ETM55E-02

# SG-8506CA
# Evaluation Board Manual

# SG-8506CA-EVB

SEIKO EPSON CORPORATION

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# Index

1. Overview ..... 1
1.1. System Configuration ..... 1
1.2. Features ..... 1
1.3. Quick Start ..... 1
1.4. SG-8506CA-EVB Block Diagram ..... 2
2. Functional Description ..... 3
2.1. Power Supply ..... 3
2.2. Control by PC ..... 5
2.3. Typical external measurement instruments connection ..... 6
3. Board Configuration ..... 7
3.1. Connection ..... 7
3.2. Board layout ..... 8
4. Software ..... 9
4.1. Required PC condition ..... 9
4.2. Turn Microsoft .NET Framework 3.5 ON ..... 9
4.3. Installation FTDI D2XX Direct Drivers ..... 12
4.4. Installation PLL Oscillator RegWriter ..... 12
4.5. Setting frequencies and registers with PLL Oscillator RegWriter ..... 13
5. Schematic ..... 15
6. Bill of Materials ..... 16
7. Caution ..... 17

# 1. Overview

SG-8506CA-EVB is an evaluation board which customer can set target frequencies by writing registers' data of SG-8506CA. This manual describes evaluation board SG-8506CA-EVB's operation and accompanying software.

## 1.1. System Configuration

- Hardware : SG-8506CA Eva-Board (SG-8506CA-EVB)
- Software : PLL Oscillator RegWriter

## 1.2. Features

- SG-8506CA evaluation with registers setting by $I^2C$ bus
- Automatic register value calculation from inputted frequencies.
  (Also user can set registers value directly.)
- Accompanying software (PLL Oscillator RegWriter)
  Windows7, 8, 8.1,10 (32 bit, 64 bit) compatible
- Power supply (+2.5 V or +3.3 V) available through USB connection
- Easy PC connection through USB cable

## 1.3. Quick Start

- Install software (PLL Oscillator RegWriter) to PC
- Set jumper evaluation board (SG-8506CA-EVB) jumper pins
- Insert SG-8506CA on the socket
- Connect measurement instruments to SG-8506CA-EVB output terminals
- Connect PC and SG-8506CA-EVB with USB cable.
- Connect external level to Vc terminal (optional)
- Startup PLL Oscillator RegWriter
- Input target frequencies and transmit register data to SG-8506CA-EVB
- Evaluate target frequencies on the system.

