## Precautions

**Please read these instructions carefully before use.**

- Do not attempt to disassemble or modify the product
- Keep the product away from external shocks or vibrations.
- Do not use damaged or peeled cables.
- Do not use the product outdoors.
- Product specifications and features are subject to change without notice.

**Warranty Information**

- Free warranty service
  - In the case that a defect is found which is caused by a design or the production flaw while using the product properly, the manufacturer is responsible for the faulty product and there is free warranty service for 1 year from the date of purchasing.
  - Even during the warranty service period, malfunction or damage of products caused by the inevitable incident such as a natural disaster is not subject of the free warranty service.
- Warranty service at a cost
  - The free warranty service period is expired.
  - Malfunction of the product caused by a user's fault.
  - Malfunction of the product caused by incidents.
  - Malfunction of the product caused by a natural disaster such as earthquake, flood, lightning, etc.
  - In case of the warranty service at a cost, the customer should cover the shipping costs.
- Examples of a user's fault
  - Fault in case of attempts to disassemble or modify the sCLK-EX.
  - Fault in case of not following the operating instructions correctly.
- Please read these operating instructions and FAQ section on our website carefully before asking for the warranty service.

## Supplied contents

- An sCLK-EX : The name is changed according to the option and frequency.
- An sCLK-EX DC power cable
- RF cable and Clock connect PCB : The standard sCLK-EX supplies a RF cable and a Clock connect PCB, and can be added extra according to the option.
- A U.FL – BNC cable : Supplied when ordering 50Ω Master Clock Option.
- A MCX – BNC cable : Supplied when ordering 75Ω Master Clock Option.
- A SATA power PCB
- A 3.5" bay bracket
- A operating instruction
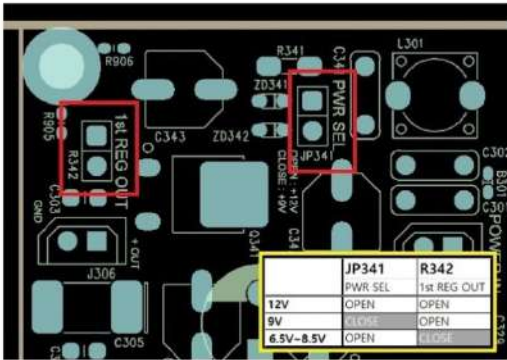
**S O t M**

*Ultimate High Performance Audio*

## Specifications

- **Internal reference clock**
  Custom designed ultra low phase noise oscillation circuit
  Isolated differential clock signal distribution
- **Clock output**
  Isolated clock output : U.FL connector x 4
  Supply matching board for connecting target board
- **Single clock frequency for interface system**
  sCLK-EX12 : 12MHz
  sCLK-EX25 : 25MHz
  sCLK-EX48 : 48MHz
  sCLK-EX22/24 : 22.5792MHz / 24.576MHz selectable by SEL0 input
  sCLK-EX45/49 : 45.1584MHz / 49.152MHz selectable by SEL0 input
  Optionally other frequencies available
- **Dual independent clock frequency for digital audio system**
  sCLK-EX1412 : 14.318MHz, 12MHz
  sCLK-EX1448 : 14.318MHz, 48MHz
  sCLK-EX1425 : 14.318MHz, 25MHz
  Optionally other frequencies available or selectable by SEL0, 1 input
- **Triple independent clock frequency for mother board & interface**
  sCLK-EX142512 : 14.318MHz, 25MHz, 12MHz
  sCLK-EX142548 : 14.318MHz, 25MHz, 48MHz
  Optionally other frequencies available or selectable by SEL0, 1 input
- **Quad independent clock frequency for mother board & interface**
  sCLK-EX14252612 : 14.318MHz, 25MHz, 26MHz, 12MHz
  sCLK-EX14252648 : 14.318MHz, 25MHz, 26MHz, 48MHz
  Optionally other frequencies available or selectable by SEL0, 1 input
- **Clock control input**
  Isolated control input connector x 2
  Non isolated control input x 7
- **External master clock input :** Optional
  Input frequency : 10MHz (Optionally other frequencies available)
    Isolated 50Ω external clock input : U.FL connector x 1
    Isolated 75Ω external clock input : MCX connector x 1
  Differential clock signal input & internal distribution
- **Power input**
  Input Voltage : 9Vdc
    (Optional input voltage : 12Vdc)
    (Optional input voltage : 6.5~8.5V)
  Operating current : 1A >
- **Power output**
  All outputs use an ultra low noise regulator circuit
  5V, 0.5A x 1
  3.3V, 0.5A x 1
- **Power regulator circuit**
  Custom designed ultra low noise regulator circuit x 3
  Standard ultra low noise regulator circuit x 1
  Active noise canceller circuit
- **Components**
  Audio grade film capacitors
  Audio grade tantalum capacitors
- **Operating environment**
  Operating temperature range: +10 ~ +30 $^o$C
  Storage temperature : 0 ~ +40$^o$C
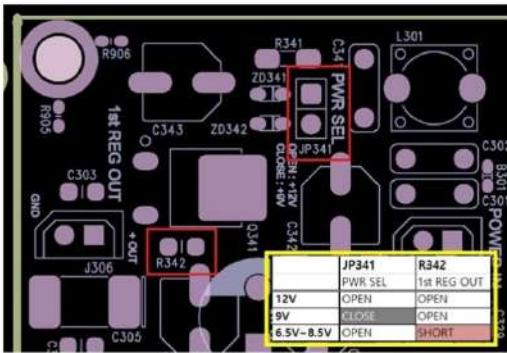  Operating & storage humidity : 10% ~ 90%

