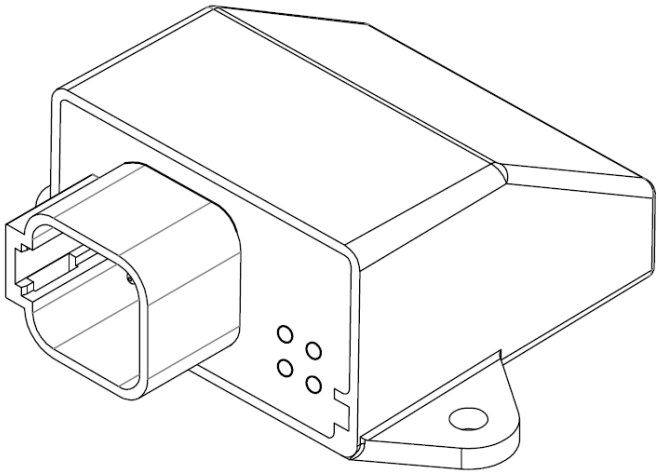
# **Project Name:** CAN Gateway Module

# Baud Rates 250k<->500k

**Revision History:**

| Rev | Rev Date | Modified by | Description |
|---|---|---|---|
| A | 2/1/2018 | ALG | First time release. |
| B | 2/7/2018 | ALG | Added drawings, updated descriptions and tables. |



# Contents

## Product Overview & Description:

This product has been designed to be a Controller Area Network (CAN) J1939 protocol specific gateway device used to pass messages back and forth between a 250k baud CAN bus and a 500k baud CAN bus with minimal delay.

## Functional Requirements:

### Electrical Requirements:

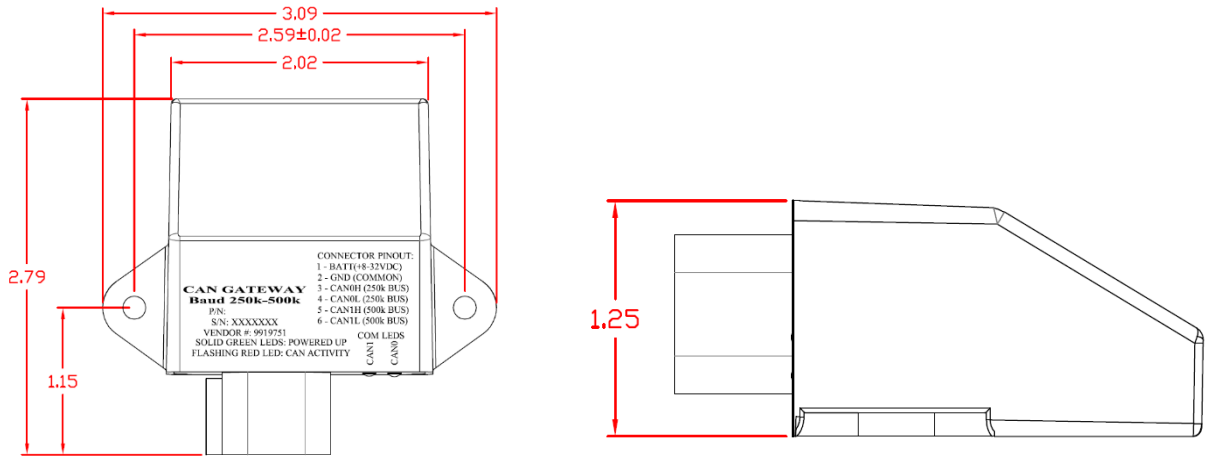
| Parameter | Min | Nominal | Max | Notes |
|---|---|---|---|---|
| Functional Battery Voltage | 8VDC | - | 32VDC | Product has been designed for both 12vdc and 24vdc systems, nominal voltage not applicable. |
| Non-Functional Battery Voltage | - | - | 36VDC | At 36vdc this product may be damaged. |
| System Standby Current | - | - | 25.7mA<br>14.4mA | Measured current with no com (Red LEDs off)<br>12.5vdc → 25.7mA and 24.5vdc → 14.4mA |

### Connector Requirements:

All connectors shall be waterproof, with a rating of at least IP67. They shall be appropriately sized for the max current and voltage that will be encountered per the electrical requirements. Equivalent connectors to those listed are acceptable. Recommended mating connector DT06-6S-P012.