### 1.4. SG-8506CA-EVB Block Diagram

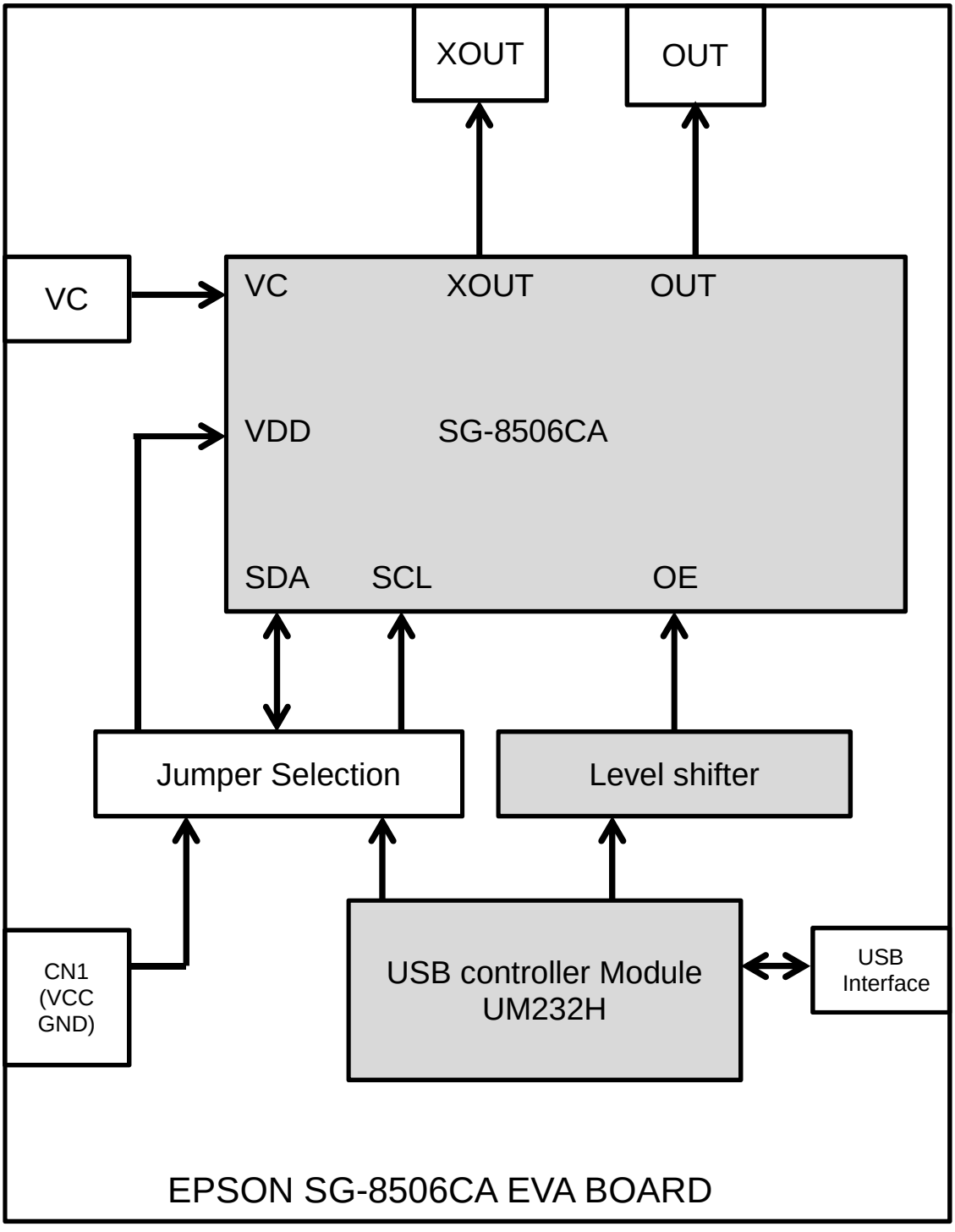



Figure 1 SG-8506CA-EVB Functional Block Diagram

# 2. Functional Description

SG-8506CA-EVB is an evaluation kits. Output frequencies are set by transmitting register data from PC to SG-8506CA-EVB through $I^2C$ bus.

## 2.1. Power Supply

Two power voltage supply ways (to SG-8506CA device on the boards) are available.
Way1 Through USB cable and regulator on board
Way2 Direct power supply from external unit
To select supply way, jumpers (JP7, JP8, and JP9) should be set.in the proper way.

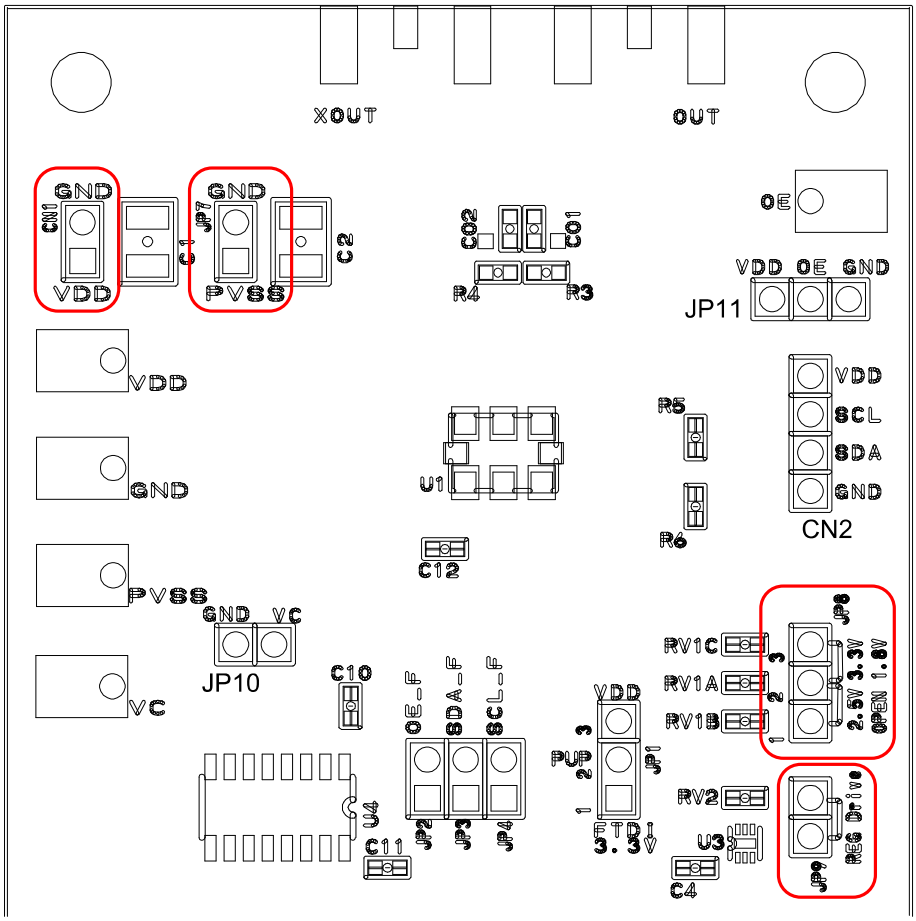



Figure 2 Jumpers for Power supply

Way1 Through USB cable and regulator on board
- JP7: short JP9:short
- JP8 1-2short:2.5V, 2-3short:3.3V

Way2 Direct power supply from external unit
- JP7: short
- JP9 :open
- CN1: power supply from external unit

Table1, 2, 3 describe detail power supply condition.

Table 1 SG-8506CA GND (PVSS) setting (JP7)

| SG-8506CA GND terminal level (PVSS) | JP7 Jumper Installation |
|---|---|
| GND common | Short |
| GND separate | Open |

Table 2 Regulator output level (through USB cable) (JP8)

| Supply Voltage [V] | JP8 Jumper Installation |
|---|---|
| 2.5 | Connect pin 1 “2.5 V” to center pin 2 |
| 3.3 | Connect pin 3 “3.3 V” to center pin 2 |

Table 3 SG-8506CA VDD power supply setting (JP9)

| Power Supply Source | JP9 Jumper Installation |
|---|---|
| USB | Short |
| External Power supply | Open (External power supply is connected to CN1) |

Caution: It is prohibited that external power supply connection to CN1 during JP9 short connection. If external power supply is connected to CN1 in case of JP9 short, power voltage collision might damage the circuitry on the board and PC.