# Product outlines
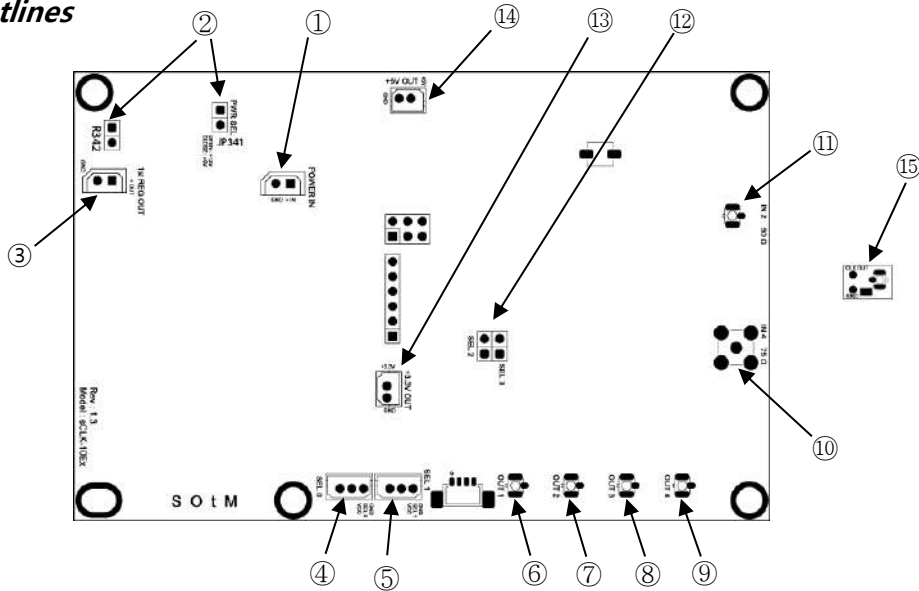


① Power input connector : Connect power to the sCLK-EX by the supplied DC power cable.

② Power voltage select jumper : Set the power input as following the image below.



**sCLK-EX Rev : 1.3**

| | JP341 PWR SEL | R342 1st REG OUT |
|---|---|---|
| 12V | OPEN | OPEN |
| 9V | CLOSE | OPEN |
| 6.5V~8.5V | OPEN | CLOSE |



**sCLK-EX Rev : 1.2**

| | JP341 PWR SEL | R342 1st REG OUT |
|---|---|---|
| 12V | OPEN | OPEN |
| 9V | CLOSE | OPEN |
| 6.5V~8.5V | OPEN | SHORT |

③ Constant voltage output connector : Use when another board needs powers.
Output to about +8.6Vdc when connecting +12Vdc.
Output to around +7.1Vdc when connecting +9Vdc.
Output to around +6.5Vdc~+8.5Vdc when connecting +6.5Vdc~+8.5Vdc.

④ Frequency control input connector (SEL0) : Use when the frequency control input is needed.

⑤ Frequency control input connector (SEL1) : Use when the frequency control input is needed.

⑥ Clock output 1 (U.FL)

⑦ Clock output 2 (U.FL)

⑧ Clock output 3 (U.FL)

⑨ Clock output 4 (U.FL).

⑩ Master clock input connector (MCX) : 75 Ω connector for a master clock input

⑪ Master clock input connector (U.FL) : 50 Ω connector for a master clock input.

⑫ Frequency control select jumper (SEL2, 3) : To use, special order is required.

⑬ +3.3Vdc output connector: This is the output connector for the internal Ultra Low Noise Regulator. Use when needs +3.3Vdc from another board.

⑭ +5Vdc output connector: This is the output connector for the internal Ultra Low Noise Regulator. Use when needs +5Vdc from another board.

⑮ Clock connect PCB : Install to the other boards which needed to replace the clock and connect by the supplied RF cable.

## sCLK-EX ordering information

**sCLK-EX** XX XX XX XX M50 75
① ② ③ ④ ⑤ ⑥

① A frequency for Clock output 1 (U.FL)

② A frequency for Clock output 2 (U.FL)

③ A frequency for Clock output 3 (U.FL)

④ A frequency for Clock output 4 (U.FL)

⑤ When adding 50Ω Master clock

⑥ When adding 75Ω Master clock

| | |
|---|---|
| 44.1K : 44.1KHz | 48K : 48KHz |
| 5.0 : 5MHz | 10 : 10MHz |
| 11 : 11.2896MHz | 12 : 12.0MHz |
| 12.2 : 12.288MHz | 14 : 14.318MHz |
| 22 : 22.5792MHz | 24 : 24.576MHz |
| 25 : 25.0MHz | 26 : 26.0MHz |
| 45 : 45.1584MHz | 48 : 48MHz |
| 49 : 49.152MHz | blank : no frequency output |
| xx/xx : selectable by SEL0 or SEL1 input | |

## Precautions

■ **On the back side of the sCLK-EX, each clock output frequency is labeling by a sticker. When connecting RF cables to other boards, be careful not to misconnect the frequency.**

■ **The sticker on the back side of the sCLK-EX shouldn't be torn or damaged because the serial number is needed if you want to add the master clock options, change the current frequencies, or enable the additional clock output to your current sCLK-EX.**

■ **When connecting a modified main board and the sCLK-EX, all clock output should be connected. Otherwise the main board or the sCLK-EX could be damaged and malfunction.**

1. Remove the crystal oscillator(Y301) and R328 on tX-USBexp by soldering.
2. Install the supplied clock connect PCB ( [image] to the position of the removed Y301 by soldering.

   **Caution : The above no.1 and 2 processes require soldering very carefully, otherwise the product can be damaged. If you are not proficient in soldering or doing these processes, please ask SOtM or the seller to do it. If you purchase the sCLK-EX48 + tX-USBexp combo package, please skip the above no.1 and 2 processes.**
3. Power off the PC and disconnect the AC power cable.
4. Install the sCLK-EX48 using the supplied 3.5"bay bracket to the inside of PC case.
5. Connect the PC's SATA power cable to the supplied SATA power PCB. And connect it to the sCLK-EX48 by the supplied sCLK-EX DC power cable.
6. With the supplied RF cable, connect the soldered clock connect PC [image] ) on the tX-USBexp to the Clock output 1 on the sCLK-EX48.

