

ML630Q464/466 Reference Board User's Manual

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Preface

This manual describes the operation of the ReferenceBoard of the 32-bit microcontroller ML630Q464/466.

The following manuals are also available. Read them as necessary.

- ML630Q464/466 User's Manual
 - Description of the ML630Q464/466

Table of Contents

| | |
|-------------------------------------|------------|
| 1. GENERAL DESCRIPTION | 1-1 |
| 1.1. OVERVIEW | 1-1 |
| 1.2. MAIN COMPONENTS | 1-2 |
| 2. FUNCTIONS..... | 2-1 |
| 2.1. LEDs | 2-1 |
| 2.2. RESET SWITCH | 2-1 |
| 2.3. GENERAL-USE SWITCH | 2-1 |
| 2.4. VREF JUMPER | 2-2 |
| 2.5. VDD_SEL, USB_SEL JUMPER..... | 2-2 |
| 2.6. RC-ADC | 2-3 |
| 2.7. SA-ADC | 2-3 |
| 2.8. LCD BIAS SELECTION | 2-4 |
| 2.9. UART TO USB..... | 2-4 |
| 3. CONNECTORS | 3-1 |
| 3.1. DEBUG..... | 3-1 |
| 3.2. CN1 | 3-1 |
| 3.3. CN2..... | 3-2 |
| 3.4. CN3..... | 3-2 |
| 3.5. CN4..... | 3-3 |
| 4. SCHEMATICS..... | 4-1 |

Chapter 1

General Description

This chapter gives a general description of the ML630Q464/466 Reference Board.

1. General Description

1.1. Overview

ML630Q464/466 Reference board is prepared by LAPIS SEMICONDUCTOR to have you study the operations of ML630Q464/466.

The board is arranged so that necessary components are mounted by you according to your purpose, then only minimum necessary components are mounted on the board by LAPIS SEMICONDUCTOR for brief use of ML630Q464/466.

By using the board with ARM Debugger, not only Software development/debugging but also writing to Flash ROM in the devices are possible.

This board also works in stand alone mode with external power supply without ARM Debugger.

1.2. Main Components

Figure 1-1 shows the ML630Q464/466 Reference Board and Table 1-1 lists the main components of the board.