### Mechanical Requirements:

The mechanical requirements of the CAN Gateway module will be determined on a case by case basis according to customer requirements while remaining within the confines of safety practices according to the provided assembly enclosure. Below are enclosure measurements in inches.



## Environmental Requirements:

| Parameter | Min | Nominal | Max | Notes |
|---|---|---|---|---|
| Storage/Operating Temperature | -40C | - | 70C | Maximum enclosure temperature |
| Storage/Operating Humidity | 0% | - | 100% | Including Condensing |
| Ingress Protection | - | - | IP67 | Protected Against Immersion up to 1m for 1hour. |

## Description of Operation:

### Indicators & Lighting:

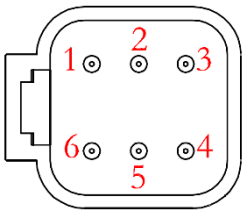
**Green LED:**

Two dual level LED indicators have been provided, the lower level green LEDs will indicate when the LED Driver has been provided power within normal range and is functional.

**Red LED:**

The two top level red LEDs are communication indicators and will flash if the unit has detected a message on an individual CAN bus and is transmitting that message to the opposite CAN bus. The Red LED associated with 500k baud bus is closest to the connector, the red LED associated with the 250k baud bus is closest to the side of the enclosure.

### Connector Pinout:




**Pin 1 → +Battery (8-32vdc)**

**Pin 2 → Ground**

**Pin 3 → CAN0 High (250k baud)**

**Pin 4 → CAN0 Low (250k baud)**

**Pin 5 → CAN1 High (500k baud)**

**Pin 6 → CAN1 Low (500k baud)**

## Stress Testing and Verification:

### Echo/Stress Testing Overview:

-"Echo/Stress" Testing was performed by comparing sent message to received message counts

-Two CAN buses were connected via two separate P-CAN readers

-Messages were sent at frequency of 1ms (CAN0 frequency 2ms and CAN1 frequency 2ms)

-Over 10,000 messages were sent from each CAN bus

-Each CAN bus received the same number of messages as were sent by the adjacent bus

-Limit Fail observation, at 0.5ms frequency (combined buses) messages were lost

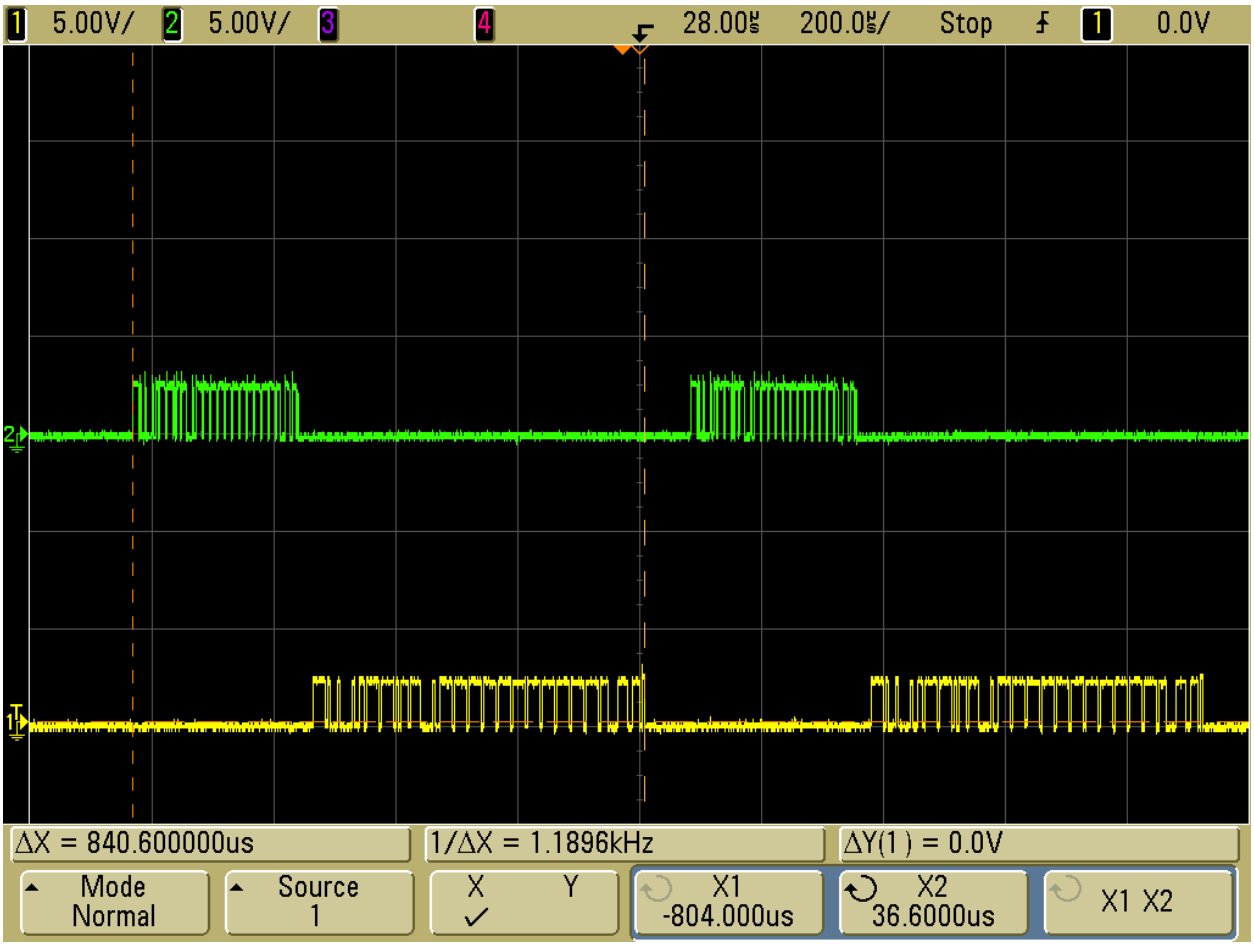
-At no time were there "Echo" messages during this testing