## 2.2. Control by PC

Software (PLL Oscillator RegWriter) controls $I^2C$ I/F, OE on SG-8506CA-EVB. Table 4 describes the jumpers' function in connection with PLL Oscillator RegWriter.

Table 4 Jumpers setting

| Jumper | Pin NO. | Signal name | Initial status |
|---|---|---|---|
| JP1*1 | 3 | SDA/SCL pull up level | 1-2 Short (3.3 V) |
| JP2 | 2 | OE | Short (Controlled by software) |
| JP3 | 2 | SDA | |
| JP4 | 2 | SCL | |
| | | | |
| | | | |
| JP7 | 2 | SG-8506CA GND level | Short (Same as GND) |
| JP8 | 3 | Regulator output voltage level (Through USB cable) | 3-2 Short (3.3 V) |
| JP9 | 2 | Power supply way | Short (Power from USB) |
| JP10 | 2 | Vc terminal GND level | Open (GND separate) |
| JP11 | 3 | OE terminal VDD/GND level | Open (VDD/GND separate) |

*1 JP1 can stay in 1-2 short even VDD voltage drops from 3.3 V to 2.5 V.

## 2.3. Typical external measurement instruments connection

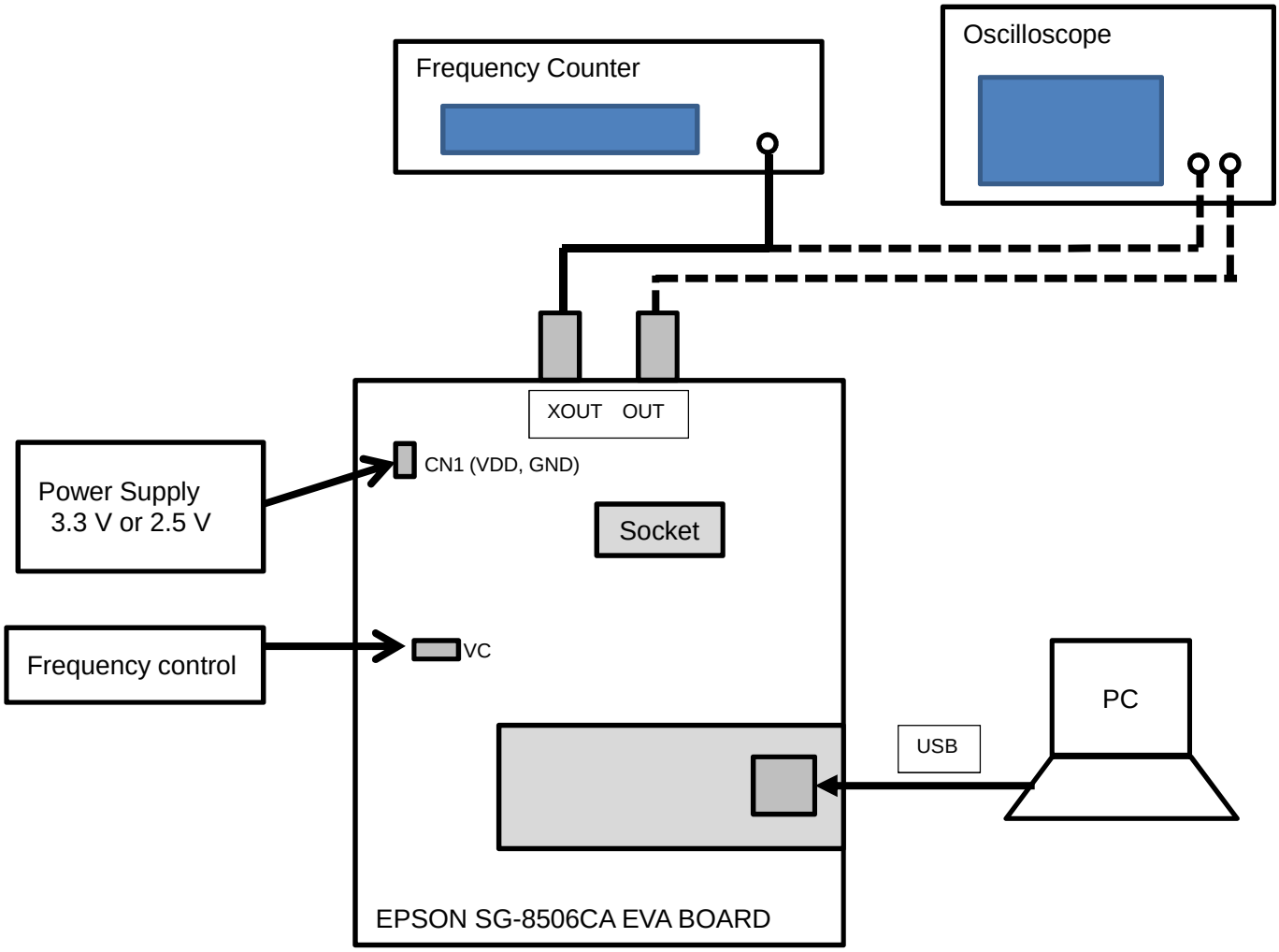



Figure 3 Typical measurement instruments connection

# 3. Board Configuration

## 3.1. Connection

Table 5 Power Supply

| Power | Voltage | remarks |
|---|---|---|
| VDD | 3.3 V or 2.5 V | Connected to SG-8506CA (socket mounted)'s VDD<br>Connected to CN1 VDD |
| GND | 0 V | Connected to CN1 GND |