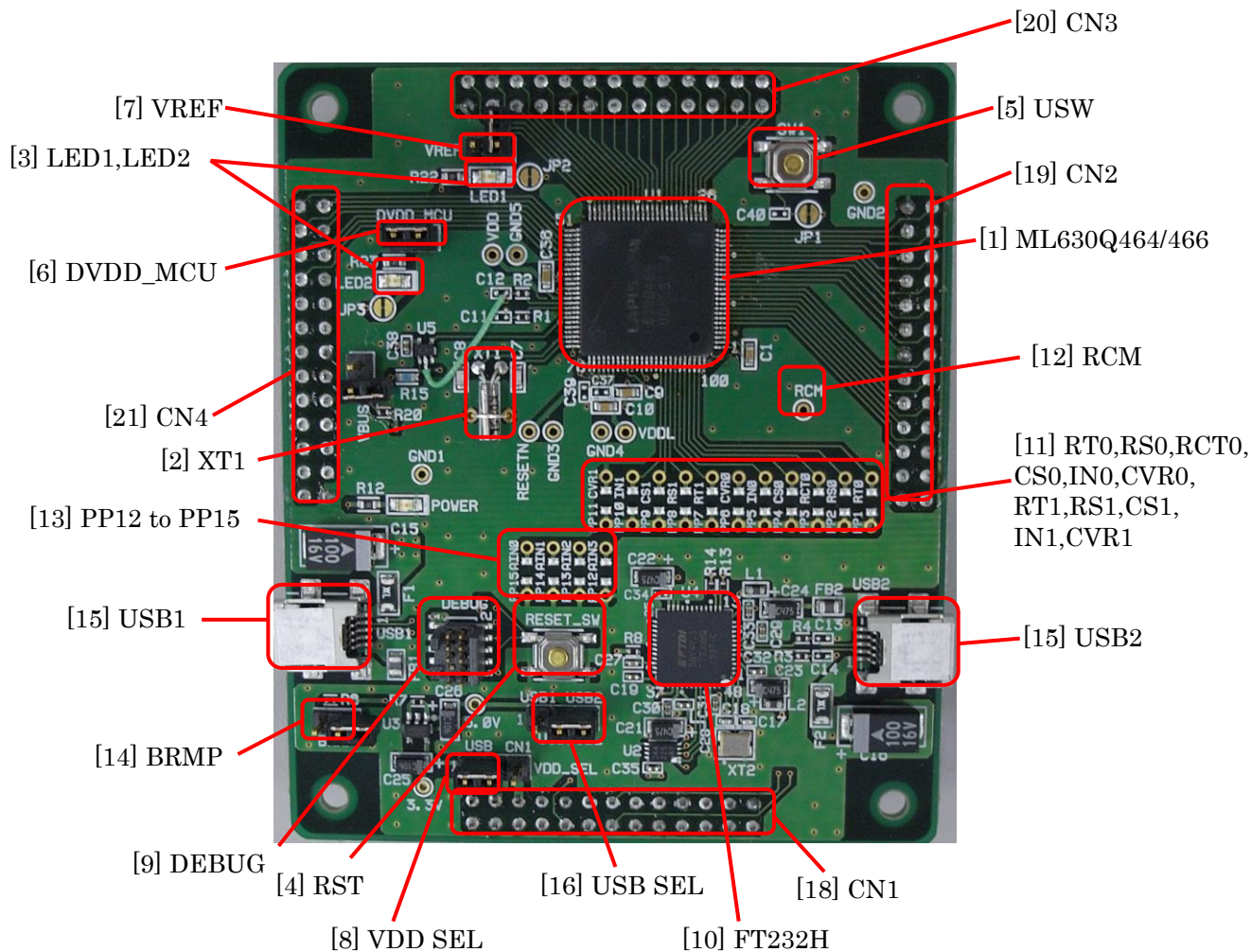


Table 1-1 Components Mounted on the reference board

| Number | Name | Description |
|--------|--|--|
| 1 | ML630Q464/466 | Microcontroller |
| 2 | XT1 | 32.768kHz oscillator |
| 3 | LED1,LED2 | Light emitting diodes LED1: Connected to P31 through JP2. LED2: Connected to P56 through JP3. |
| 4 | RST | Reset switch. |
| 5 | USW | General -use switch. Connected to P30 through JP1. |
| 6 | DVDD_MCU | Jumper for measuring the LSI current. |
| 7 | VREF | Jumper for selecting the input voltage. |
| 8 | VDD SEL | The power supply of the microcontroller is selected by this jumper. 1-2: The power supply is supplied from USB. 2-3: The power supply is supplied from CN1. |
| 9 | DEBUG | Connector for Debugger. |
| 10 | FT232H | Convert from USB to UART. |
| 11 | RT0, RS0, RCT0, CS0, IN0, CVR0, RT1, RS1, CS1, IN1, CVR1 | Resistors and capacitors for RC-ADC. |
| 12 | RCM | Monitor pin of RC-ADC. |
| 13 | PP12 to PP15 | Used for the capacitors of AIN0 to AIN3 pins. |
| 14 | BRMP | Jumper of the boot select. |
| 15 | USB1, USB2 | USB connector USB1: Connected to DP,DM of ML630Q464/466 USB2: Connected to P36,P37 of ML630Q464/466 through FT232H via zero-ohm resistors. |
| 16 | USB_SEL | The power supply of the microcontroller is selected by this jumper. 1-2: The power supply is supplied from USB1. 2-3: The power supply is supplied from USB2 |
| 17 | CN1 | Connector for peripherals. |
| 18 | CN2 | Connector for peripherals. |
| 19 | CN3 | Connector for peripherals. |
| 20 | CN4 | Connector for peripherals. |