   **Caution : If you purchase the sCLK-EX48 + tX-USBexp combo package, connect the RF connector(J301) on the back side of tX-USBexp to the Clock output 1 on the sCLK-EX48 by the supplied RF cable.**
7. Refer to the tX-USBexp instllation guide(manual) and install the tX-USBexp into the PC.
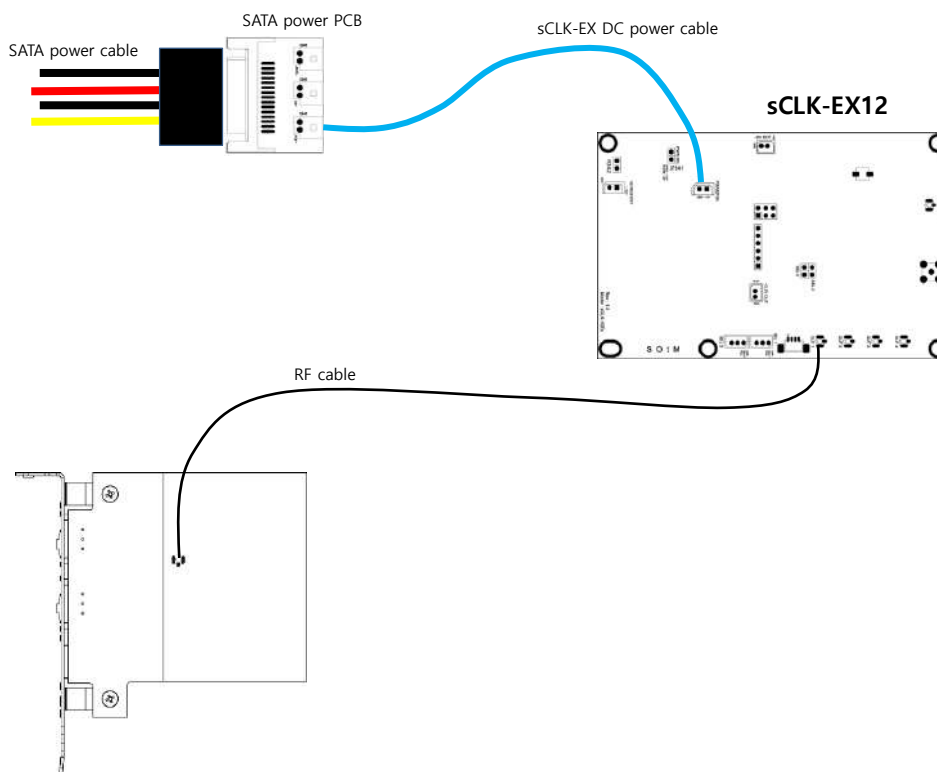8. Install the tX-USBexp driver and use.
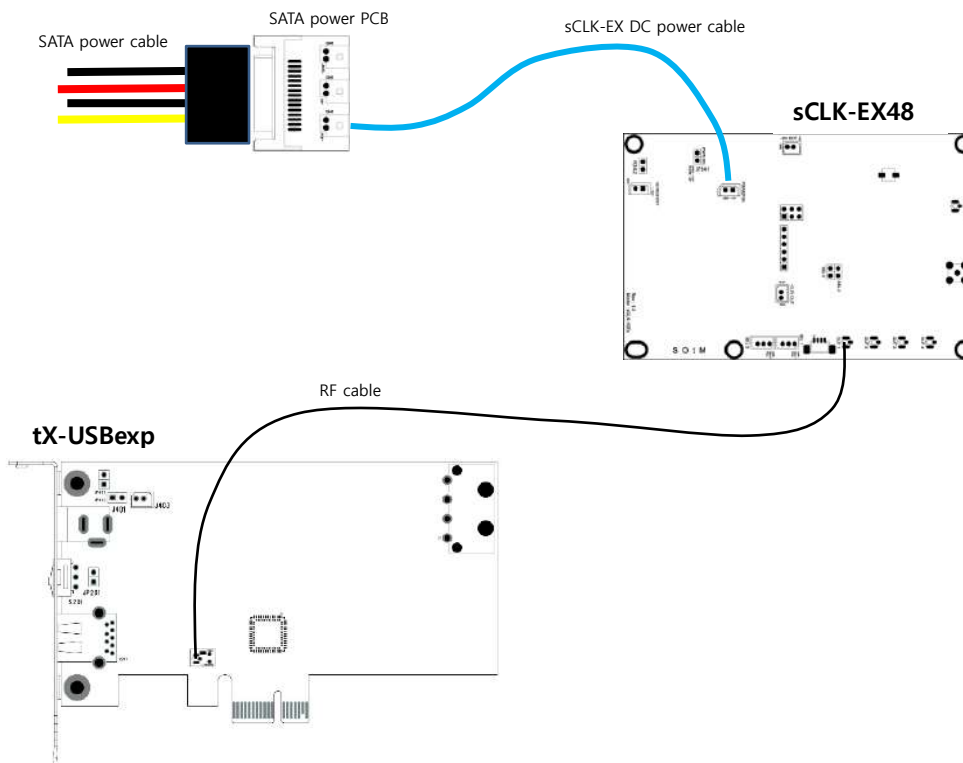


**Precautions**

I. **If any damage occurrs while soldering the board by yourself, you are responsible for the damage or malfunction. If you are not proficient in soldering or doing the process, please ask SOtM or the seller.**

II. **The sCLK-EX48 is capable of synchronizing an external clock like the 10MHz Master clock if you order the Master clock option.**

III. **The sticker on the back side of the sCLK-EX shouldn't be torn or damaged because the serial number is needed if you want to add the master clock options, change the current frequencies to the other frequency, or enable the additional clock output to your current sCLK-EX.**

# sCLK-EX12 + tX-USBhubIN installation guide

1. Put 0Ω on R331 and R329. Put 249Ω on R328 and remove R327 on the tX-USBhubIN by soldering.(The resistor is 1608 size.)

   **Caution : The above no.1 process requires soldering very carefully, otherwise the product can be damaged. If you are not proficient in soldering or doing this process, please ask SOtM or the seller to do it.**

   **If you purchase the sCLK-EX12 + tX-USBhubIN combo package, please skip this process.**

2. Power off the PC and disconnect the AC power cable.
3. Install the sCLK-EX12 using the supplied 3.5"bay bracket to the inside of PC case.
4. Connect the PC's SATA power cable to the supplied SATA power PCB. And connect it to the sCLK-EX12 by the supplied sCLK-EX DC power cable.
5. With the supplied RF cable, connect the RF connector on the tX-USBhubIN to the Clock output 1 on the sCLK-EX12.
6. Refer to the tX-USBhubIN instllation guide(manual) and install the tX-USBhubIN into the PC..