## Full Period measurement (500k → 250k):

-500k bus sending (green)

-250k bus receiving (yellow)

-total period 840us

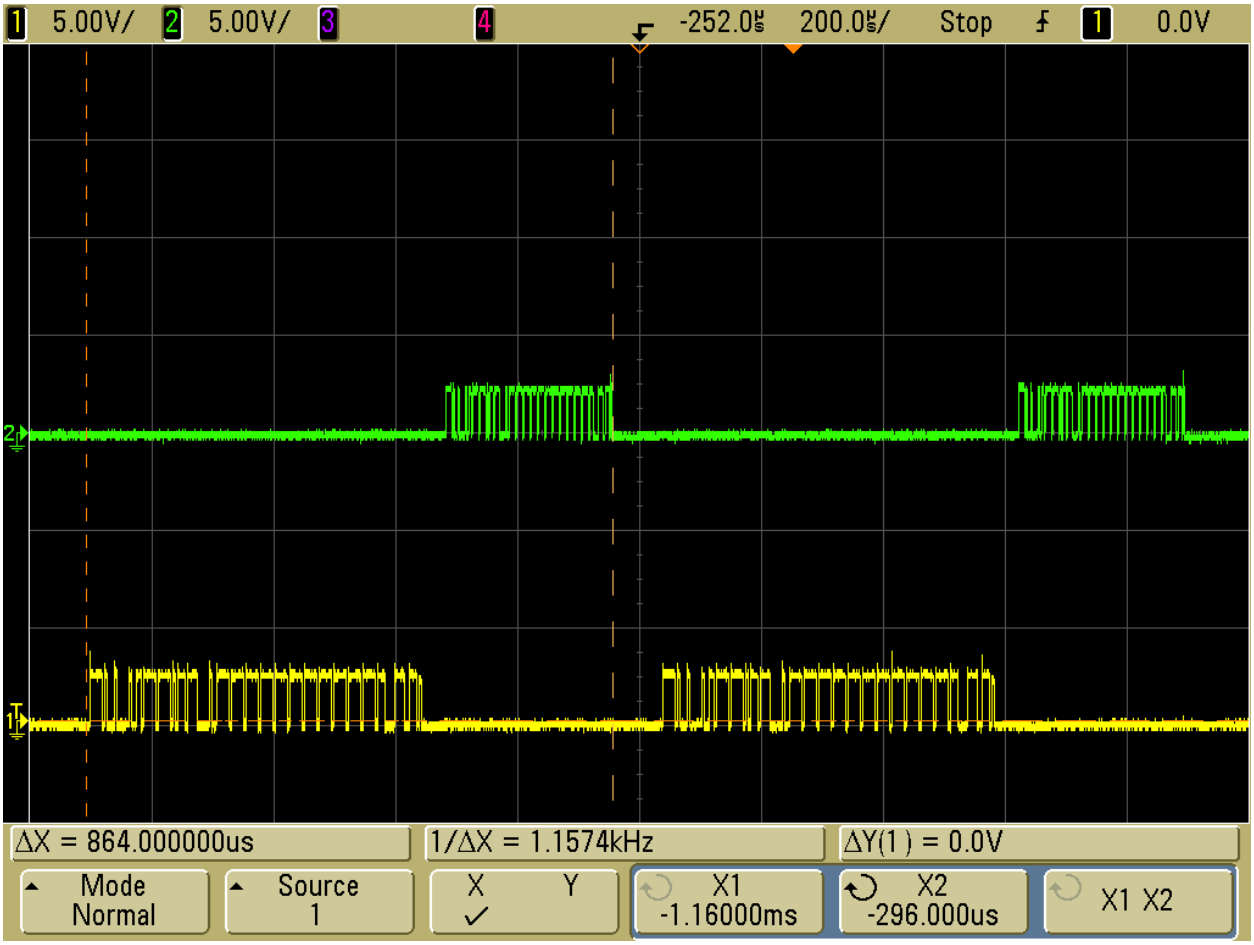


## Full Period measurement (250k → 500k):

-250k bus sending (yellow)

-500k bus receiving (green)