Chapter 2

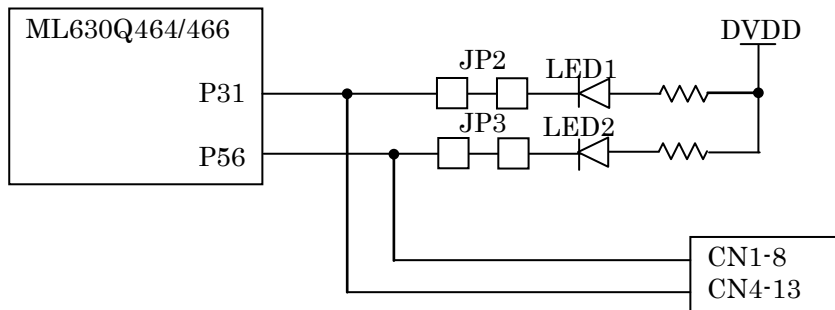
Functions

This chapter gives the functions fo ML630Q464/466 reference board.

2. Functions

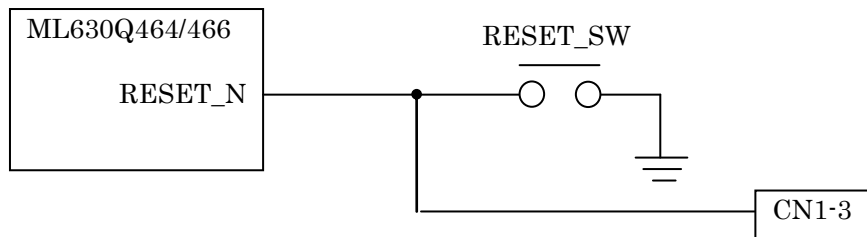
2.1. LEDs

P31, P56 can drive direct to LED. When separate P31 or P56 from LEDs, please cut the wiring of JP2 or JP3.



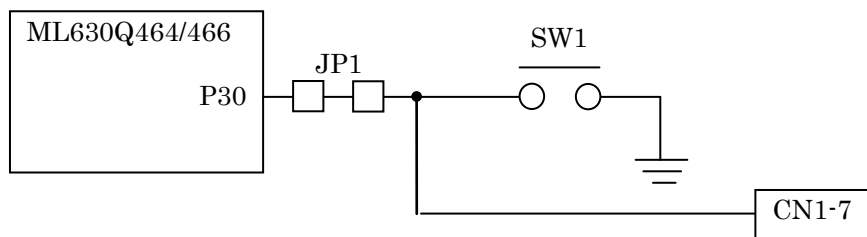
2.2. Reset switch

RESET_N pin is connected to the push switch(RESET_SW) and CN1 connector. The RESET_N pin has the internal pull-up resistor.



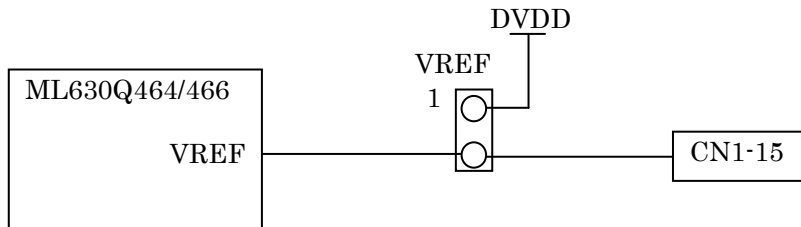
2.3. General-use switch

P30 pin is connected to the general-use switch(SW1). When SW1 is used, connect the pull-up resistor by setting the P3CON register of ML630Q464/466. When separate P30 from USW, cut the wiring of JP1.



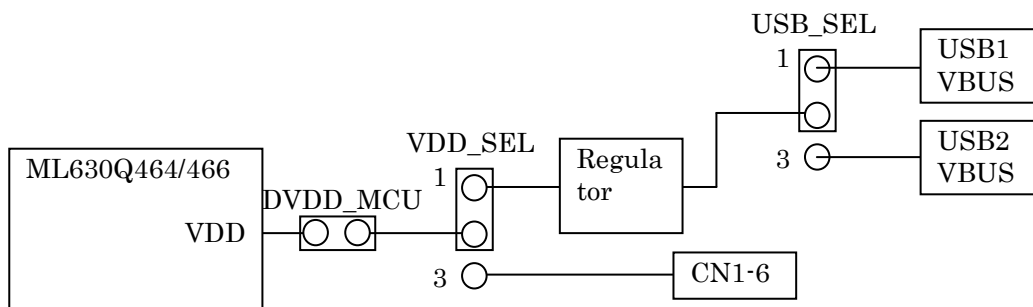
2.4. VREF jumper

VREF is connected to VDD with VREF jumper.