Table 6 Connectors, terminals, Socket

| Connector, Terminal Socket | content | Remarks |
|---|---|---|
| CN1 | VDD, GND | |
| VDD | VDD | |
| GND | GND | |
| CN2 | I/F | |
| VC | VC | |
| OE | OE | |
| SMA1 | SG-8506CA output (OUT) | |
| SMA2 | SG-8506CA inverse output (XOUT) | |
| Mini-USB | USB | |
| U1 | SG-8506CA socket | |

### 3.2. Board layout

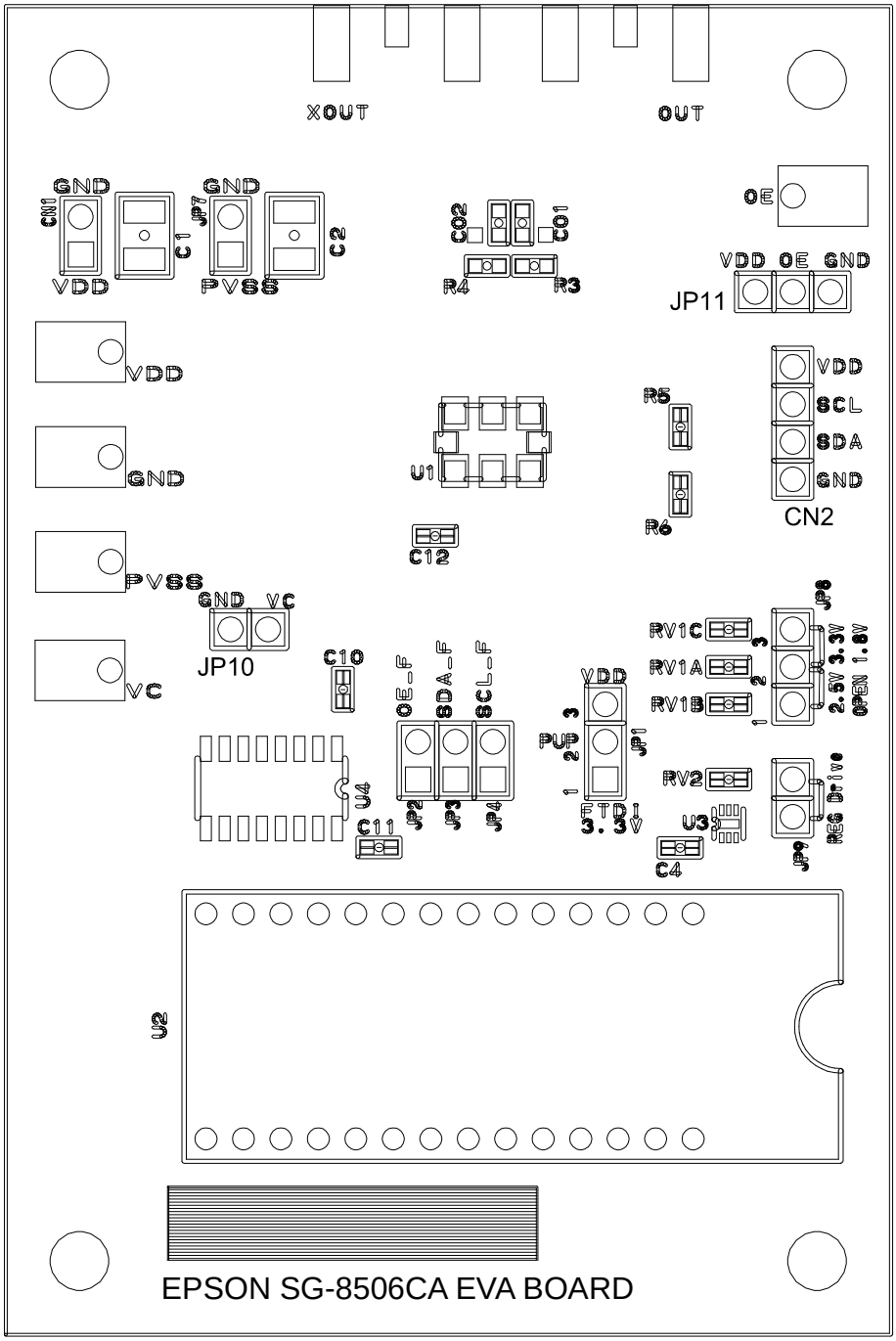



Figure 4 SG-8506CA-EVB Board layout

# 4. Software

Software (PLL Oscillator RegWriter) should be installed into PC for SG-8506CA-EVB operation.

## 4.1. Required PC condition

- Microsoft Windows 7, 8, 8.1, 10
- USB2.0
- HDD space 1MB
- 1024 x 768 screen resolution or greater
- Microsoft .NET Framework 3.5
- FTDI D2XX Direct Drivers

## 4.2. Turn Microsoft .NET Framework 3.5 ON

Microsoft .NET Framework 3.5 is required for PLL Oscillator RegWriter operation.

Microsoft .NET Framework 3.5 is installed in Windows 7initially and set turn ON. But in case turned OFF, the check box should be ON at Windows Futures. Customer can set by selecting PC control panel and program & function during internet on line.