-total period 864us

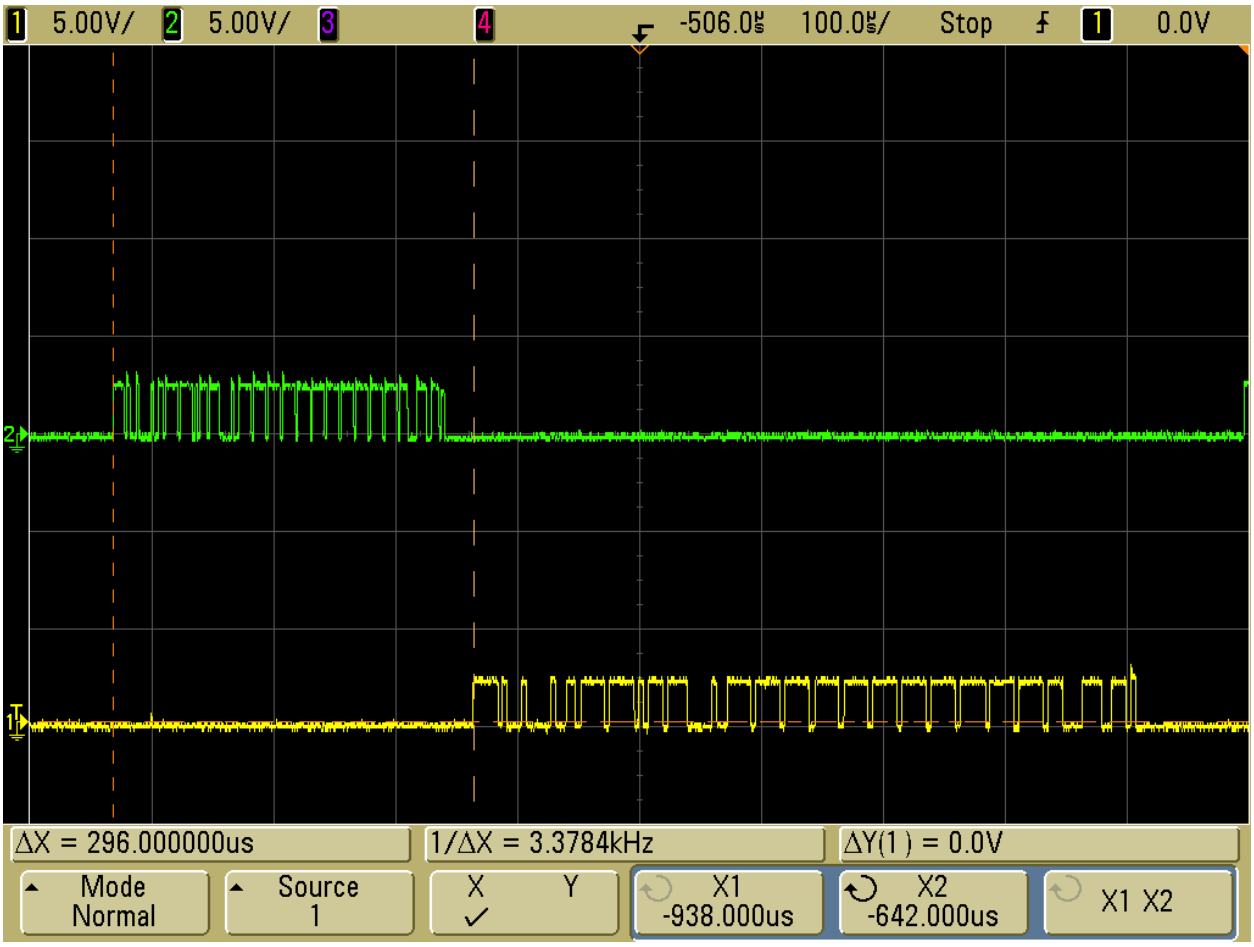


## Latency start to start measurement (500k → 250k):

-500k bus sending (green)

-250k bus receiving (yellow)