2.5. VDD_SEL, USB_SEL jumper

The power supply of the ML630Q464/466 can select from USB1, USB2 and CN1 connector.



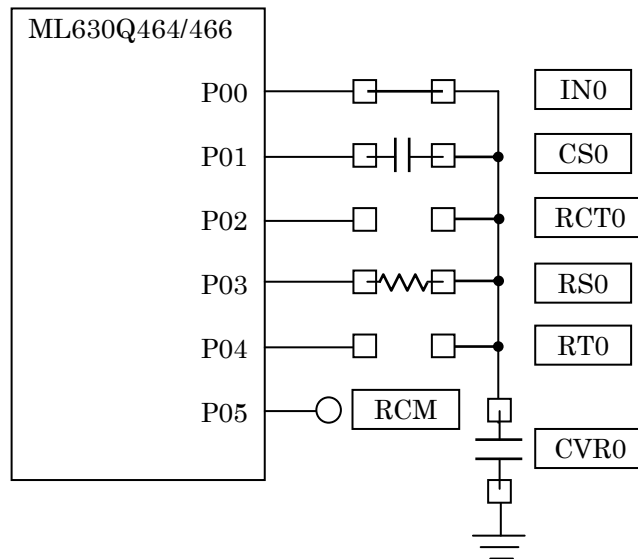
| power supply | jumper setting |
|--------------|---|
| USB1 VBUS | USB_SEL: 1-2 short VDD_SEL: 1-2 short DVDD_MCU: short |
| USB2 VBUS | USB_SEL: 2-3 short VDD_SEL: 1-2 short DVDD_MCU: short |
| CN1-6 | USB_SEL: - VDD_SEL: 2-3 short DVDD_MCU: short |

*: DVDD_MCU is used, when the consumption current of the ML630Q464/466 is measured.
Usually make it short.

2.6. RC-ADC

When use the channel-0 of RC-ADC, please mount capacitors and resistors at RT0, RS0, RCT0, CS0, IN0 and CVR0. When use the channel-1 of RC-ADC, please mount capacitors and resistors at RT1, RS1, CS1 and CVR1. RC oscillation can be monitored at RCM.