**Precautions**

I. **If any damage occurrs while soldering the board by yourself, you are responsible for the damage or malfunction. If you are not proficient in soldering or doing the process, please ask SOtM or the seller.**

II. **The sCLK-EX12 is capable of synchronizing an external clock like the 10MHz Master clock if you order the Master clock option.**

III. **The sticker on the back side of the sCLK-EX shouldn't be torn or damaged because the serial number is needed if you want to add the master clock options, change the current frequency to the other frequencies, or enable the additional clock output to your current sCLK-EX.**

1. Put 180Ω on R415 and put a jumper pin on JP405. (The resistor is SMD type and 1608 size.)

   **Caution : The above no.1 process requires soldering very carefully, otherwise the product can be damaged. If you are not proficient in soldering or doing this process, please ask SOtM or the seller to do it.**

   **If you purchase the sCLK-EX25 + sNI-1G combo package, please skip this process.**

2. Power off the PC and disconnect the AC power cable.
3. Install the sCLK-EX25 using the supplied 3.5"bay bracket to the inside of PC case.
4. Connect the PC's SATA power cable to the supplied SATA power PCB. And connect it to the sCLK-EX25 by the supplied sCLK-EX DC power cable.
5. With the supplied RF cable, connect the RF connector on the sNI-1G to the Clock output 1 on the sCLK-EX25.
6. Refer to the sNI-1G instllation guide(manual) and install the sNI-1G into the PC..
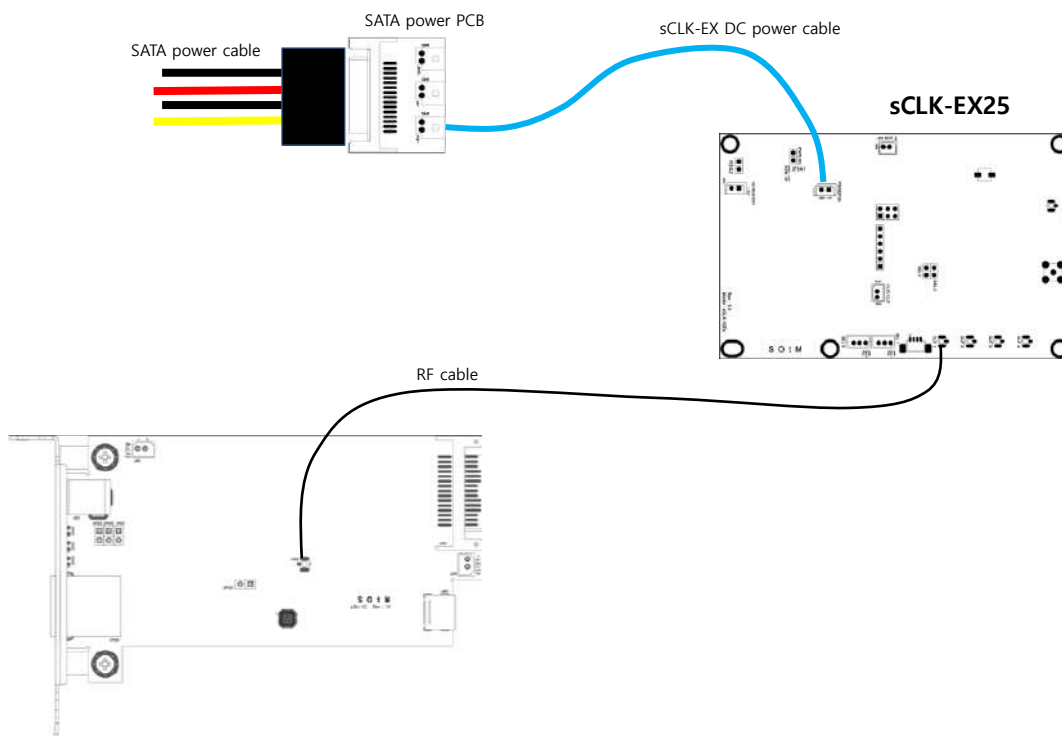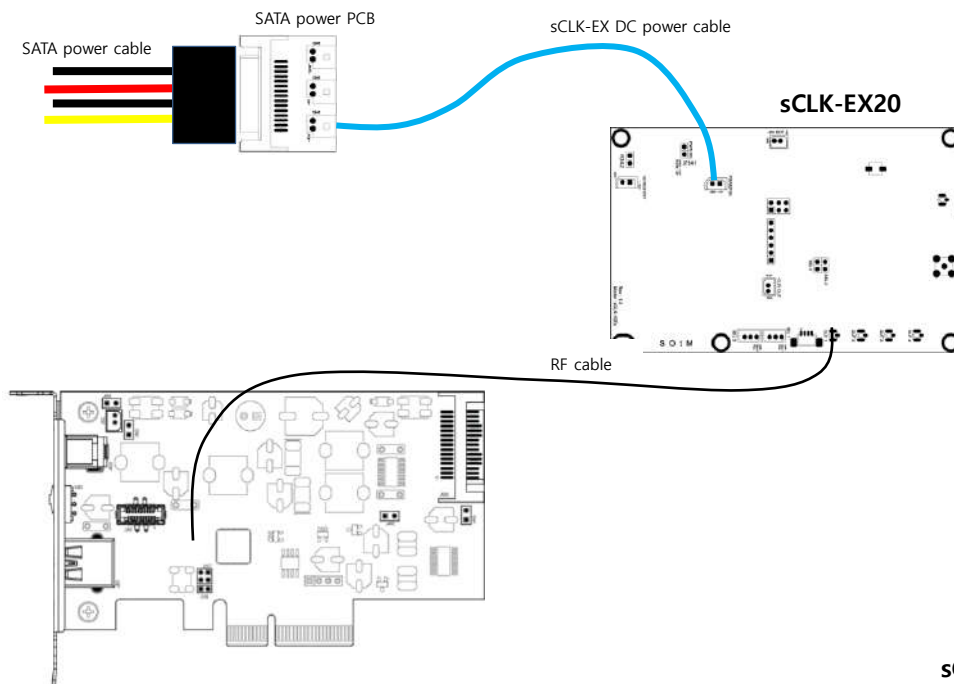