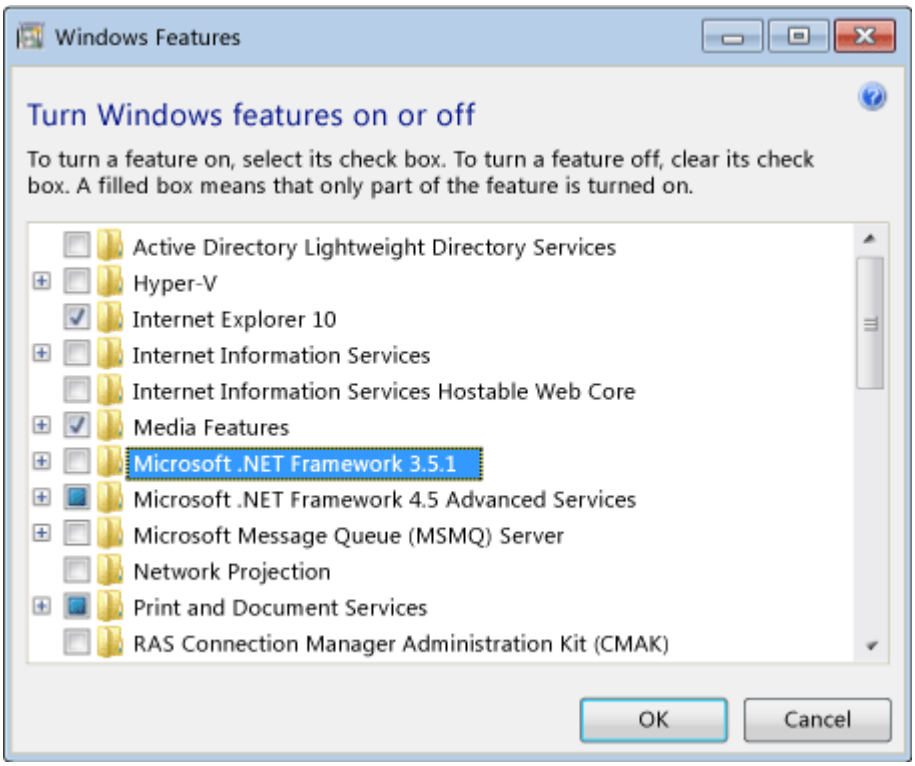



Figure 5 Microsoft .NET Framework 3.5 Turn ON (Windows 7)

In case of Windows 8/8.1, Microsoft .NET Framework 3.5 is installed initially, but set turn OFF. Two ways are available to turn ON Microsoft .NET Framework 3.5 during internet on line.

1. Installation of Microsoft .NET Framework 3.5 on demand
   At initial starting time of PLL Oscillator RegWriter, next massage box is shown. Click "Install this feature" for installation during internet on line.

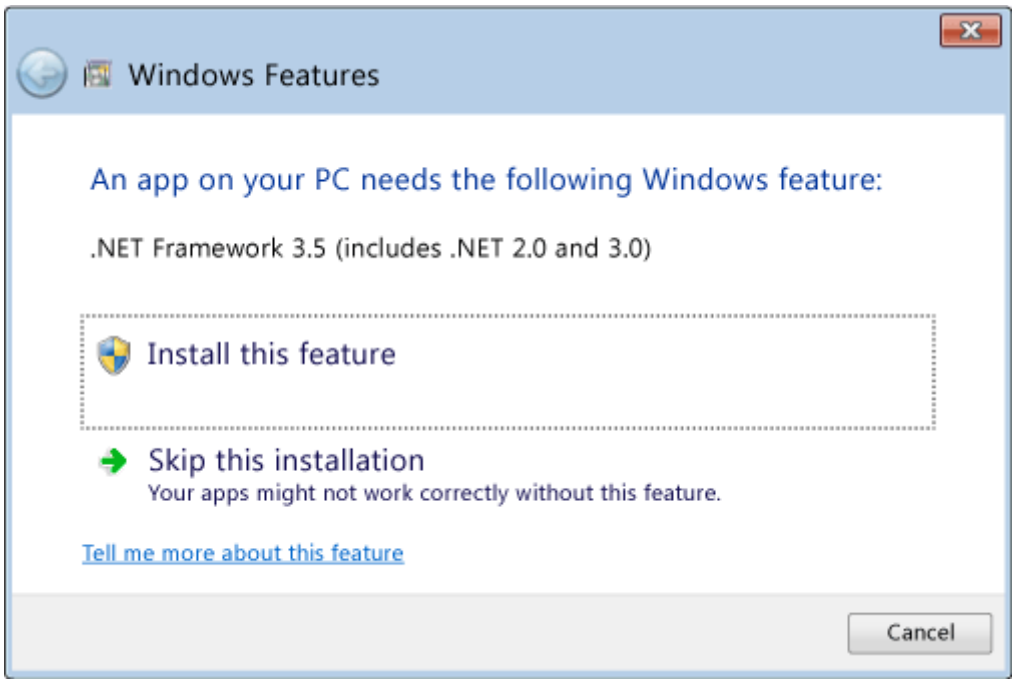



Figure 6 Microsoft .NET Framework 3.5 turn ON (Windows 8/8.1, on demand)

2. Microsoft .NET Framework 3.5 turn ON with PC control panel
   Customer can set turn ON by selecting PC control panel and program & function during internet on line.

