VETRA radio communication system
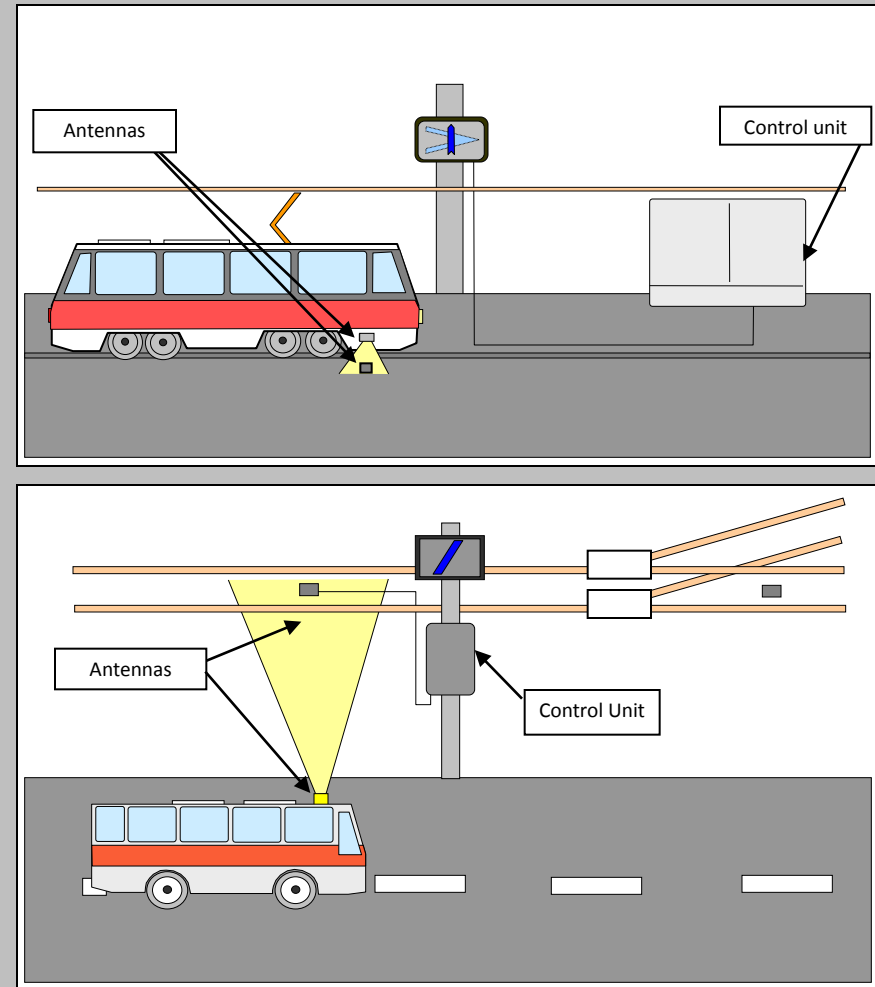## for communication between trams and ground devices

Elektroline, Inc.

Prague, Czech Republic

www.elektroline.cz

Introduction to the VETRA system

- Communication system between trams and ground devices

- Bidirectional communication possible

- Based on 2,4 GHz radio

- High-speed data transmission

- High resistance against disturbances

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Description of the VETRA system
Parts of the system
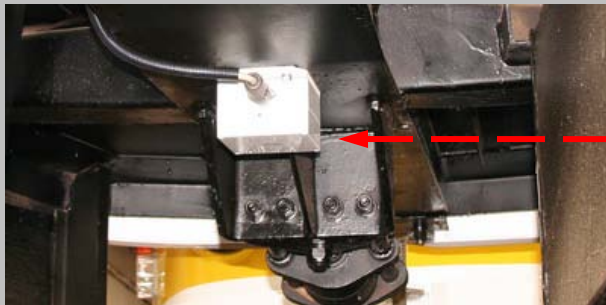
VETRA communication

- **Vehicle equipment**

  - onboard terminal

  - RS485 data connection

  - vehicle antenna

- **Ground equipment**

  - ground device

  - RS485 data connection

  - ground antenna*

*An OCL antenna can be used instead of ground antenna
(OCL antennas are usually used for trolleybuses).