**Precautions**

IV. **If any damage occurrs while soldering the board by yourself, you are responsible for the damage or malfunction. If you are not proficient in soldering or doing the process, please ask SOtM or the seller.**

V. **The sCLK-EX25 is capable of synchronizing an external clock like the 10MHz Master clock if you order the Master clock option.**

VI. **The sticker on the back side of the sCLK-EX shouldn't be torn or damaged because the serial number is needed if you want to add the master clock options, change the current frequencies to the other frequencies, or enable the additional clock output to your current sCLK-EX.**
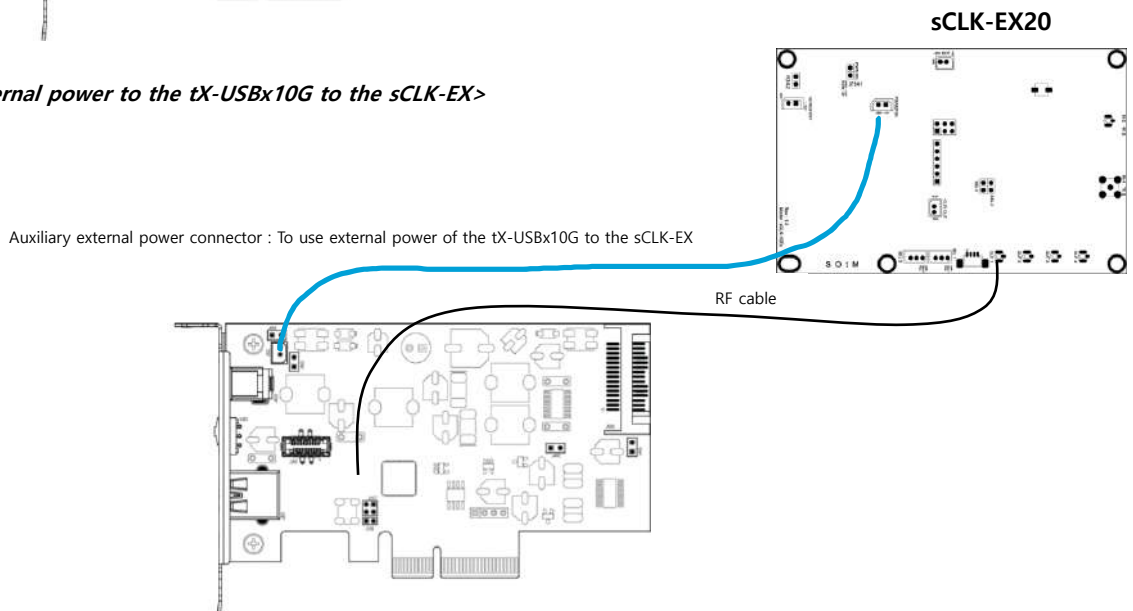
1. Adjust the jumper pin settings on J107 and J106 of the tX-USBx10G for the sCLK-EX20 connections.
   
   **A.  Remove two jumpers on the J107 and install a jumper on the J106.**

2. Power off the PC and disconnect the AC power cable.

3. Install the sCLK-EX20 using the supplied 3.5"bay bracket to the inside of PC case.

4. Connect the PC's SATA power cable to the supplied SATA power PCB. And connect it to the sCLK-EX20 by the supplied sCLK-EX DC power cable.

5. With the supplied RF cable, connect the RF connector on the tX-USBx10G to the Clock output 1 on the sCLK-EX20. The RF connector (J104) of the tX-USBx10G is underneath of the product.

6. Refer to the sNI-1G instllation guide and install the sNI-1G into the PC..

*<When connected SATA power to the sCLK-EX>*

SATA power PCB

SATA power cable

sCLK-EX DC power cable

**sCLK-EX20**

RF cable

**sCLK-EX20**

*<When connecting external power to the tX-USBx10G to the sCLK-EX>*

Auxiliary external power connector : To use external power of the tX-USBx10G to the sCLK-EX

RF cable

**Precautions**

I.  If any damage occurrs while soldering the board by yourself, you are responsible for the damage or malfunction. If you are not proficient in soldering or doing the process, please ask SOtM or the seller.

II. The sCLK-EX25 is capable of synchronizing an external clock like the 10MHz Master clock if you order the Master clock option.

III. The sticker on the back side of the sCLK-EX shouldn't be torn or damaged because the serial number is needed if you want to add the master clock options, change the current frequencies to the other frequencies, or enable the additional clock output to your current sCLK-EX.

1. Remove the crystal oscillator(Y301) and R328 on tX-USBexp by soldering.
2. Install the supplied clock connect PCB (  ) to the position of the removed Y301 by soldering.

    **Caution : The above no.1 and 2 processes are required soldering very carefully, otherwise the product can be damaged. If you are not proficient in soldering or doing these processes, please ask SOtM or the seller to do it.**

3. Power off the PC and disconnect the AC power cable.
4. Open the PC case and take out(disassemble) the main board.
5. Remove the system crystal (oscillator) on the main board and install the supplied clock connect PCB (  ) to the position of the removed system crystal (oscillator) by soldering.

    **Caution : Normally the system crystal (oscillator) on the main board is 14.318MHz, but the correct frequency, type of components, required voltage and other information should be double confirmed by the technical data and the frequency measurement data before you proceed with the installation.**

6. Remove the Ethernet communications crystal oscillator on the main board and install the supplied clock connect PCB (  ) to the position of the removed Ethernet communications crystal oscillator by soldering.