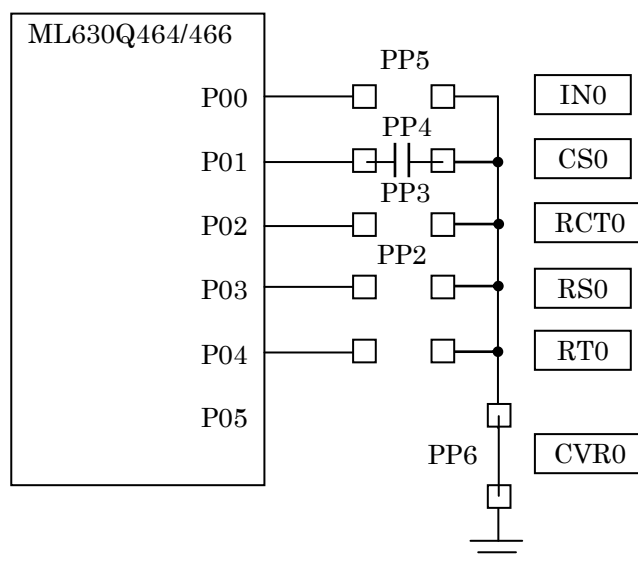
Example RS0-CS0 oscillation mode



2.7. SA-ADC

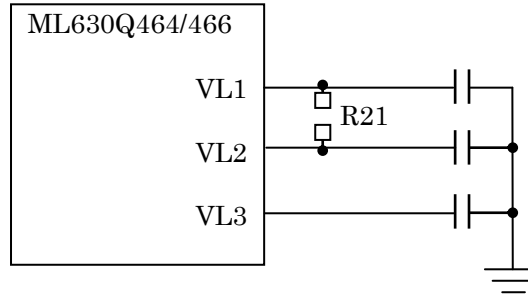
When use the SA-ADC, please connect the input to be measured at the P32-35(AIN0-3), P20-23(AIN4-7) or P00-03(AIN8-11). When use the noise reduction capacitor for AIN0-11, please mount at PP12 to PP15, PP7 to PP10 or PP2 to PP5. And please note that the 0 ohm resistor must be mounted on PP11, when the noise reduction capacitors are necessary at PP7-10, and also the 0 ohm resistor must be mounted on PP6, when the noise reduction capacitors are necessary at PP2-5.

Example AIN9 needs the noise reduction capacitor.



2.8. LCD bias selection

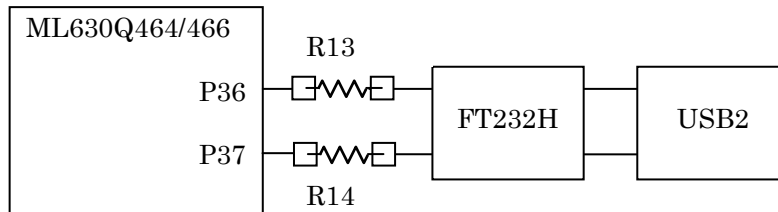
By the bias setting of the LCD, please mount the 0 ohm registers on R21.



| bias setting | jumper setting |
|--------------|---------------------------------|
| 1/2 bias | 0 ohm registers mount on R21. |
| 1/3 bias | 0 ohm resistor does not mount . |

2.9. UART to USB

The UART is connected to USB2 connector through FT232H. Only P36,P37 are connected to USB2 connector.



Chapter 3

Connectors

This chapter describes the connectors mounted on the ML630Q464/466 Reference Board.

3. Connectors

3.1. DEBUG

| PIN No | Signal name | I/O | Destination | PIN No | Signal name | I/O | Destination |
|--------|-------------|-----|-------------|--------|-------------|-----|-------------|
| 1 | VTref | O | VDD | 2 | SWDIO | I/O | SWD |
| 3 | GND | - | VSS | 4 | SWCLK | I | SWC |
| 5 | GND | - | VSS | 6 | SWO | O | N.C. |
| 7 | KEY | - | N.C. | 8 | TDI | - | N.C. |
| 9 | GND | - | VSS | 10 | nSRST | I | RESET_N |

3.2. CN1

| PIN No | Signal name | I/O | Destination | PIN No | Signal name | I/O | Destination |
|--------|-------------|-----|-------------|--------|-------------|-----|-------------|
| 1 | - | - | - | 2 | - | - | - |
| 3 | RESET_N | I | RESET_N | 4 | GND | - | VSS |
| 5 | - | - | - | 6 | DVDD | - | VDD |
| 7 | P30 | I/O | P30_CMP0P | 8 | P31 | I/O | P31_CMP0M |
| 9 | P32 | I/O | P32_CMP1P | 10 | P33 | I/O | P33_CMP1M |
| 11 | P34 | I/O | P34_AIN0 | 12 | P35 | I/O | P35_AIN1 |
| 13 | P36 | I/O | P36_TMCKI4 | 14 | P37 | I/O | P37_TMCKI5 |
| 15 | VREF | I | VREF | 16 | P20 | I/O | P20_AIN4 |
| 17 | P21 | I/O | P21_AIN5 | 18 | P22 | I/O | P22_AIN6 |
| 19 | P23 | I/O | P23_AIN7 | 20 | P00 | I/O | P00_AIN8 |
| 21 | P01 | I/O | P01_AIN9 | 22 | P02 | I/O | P02_AIN10 |
| 23 | P03 | I/O | P03_AIN11 | 24 | P04 | I/O | P04 |
| 25 | P05 | I/O | P05 | 26 | GND | - | VSS |