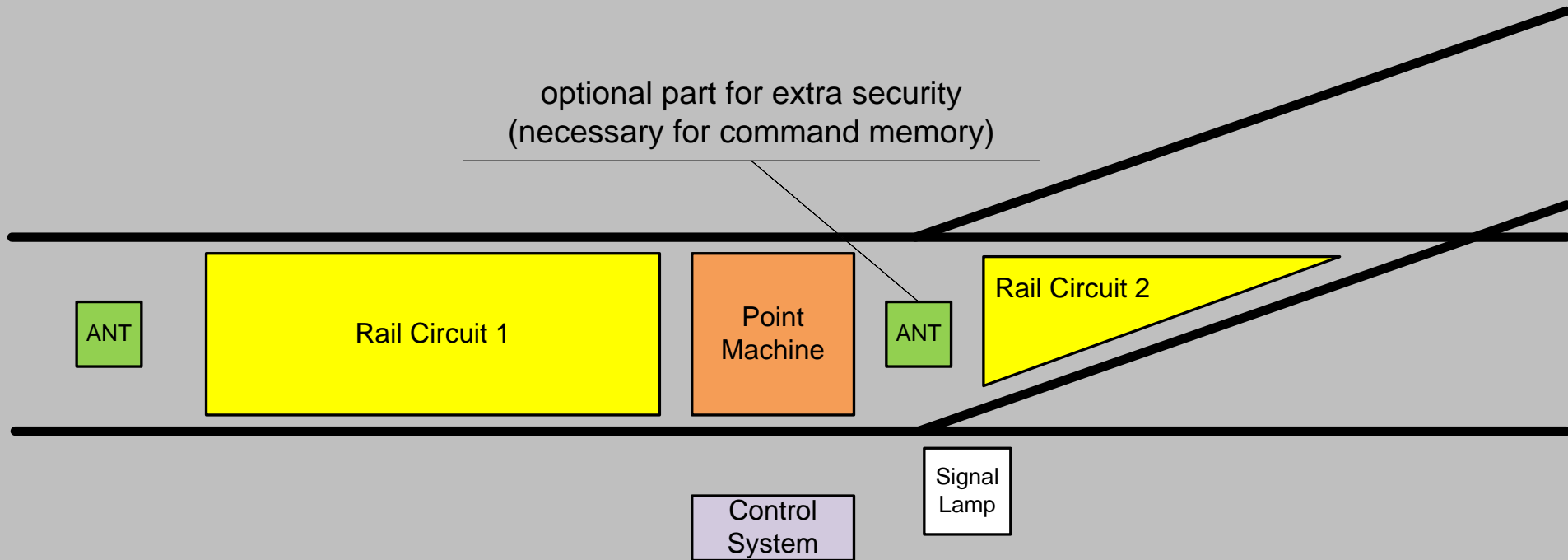**Elektroline**

- Automatic setting of switch points according to route numbers
  - Tram is led through the city according to set route number
  - Driver has possibility to change direction by arrow buttons (when needed)
- Routes are fully programmable
- Simplifies and accelerates traffic through switch points

VETRA system application
Automatic setting of switch points

optional part for extra security
(necessary for command memory)

ANT	Rail Circuit 1	Point Machine	ANT	Rail Circuit 2

Signal Lamp

Control System

- Point machine: moves the switch point into desired position
- Control system: manages all switch point equipment
- Signal lamp: shows information about the switch point to tram driver
- ANT: receives commands from trams and secures the switch point
- Rail circuits: secure the switch point

