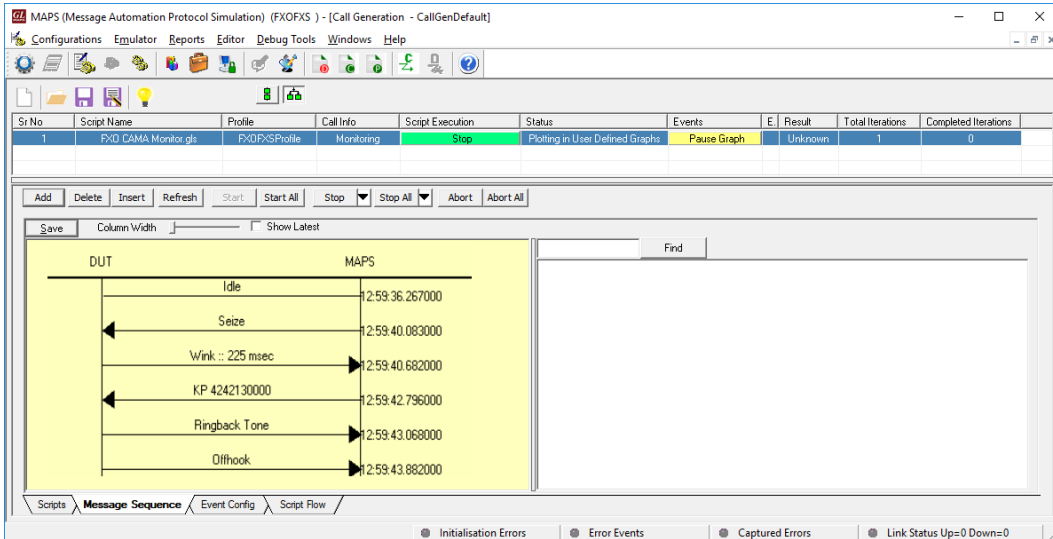
911 CAMA FXO Monitoring

The tProbe™ FXO port can be tapped onto CAMA-type circuits for non-intrusive monitoring of 911 service. Monitoring capabilities include seizure and wink start detection, onhook and offhook detection and MF digit (calling party ANI) detection. A normal analog call is routed based on the destination (called party) phone number. However, 911 calls are routed based on the calling party number.



MAPS™ FXO FXS Emulator displaying a real-time ladder diagram of the CAMA type trunk signaling sequence as captured by the FXO port. Typically, there are 5 CAMA signaling types based on the number of digits in ANI, these include, 7-digit transmission (kp-0-nxx-xxxx-st), 8-digit transmission (KP-npd-nxx-xxxx-st), 10-digit transmission (kp-0-npa-nxx-xxxx-st), 20-digit transmission (kp-0-npa-nxx-xxxx-st-kp-yyy-yyy-yyyy-st), and kp-2-st (indicates a failure to receive ANI).

The following screenshot depicts monitoring a 10-digit ANI transmission using MAPS™ FXO FXS Emulator. Continuously monitor line current and voltages of FXO and FXS ports and plots the detected line voltage in User-Defined Graphs.



Buyer's Guide

Item No	Product Description
XX651	MAPS™ CAS Emulator
XX624	MAPS™ FXO FXS Emulator (only for tProbe)
PTE001	tProbe™ Dual T1 E1 Laptop Analyzer with Basic Analyzer Software
PTE015	w/ 2Wire FXO and FXS Optional Board
XX092	CAS (Channel Associated Signaling) Analyzer
OLV092	Offline CAS Analyzer

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

For more information, refer to [Testing Emergency Call Services: 911, Enhanced 911 \(E-911\) & NG-911](#) webpage.



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