3.3. CN2

| PIN No | Signal name | I/O | Destination | PIN No | Signal name | I/O | Destination |
|--------|-------------|-----|-------------|--------|-------------|-----|-------------|
| 1 | - | - | - | 2 | - | - | - |
| 3 | - | - | - | 4 | - | - | - |
| 5 | - | - | - | 6 | P63 | I/O | P63_COM7 |
| 7 | P62 | I/O | P62_COM6 | 8 | P61 | I/O | P61_COM5 |
| 9 | P60 | I/O | P60_COM4 | 10 | COM3 | O | COM3 |
| 11 | COM2 | O | COM2 | 12 | COM1 | O | COM1 |
| 13 | COM0 | O | COM0 | 14 | GND | - | VSS |
| 15 | SEG0 | O | SEG0 | 16 | SEG1 | O | SEG1 |
| 17 | SEG2 | O | SEG2 | 18 | SEG3 | O | SEG3 |
| 19 | SEG4 | O | SEG4 | 20 | SEG5 | O | SEG5 |
| 21 | SEG6 | O | SEG6 | 22 | SEG7 | O | SEG7 |
| 23 | SEG8 | O | SEG8 | 24 | SEG9 | O | SEG9 |
| 25 | SEG10 | O | SEG10 | 26 | GND | - | VSS |

3.4. CN3

| PIN No | Signal name | I/O | Destination | PIN No | Signal name | I/O | Destination |
|--------|-------------|-----|-------------|--------|-------------|-----|-------------|
| 1 | SEG11 | O | SEG11 | 2 | SEG12 | O | SEG12 |
| 3 | SEG13 | O | SEG13 | 4 | SEG14 | O | SEG14 |
| 5 | SEG15 | O | SEG15 | 6 | SEG16 | O | SEG16 |
| 7 | SEG17 | O | SEG17 | 8 | SEG18 | O | SEG18 |
| 9 | SEG19 | O | SEG19 | 10 | SEG20 | O | SEG20 |
| 11 | SEG21 | O | SEG21 | 12 | SEG22 | O | SEG22 |
| 13 | SEG23 | O | SEG23 | 14 | SEG24 | O | SEG24 |
| 15 | SEG25 | O | SEG25 | 16 | SEG26 | O | SEG26 |
| 17 | SEG27 | O | SEG27 | 18 | SEG28 | O | SEG28 |
| 19 | SEG29 | O | SEG29 | 20 | SEG30 | O | SEG30 |
| 21 | SEG31 | O | SEG31 | 22 | SEG32 | O | SEG32 |
| 23 | SEG33 | O | SEG33 | 24 | P40 | I/O | P40_SEG34 |
| 25 | P41 | I/O | P41_SEG35 | 26 | GND | - | VSS |