-total latency 296us

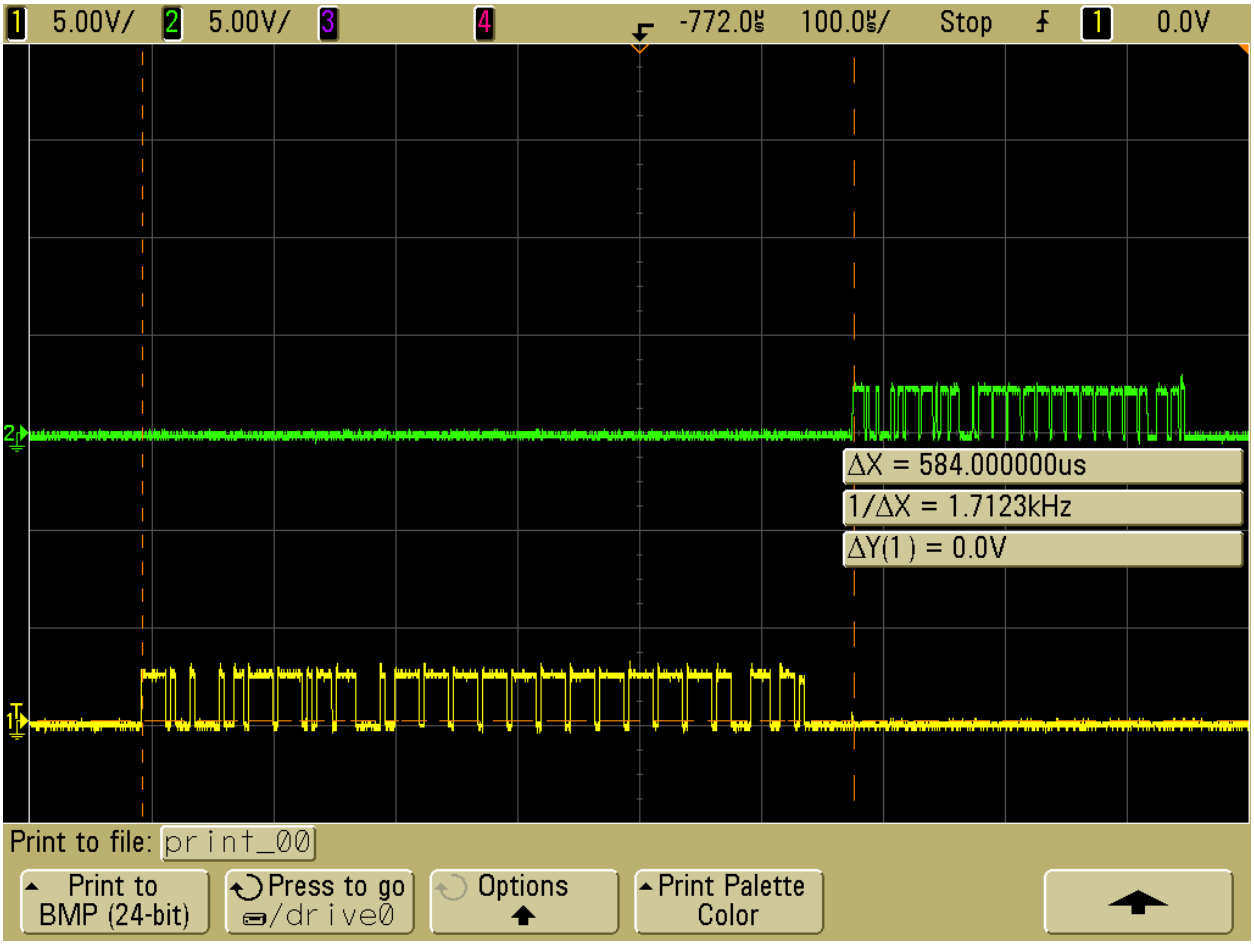


## Latency start to start measurement (250k → 500k):

-250k bus sending (yellow)