    **Caution : Normally the Ethernet communications crystal oscillator on the main board is 25MHz, but the correct frequency, type of components, required voltage and other information should be double confirmed by the technical data and the frequency measurement data before you proceed with the installation.**

    **Cautions : If you purchase the sCLK-EX142548 + tX-USBexp + PC main board combo package, please skip the above no.1,2,5,6 processes.**

7. Install the sCLK-EX142548 using the supplied 3.5"bay bracket to the inside of PC case.
8. Connect the PC's SATA power cable to the supplied SATA power PCB. And connect it to the sCLK-EX142548 by the supplied sCLK-EX DC power cable.
9. By the supplied RF cable, connect

    the clock connect PCB(  ) soldered where the system crystal (oscillator) on the main board to the Clock output 1,

    the clock connect PCB(  ) soldered where the Ethernet communications crystal (oscillator) on the main board to the Clock output 2,

    the clock connect PCB(  ) soldered where the crystal (oscillator) on the tX-USBexp to the Clock output 3 on the sCLK-EX142548.

    **Caution : If you purchase the sCLK-EX48 + tX-USBexp combo package, connect the RF connector(J301) on the back side of tX-USBexp to the Clock output 1 on the sCLK-EX48 by the supplied RF cable**

10. Install the main board back to the PC case.
11. Refer to the tX-USBexp instllation guide(manual) and install the tX-USBexp into the PC.
12. Connect AC power cable to PC and Power on.
13. Install the tX-USBexp driver and use.

**Precautions**

I. This installation guide is for the sCLK-EX142548 + tX-USBexp + PC main board combo package.

II. Advanced technical skill should be required to confirm the correct frequency, type of component, required voltage and the specification for the clock upgrade. If you are not proficient in such information or soldering, please ask SOtM or the seller to do it. Otherwise, we highly recommend using the sCLK-EX combo packages.

III. To confirm the requried voltage for the clock upgrade, you will need to check the technical data of the clock input IC. Normally the required voltage for the clock signal is 3.3V and the supplied clock connect PCB (  ) is designed to output 3.3V too. But if the required voltage for the clock input is not 3.3V, you will need to ask SOtM to provide the other voltage of the clock connect PCB in advance the order.

IV. The above no.5 and 6 processes require soldering skills, otherwise the product can be damaged. If you are not proficient in soldering or doing these processes, please ask SOtM or the seller to do it. Otherwise, we recommend using the sCLK-EX combo package which includes the main board.
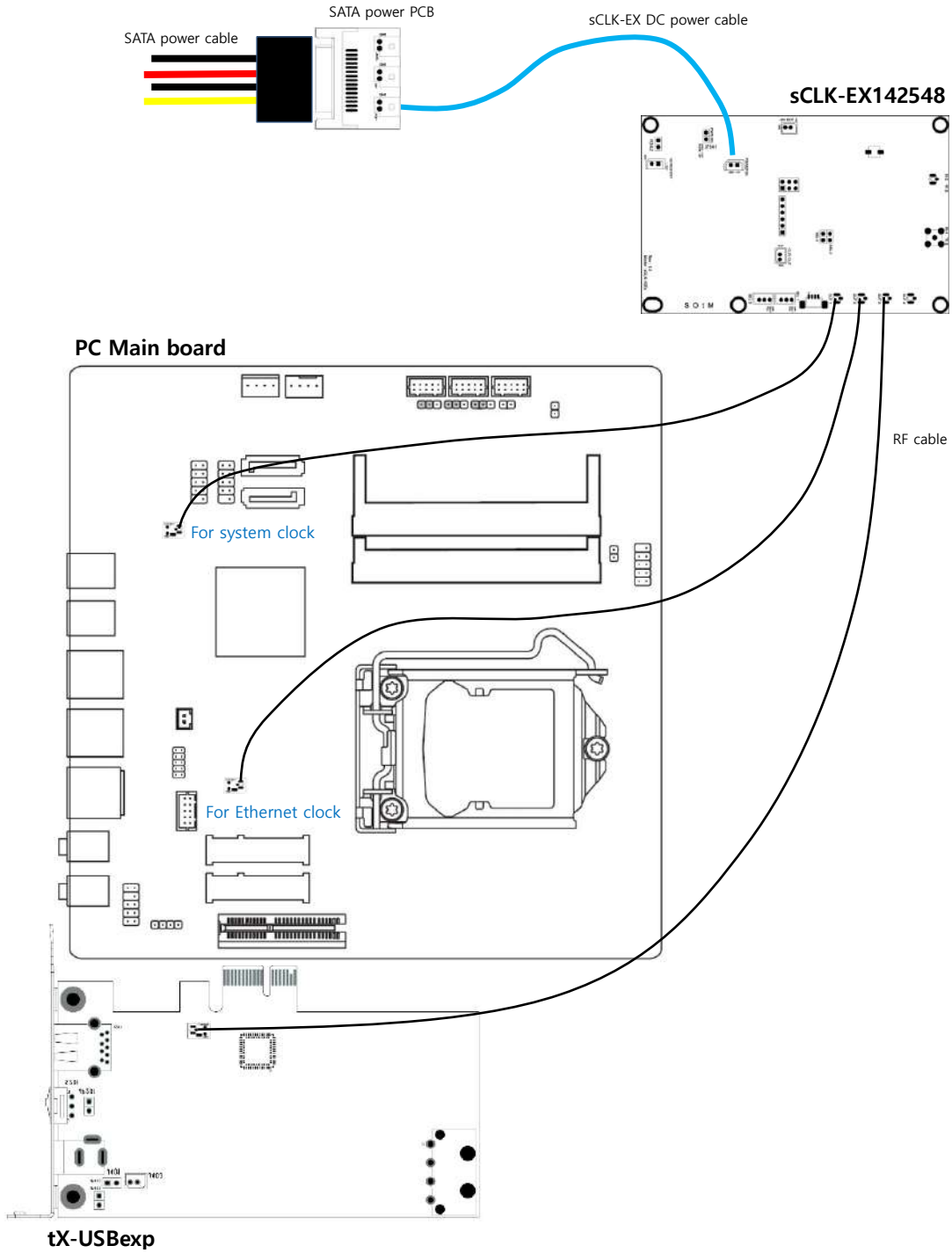
V. Users who conduct the installation are responsible for any damage or malfunction. If any damage occurrs while soldering the board by yourself, you are responsible for the damage or malfunction. If you are not proficient in soldering or doing the process, please ask SOtM or the seller.