3.5. CN4

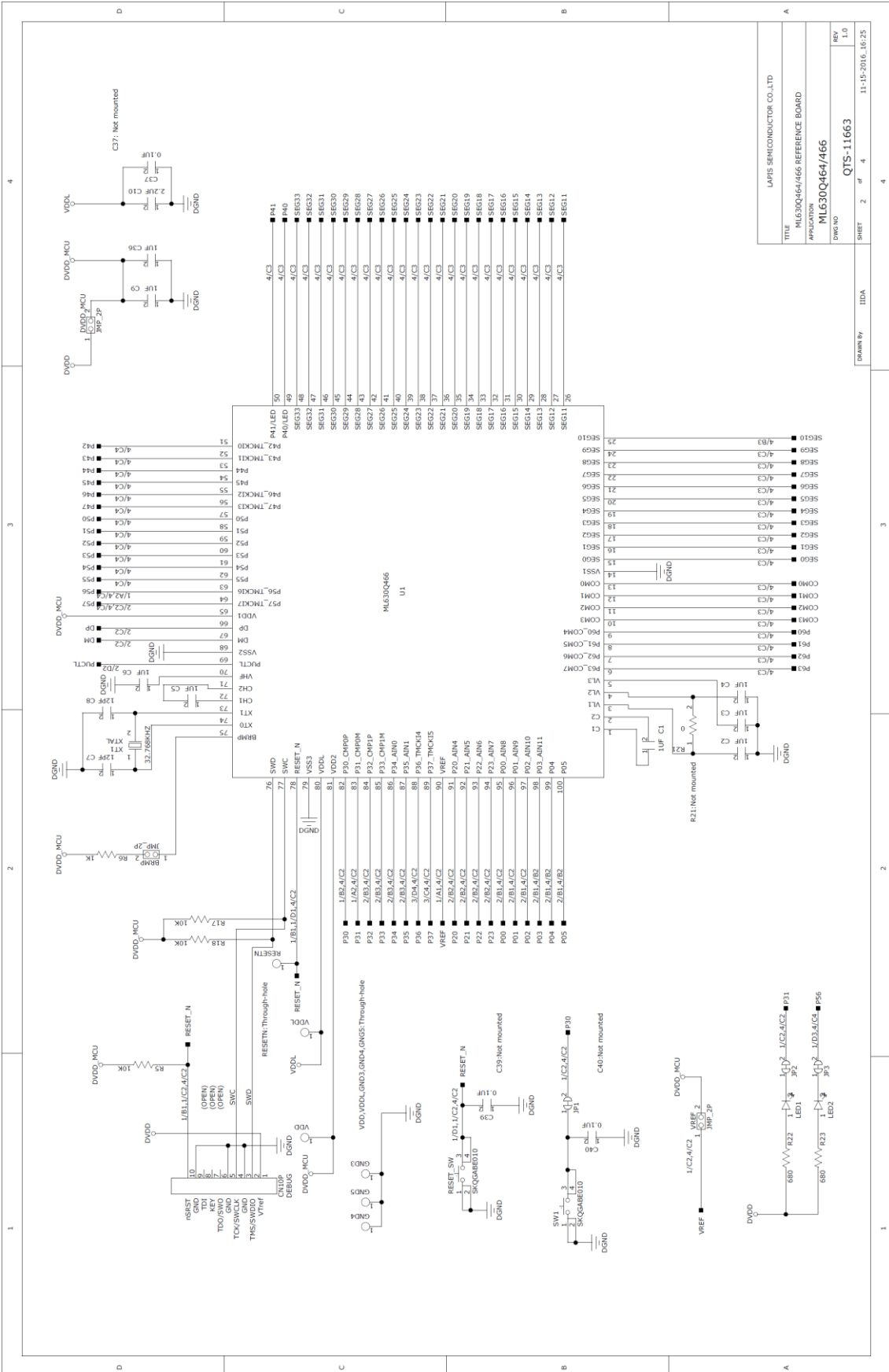
| PIN No | Signal name | I/O | Destination | PIN No | Signal name | I/O | Destination |
|--------|-------------|-----|-------------|--------|-------------|-----|-------------|
| 1 | P42 | I/O | P42_SEG36 | 2 | P43 | I/O | P43_SEG37 |
| 3 | P44 | I/O | P44_SEG38 | 4 | P45 | I/O | P45_SEG39 |
| 5 | P46 | I/O | P46_SEG40 | 6 | P47 | I/O | P47_SEG41 |
| 7 | P50 | I/O | P50_SEG42 | 8 | P51 | I/O | P51_SEG43 |
| 9 | P52 | I/O | P52_SEG44 | 10 | P53 | I/O | P53_SEG45 |
| 11 | P54 | I/O | P54_SEG46 | 12 | P55 | I/O | P55_SEG47 |
| 13 | P56 | I/O | P56_SEG48 | 14 | P57 | I/O | P57_SEG49 |
| 15 | - | - | - | 16 | - | - | - |
| 17 | - | - | - | 18 | - | - | - |
| 19 | - | - | - | 20 | - | - | - |
| 21 | - | - | - | 22 | - | - | - |
| 23 | - | - | - | 24 | - | - | - |
| 25 | - | - | - | 26 | GND | - | VSS |