-500k bus receiving (green)

-total latency 584us

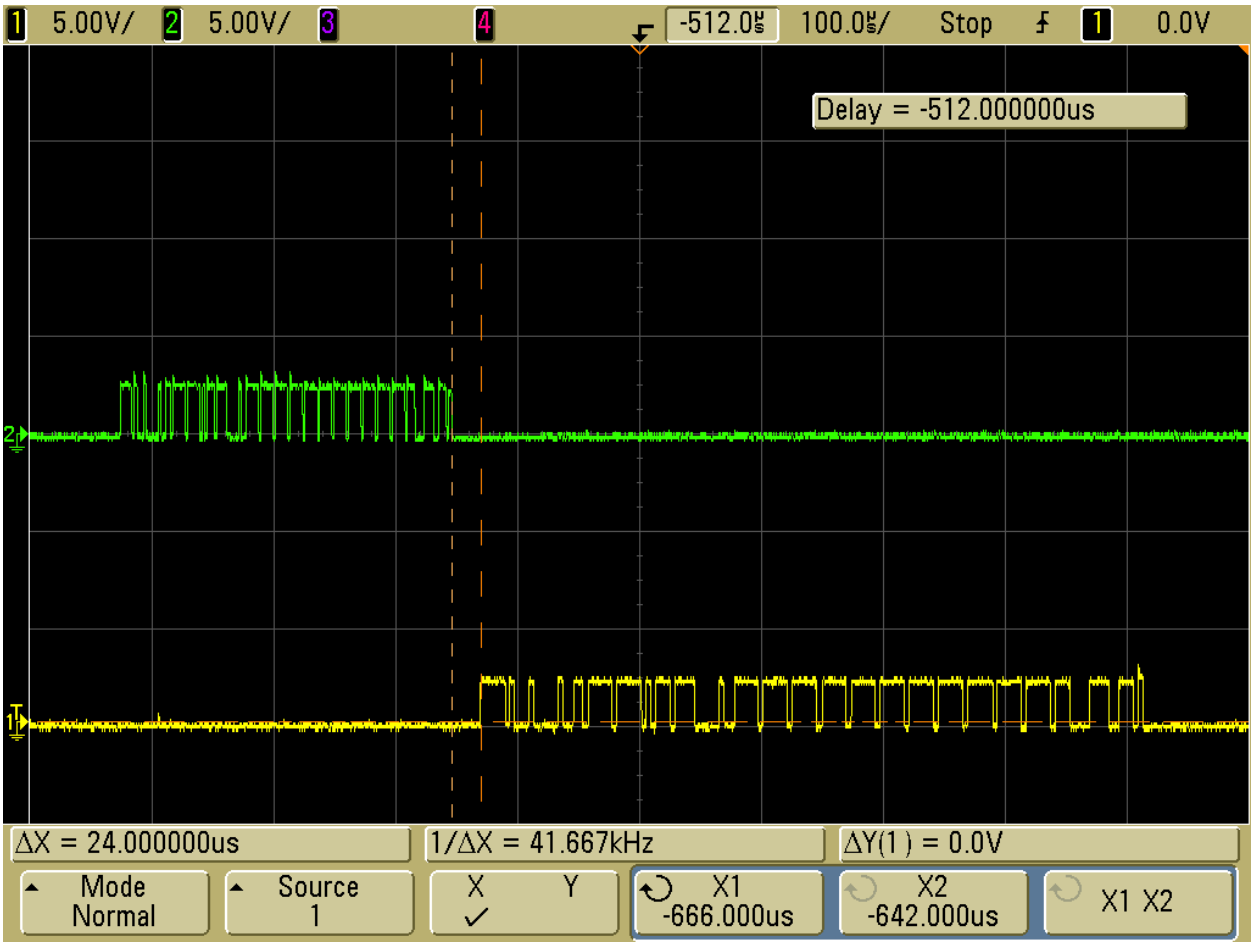


## Transition end to start measurement (500k → 250k):

-500k bus sending (green)