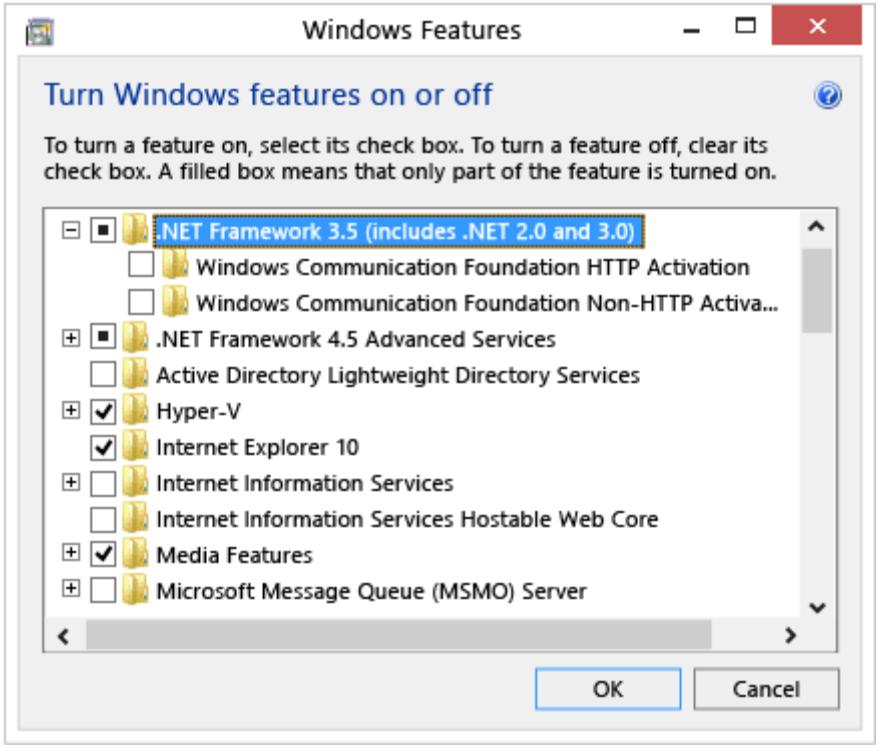



Figure 7 Microsoft .NET Framework 3.5 turn ON (Windows 8/8.1, Control Panel)

Please refer to Microsoft site Windows 8/8.1 Microsoft site

## 4.3. Installation FTDI D2XX Direct Drivers

An adequate device driver is automatically installed when SG-8506CA-EVB is connected to PC USB terminal during internet on line condition.

If automatic installation is not executed, customer can install device driver by FTDI setup executable.

1. Disconnect SG-8506CA-EVB from PC USB terminal.
2. Down load setup executable on FTDI WEB site FTDI
3. Click the right mouse button “setup executable” and “Run as administrator”.

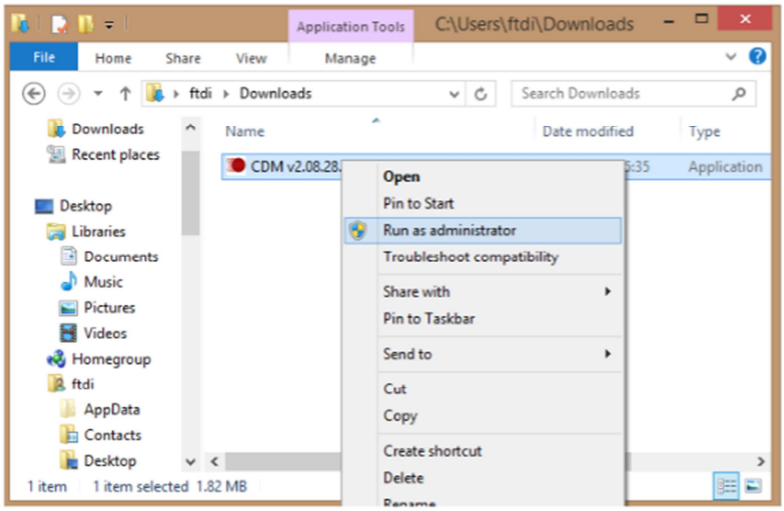



Figure 8 Execution FTDI setup executable

## 4.4. Installation PLL Oscillator RegWriter

Install software (PLL Oscillator RegWriter) to PC by installer (PLL_Oscillator_RegWriter_V1.msi).

## 4.5. Setting frequencies and registers with PLL Oscillator RegWriter

Product selection

Select SG-8506CA with radio button.

Setting $I^2C$ slave address

Input $I^2C$ Slave Address with hex format. If it is unknown, press Search Addr button and found automatic search result.

Frequency setting

Input target frequency into Output Frequency column. Registers are calculated automatically.

Kv value selection

Select Kv value (0~11) on Kv column. If larger value (12~) is selected, Vc control function becomes inactive.

Registers' value writing and verification

Registers data is transmitted to SG-8506CA by pressing Write button.
Write and Verify button works register's data transmission and verifying between PLL Oscillator RegWriter and SG-8506CA device on the board. Result is shown in History column.

OE port control

OE port is controlled by radio button respectively.

Advanced operation

Register reading : SG-8506CA device registers data is transmitted and displayed on Register Read Table.

Frequency calculation from Register: By inputting Register value (hex code), customer can obtain frequency in Output Frequency column.

Reference frequency adjustment: Customer can change any reference frequency by selecting Advanced Mode from Tool pull down menu.