VI. sCLK-EX142548 is capable of synchronizing an external clock like the 10MHz Master clock if you order the Master clock option.

VII. The sticker on the back side of the sCLK-EX shouldn't be torn or damaged because the serial number is needed if you want to add the master clock options, change the current frequency to the other frequencies or enable the additional clock output to your current sCLK-EX.

VIII. If you commission SOtM or the seller to do the upgrade on your main board, the labor cost and a round trip shipping

costs will be requried. If any damage occurs for the requested main board while processing the upgrade, the repair cost would be charged to SOtM, the seller and the client who requested this upgrade equally, and the repair cost is calculated depreciation on the requested main board.

SATA power cable

SATA power PCB

sCLK-EX DC power cable

**sCLK-EX142548**

SOtM

**PC Main board**

For system clock

RF cable

For Ethernet clock

**tX-USBexp**

1. Refer to the sCLK-EX installation guide and install the sCLK-EX accordingly. Depending on what sCLK-EX package use, the different installation guides are provided.
2. A U.FL – BNC cable is for 50Ω impedance, a MCX – BNC cable is for 75Ω impedance. Refer to the image below and connect the correct cable according to the correct impedance of the external master clock input to the sCLK-EX and fasten the BNC connector bracket to the PC case.
3. The Detect LED turns on once the clock output synchronizes to the external master clock input. The Detect LED located next to the Operate LED and the Operate LED blinks once the sCLK-EX operates normally.
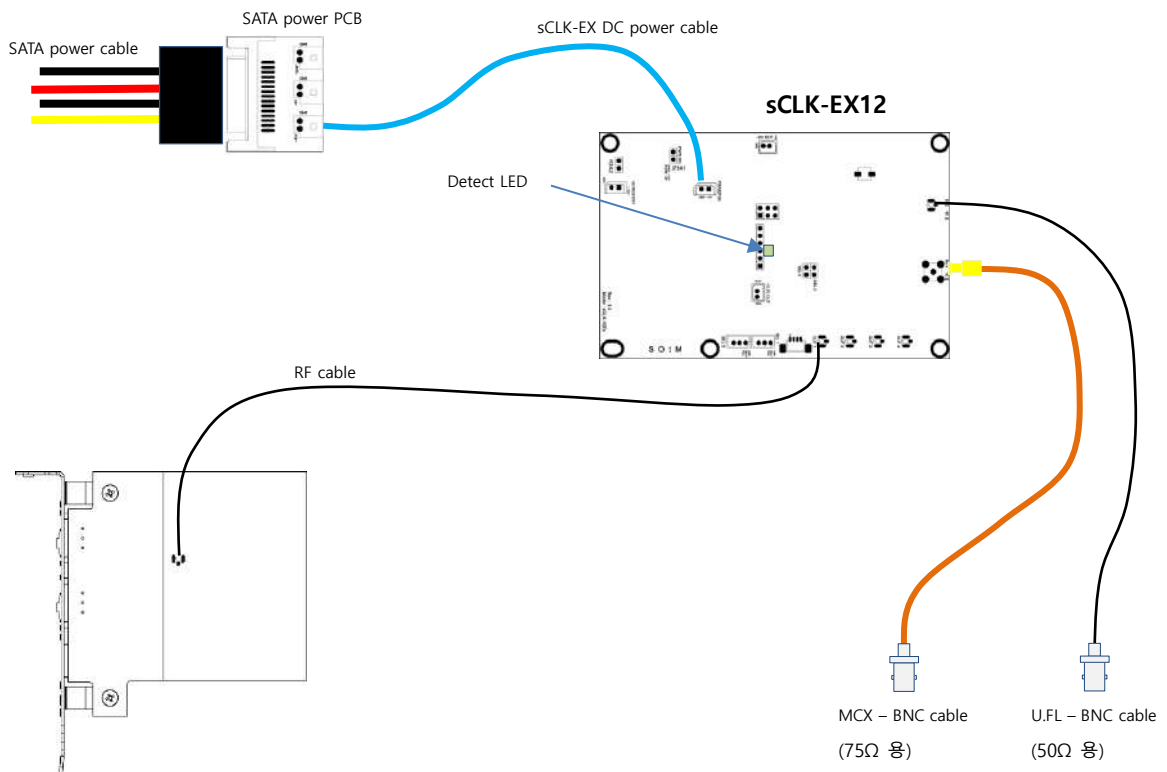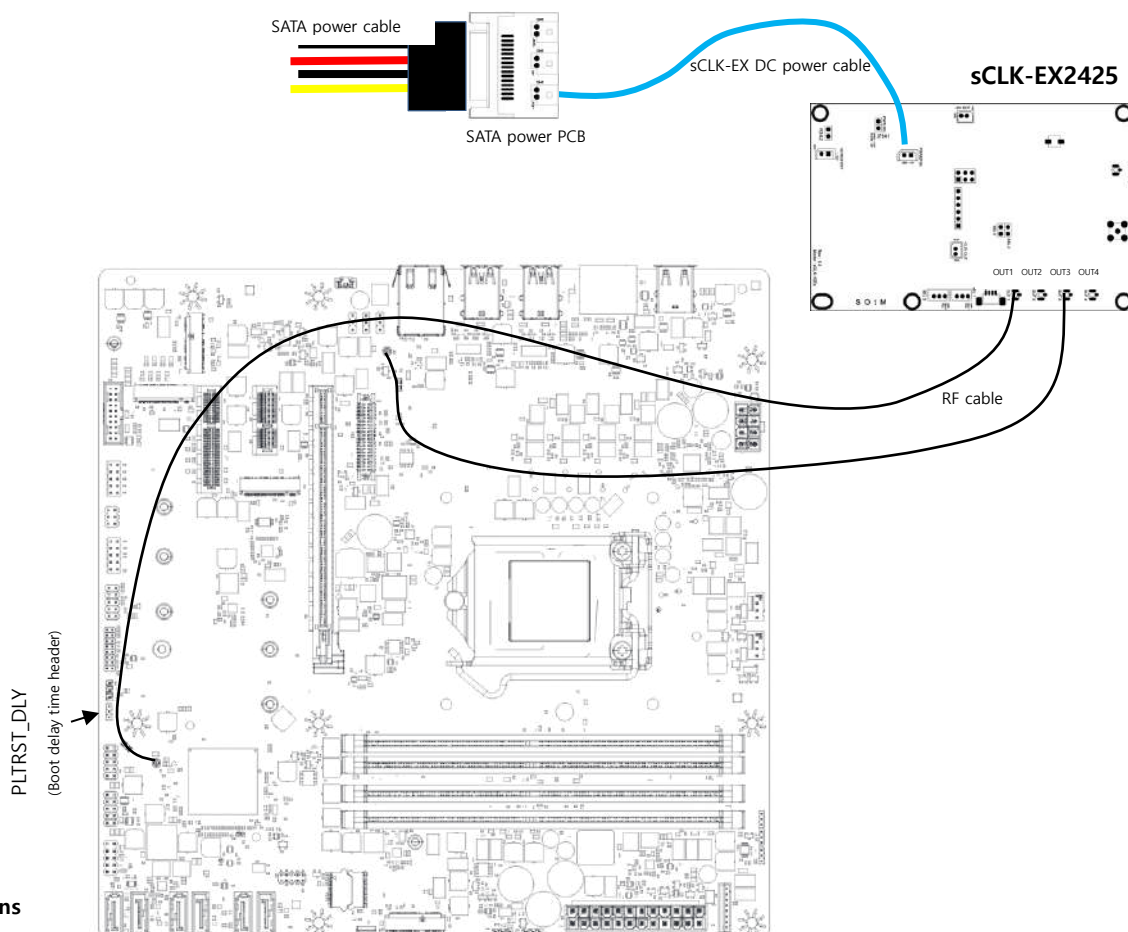