-250k bus receiving (yellow)

-total transition 24us

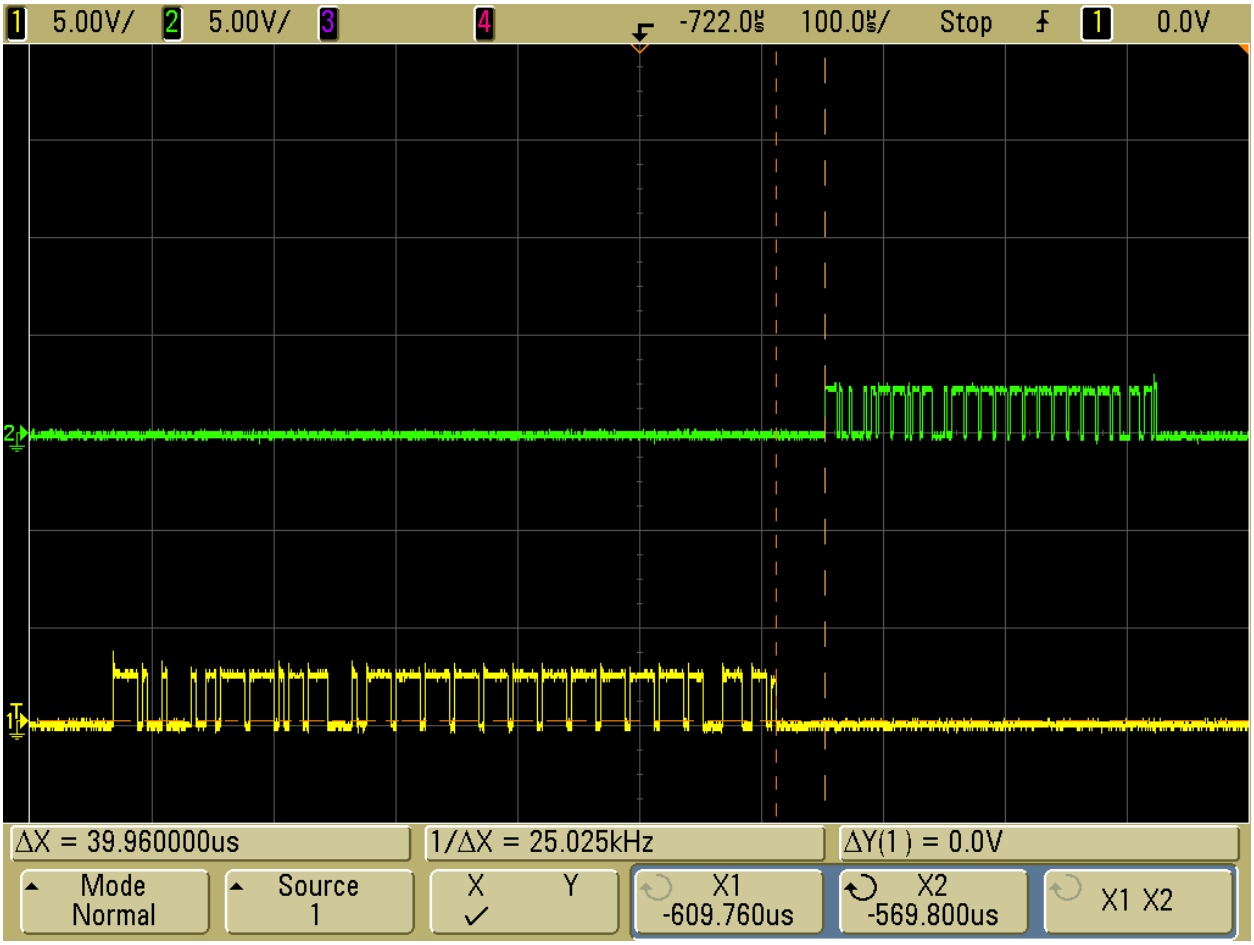


## Transition end to start measurement (250k → 500k):

-250k bus sending (yellow)

-500k bus receiving (green)

-total transition 40us

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