VETRA communication

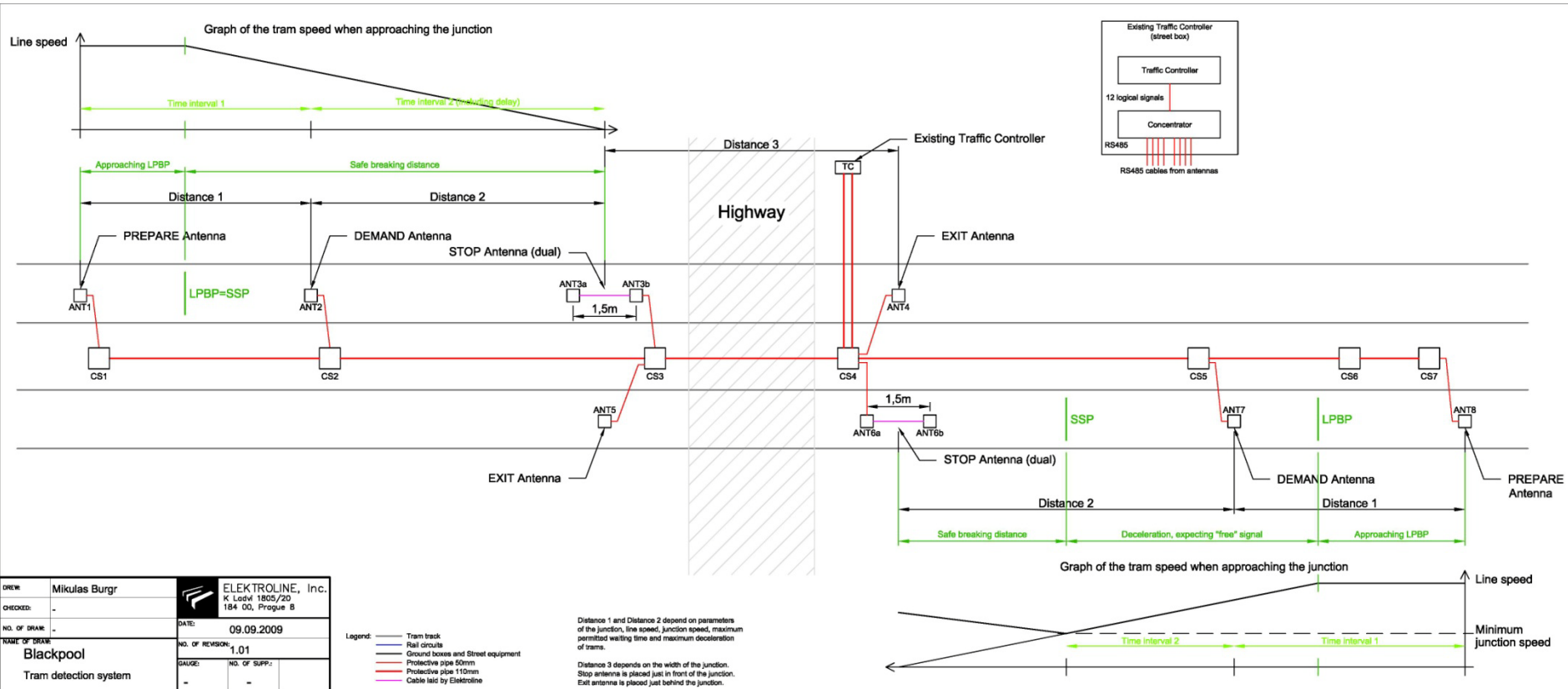Elektroline

- Safe and reliable system for detection of trams at level crossings
- Elektroline offers complete solution for level crossings with road traffic
  - Tram traffic markedly accelerates
  - Less accidents

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VETRA system application
Vehicle localization system