**Precautions**

I. The installation guide is for the sCLK-EX12M5075 + tX-USBhubIN combo package. Please refer to how to name sCLK-EX, sCLK-EX12M5075 means the 12Mhz frequency is enabled for Clock output 1 and the 50Ω Master Clock Option and 75Ω Master Clock Option are added.

I. The sCLK-EX master clock option offers
   - 50Ω Master Clock Option : it comes with 50Ω U.FL to BNC cable.
   - 75Ω Master Clock Option : it comes with 75Ω MCX to BNC cable.

II. The standard master clock input frequency is 10MHz. Different input frequencies are available, if you need different input frequencies, you will need to ask in advance of the order.

III. All sCLK-EXs are capable of synchronizing an external clock as like the 10MHz Master clock if you order the Master clock option.

IV. The sticker on the back side of the sCLK-EX shouldn't be torn or damaged because the serial number is needed if you want to add the master clock options, change the current frequency to the other frequencies, or enable the additional clock output to your current sCLK-EX.

1. Remove R2716, R2717, R153 and R154 on the sMB-Q370 and add 0Ω resistors on R2671 and R2715 by soldering.( The resistor is 2012 size SMD type.)
   A. **Caution : The above no.1 process requires soldering very carefully, otherwise the product can be damaged. If you are not proficient in soldering or doing this process, please ask SOtM or the seller to do it.**
   B. **If you purchased the sCLK-EX2425 + sMB-Q370 combo package, please skip the above no.1 process.**
2. Install the sMB-Q370 to a PC case.
3. Install the sCLK-EX2425 with the supplied 3.5" bay bracket to the inside of PC case.
4. Connect the PC's SATA power cable to the supplied SATA power PCB. And connect it to the sCLK-EX2425 by the supplied sCLK-EX DC power cable.
5. With the supplied RF cables, connect the output no.1 of the sCLK-EX2425 to the RF1(System clock) of the sMB-Q370 and the output no.3 of the sCLK-EX2425 to the RF2(Ethernet clock) of the sMB-Q370.
   A. **Caution : If you purchased the sCLK-EX482425 + sMB-Q370 + tX-USBexp package, connect the output no.1 of the sCLK-EX482425 to the RF connector(J301) on the back side of the tX-USBexp, the output no.2 of the sCLK-EX482425 to the RF1(System clock) of the sMB-Q370 and the output no.4 of the sCLK-EX482425 to the RF2(Ethernet clock) of the sMB-Q370 by the supplied RF cables.**
   B. **Caution : If you purchased the sCLK-EX25252448 + sMB-Q370 + tX-USBexp + sNI-1G package, connect the output no.1 of the sCLK-EX25252448 to the RF connector(J402) on the sNI-1G, the output no.2 of the sCLK-EX25252448 to the RF2 of the sMB-Q370, the output no.3 of the sCLK-EX25252448 to the RF1 of the sMB-Q370 and the output no.4 of the sCLK-EX482425 to the back side of the tX-USBexp by the supplied RF cable.**
6. Fix the RF cables for the RF1 and RF2 to the RF cable holders(J56 and J57).
7. If you use SATA power for sCLK-EX2425, place the PLTRST_DLY jumper on the no. 1-2 pins.
   If you use external power for sCLK-EX2425, place the PLTRST_DLY jumper on the no. 2-3 pins.



SATA power cable

sCLK-EX DC power cable

**sCLK-EX2425**

SATA power PCB

OUT1 OUT2 OUT3 OUT4

SOtM

RF cable

PLTRST_DLY
(Boot delay time header)

**Precautions**

I. **If any damage occurrs while soldering the board by yourself, you are responsible for the damage or malfunction. If you are not proficient in soldering or doing the process, please ask SOtM or the seller.**
II. **The sCLK-EX2425 is capable of synchronizing with a 10mhz external clock device like sCLK-OCX10 if have a Master clock input optionally.**
III. **The sticker on the back side of the sCLK-EX should not be torn or damaged because the serial number is required if you want to add the master clock input option, change the current frequencies to the other frequencies, or enable the additional clock output to your current sCLK-EX.**