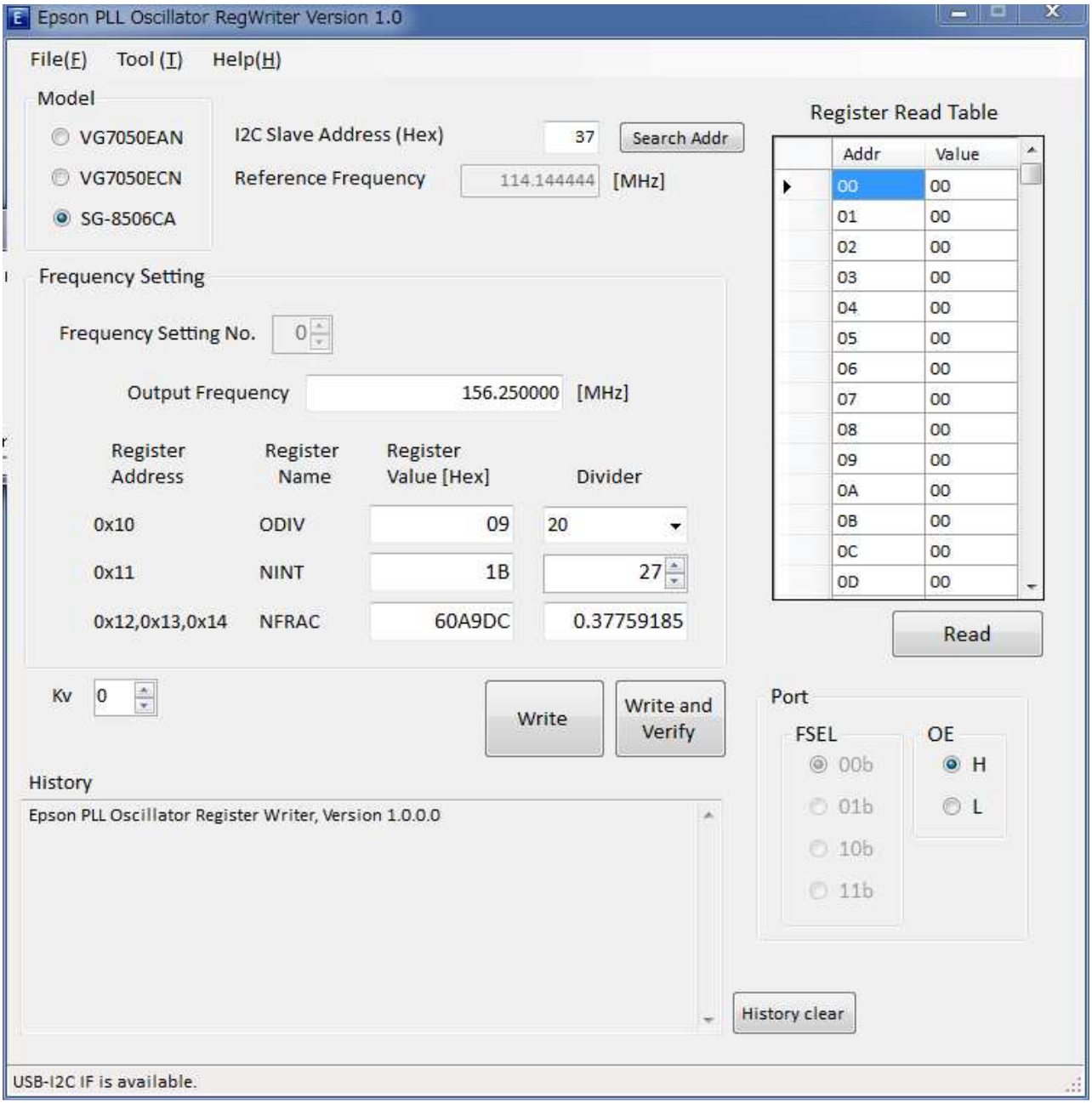
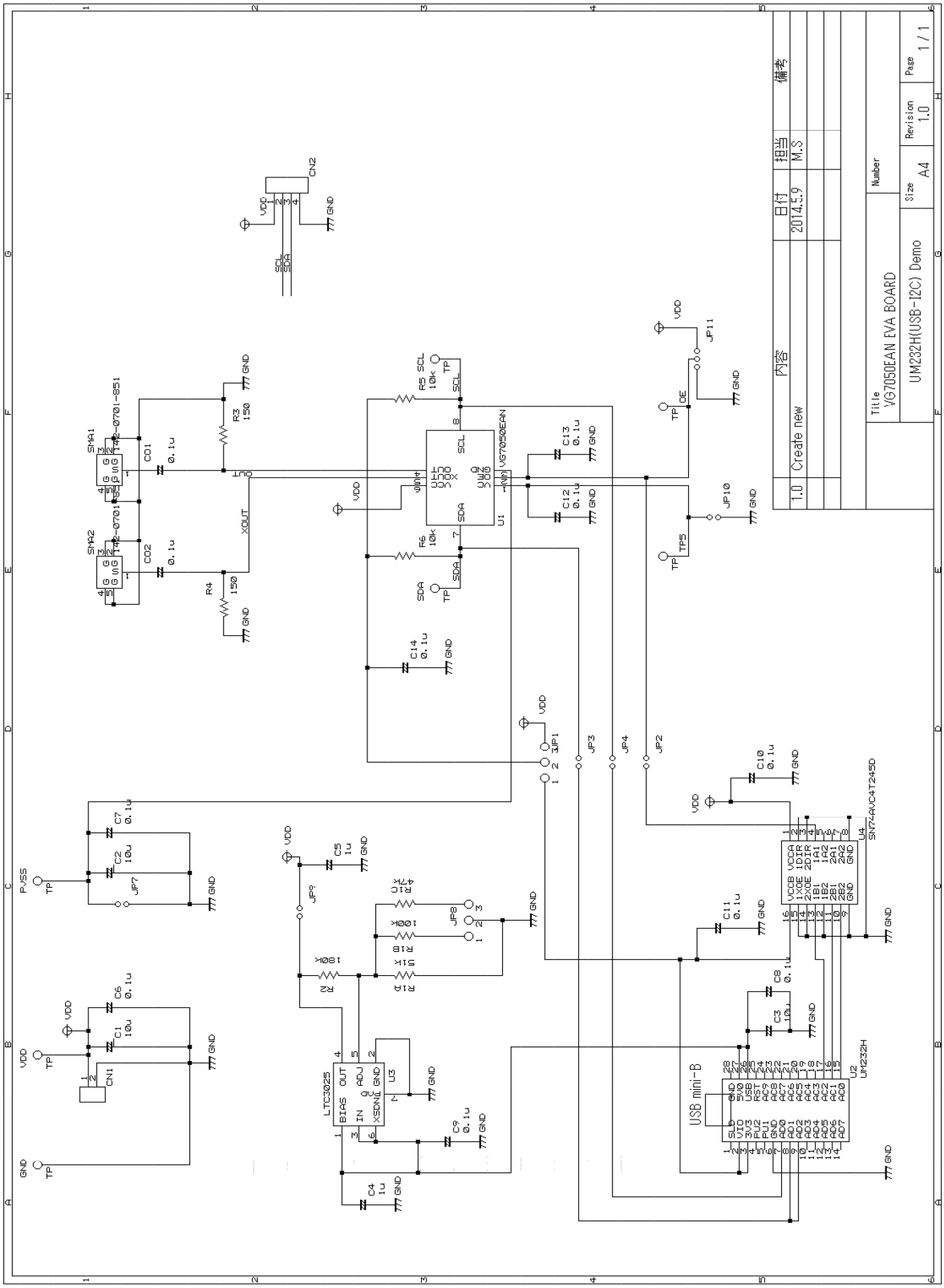