- Exact localization using VETRA antennas
- Immediate information about exact tram position
  - to tram line dispatcher
  - to tram driver
  - to passanger information system
- Possible connection of more VETRA systems (e.g. switch point VETRA antennas can be used also for localization, etc.)
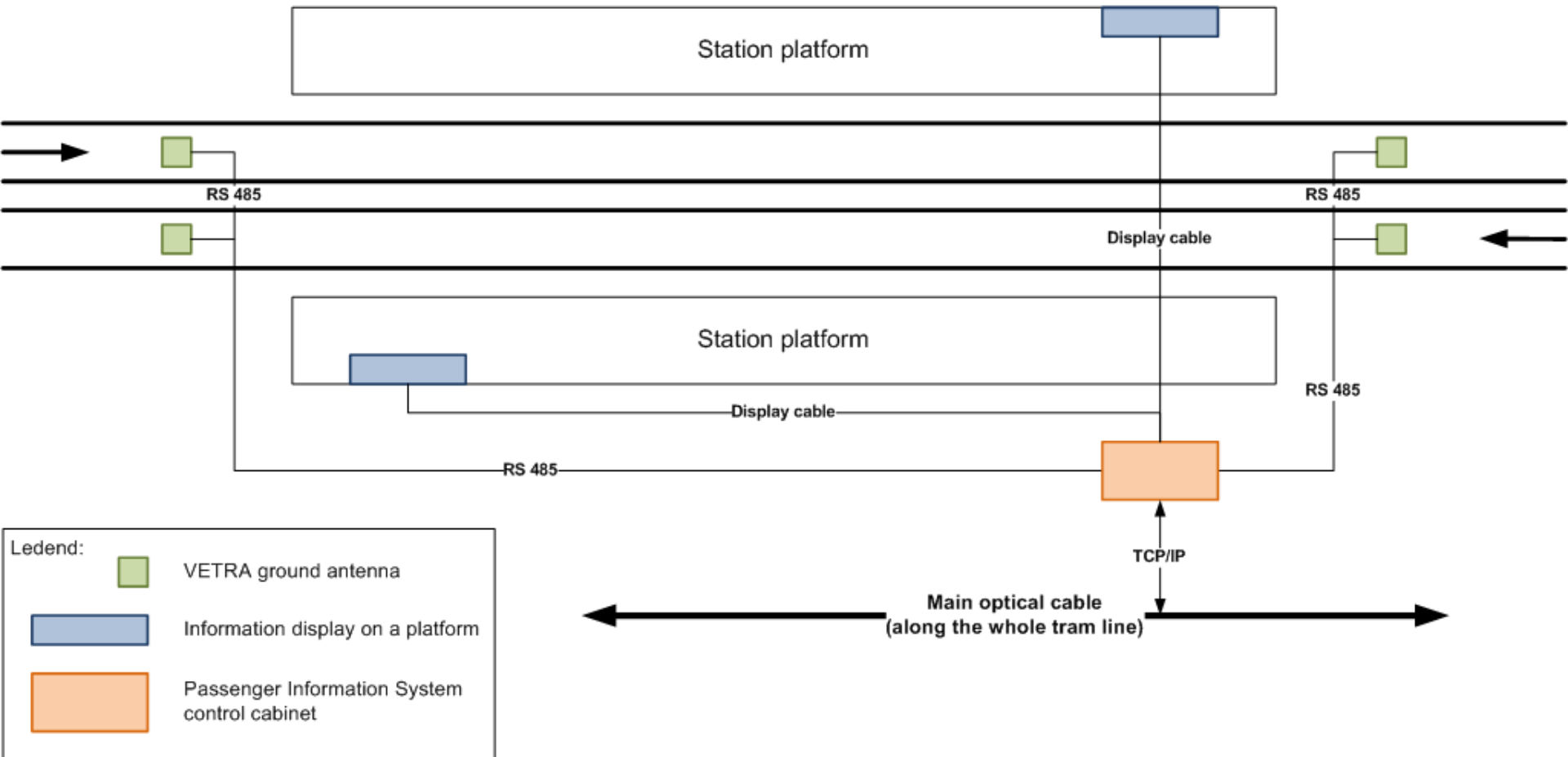
- Data from all VETRA systems can be integrated into passenger information system

- VETRA system can provide information about
  - tram location
  - line number
  - tram unique ID number
  - other information (programmable)

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Passenger Information System with optical network communication (tram stop equipment)

Station platform

RS 485

RS 485

Display cable

Station platform

RS 485

Display cable

RS 485

TCP/IP

Main optical cable
(along the whole tram line)

Ledend:

VETRA ground antenna

Information display on a platform

Passenger Information System
control cabinet

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- VETRA communication is <u>bidirectional</u>
- Possibility to send information from ground devices to vehicles
  - Information about tram's actual position
  - Information about traffic lights
  - Information about ground equipment status
  - etc…
- Programmable functions
- Connection to an onboard computer is possible

- **Small dimensions**
  => easy installation both in track and on vehicles

- **Fast bidirectional communication**
  => possibility to transmitt data both from/to a tram
  => communication is reliable even in high speed

- **2,4 GHz frequency**
  => free frequency band, no licences needed, no fees

- **Intelligent system of tram routes**
  => faster and safer traffic at switch points

- **Possible connection of more VETRA systems**
  => integrated system

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Thank you for your attention

For additional information, please see:
www.elektroline.cz