Figure 9 PLL Oscillator RegWriter operation panel

# 5. Schematic


Title
VG7050EAN EVA BOARD
UM232H(USB-I2C) Demo
Number
Size
A4
Revision
1.0
Page
1 / 1
内容
日付
担当
備考
1.0
Create new
2014.5.9
M.S
VG7050EAN
LTC3025
SN74AVC4T245D
UM232H
USB mini-B

# 6. Bill of Materials

| No | maker | device | code | instance | qty | specification |
|---|---|---|---|---|---|---|
| 1 | MURATA | capacitor | GRM32NF11E106Z | C1, C2, C3 | 3 | 3225, 10 µF ±10%, DC10 V |
| 2 | MURATA | capacitor | GRM188B31E105K | C4, C5 | 2 | 1608, 1 µF ±10%, DC10 V |
| 3 | MURATA | capacitor | GRM188B11E104K | C6, C7, C8, C9, C10, C11, C12, C13, C14, CO1, CO2 | 11 | 1608, 0.1 µF ±10%, DC25 V |
| 4 | KOA | resistor | RK73H1JTTD5102F | R1A | 1 | 1608, 51 kΩ ±1% |
| 5 | KOA | resistor | RK73H1JTTD1003F | R1B | 1 | 1608, 100 kΩ ±1% |
| 6 | KOA | resistor | RK73H1JTTD4702F | R1C | 1 | 1608, 47 kΩ ±1% |
| 7 | KOA | resistor | RK73H1JTTD1803F | R2 | 1 | 1608, 180 kΩ ±1% |
| 8 | KOA | resistor | RK73H1JTTD1500F | R3, R4 | 2 | 1608, 150 Ω ±1% |
| 9 | KOA | resistor | RK73H1JTTD1002F | R5, R6 | 2 | 1608, 10 kΩ ±1% |
| 10 | Emerson Network Power Connectivity Solutions | SMA | 142-0701-851 | SMA1, SMA2 | 2 | - |
| 11 | MiS Technologies | Socket | CXP-A08-11-00 | U1 | 1 | - |
| 12 | Linear Technology | regulator | LTC3025 | U3 | 1 | 2 mm x 2 mm, DFN |
| 13 | Texas Instruments | Level shifter | SN74AVC4T245D | U4 | 1 | SOP |
| 14 | MAC8 | Wrapping terminal | WL-1 | CN1, CN2, JP1, JP2, JP3, JP4 TP (SDA, SCL) | - | - |
| 15 | MAC8 | Check pin | LC-22-G- red | VDD | 1 | red |
| 16 | MAC8 | Check pin | LC-22-G-yellow | PVSS, OE, VC | 3 | yellow |
| 17 | MAC8 | Check pin | LC-22-G-black | TP_GND | 1 | black |
| 18 | FTDI | FTDI module | UM232H | U2 | 1 | - |
| 19 | RS | spacer | 325-659 | - | 4 | M3 x 12.7 mm nylon |

# 7. Caution

It is prohibited that external power supply connection to CN1 during JP9 short connection. If external power supply is connected to CN1 in case of JP9 short, power voltage collision might damage the circuitry on the board and PC.

# Evaluation Board Manual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