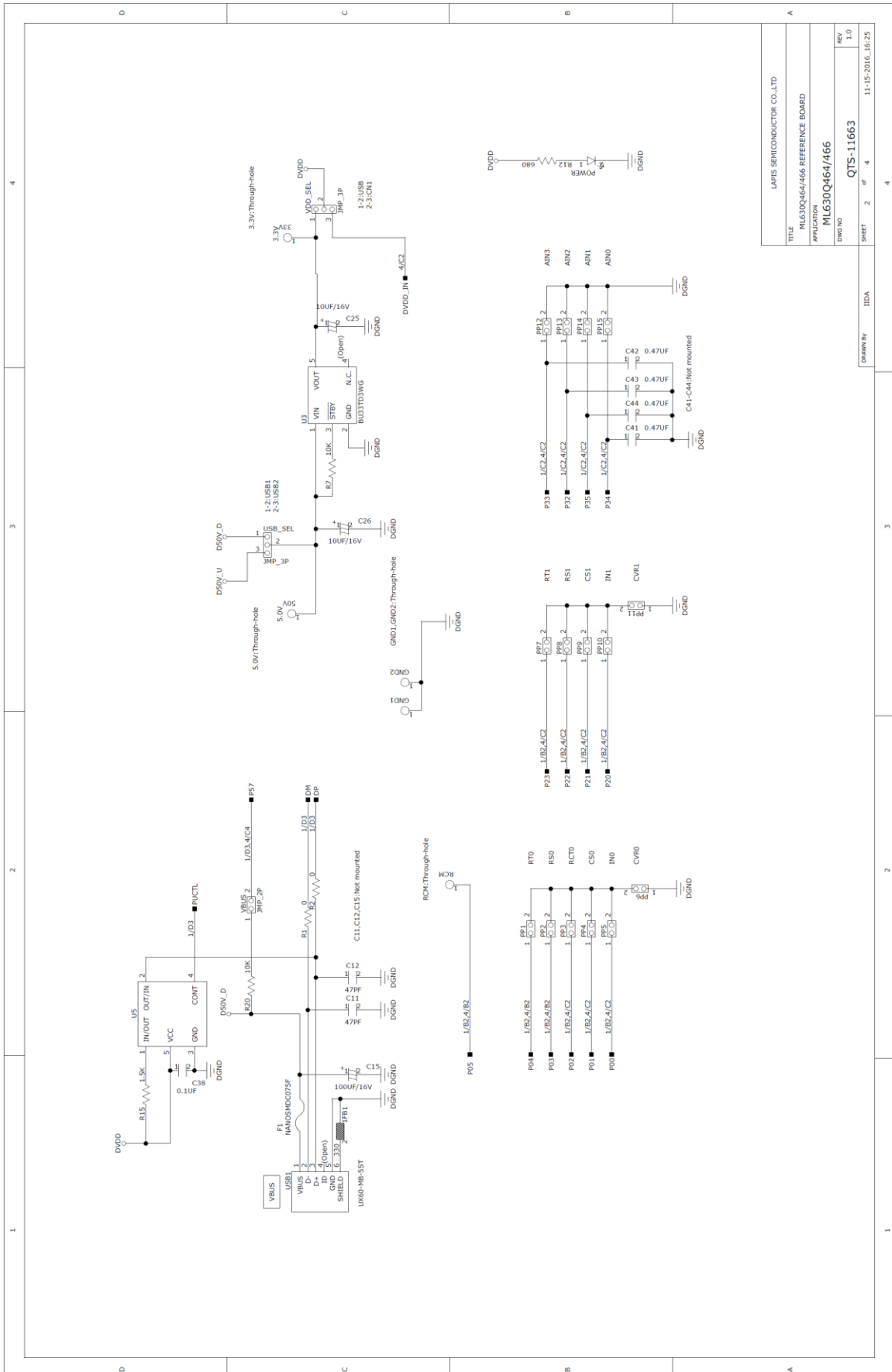
Chapter 4

Schematics

This chapter describes the schematics of ML630Q464/466 Reference Board.

4. Schematics

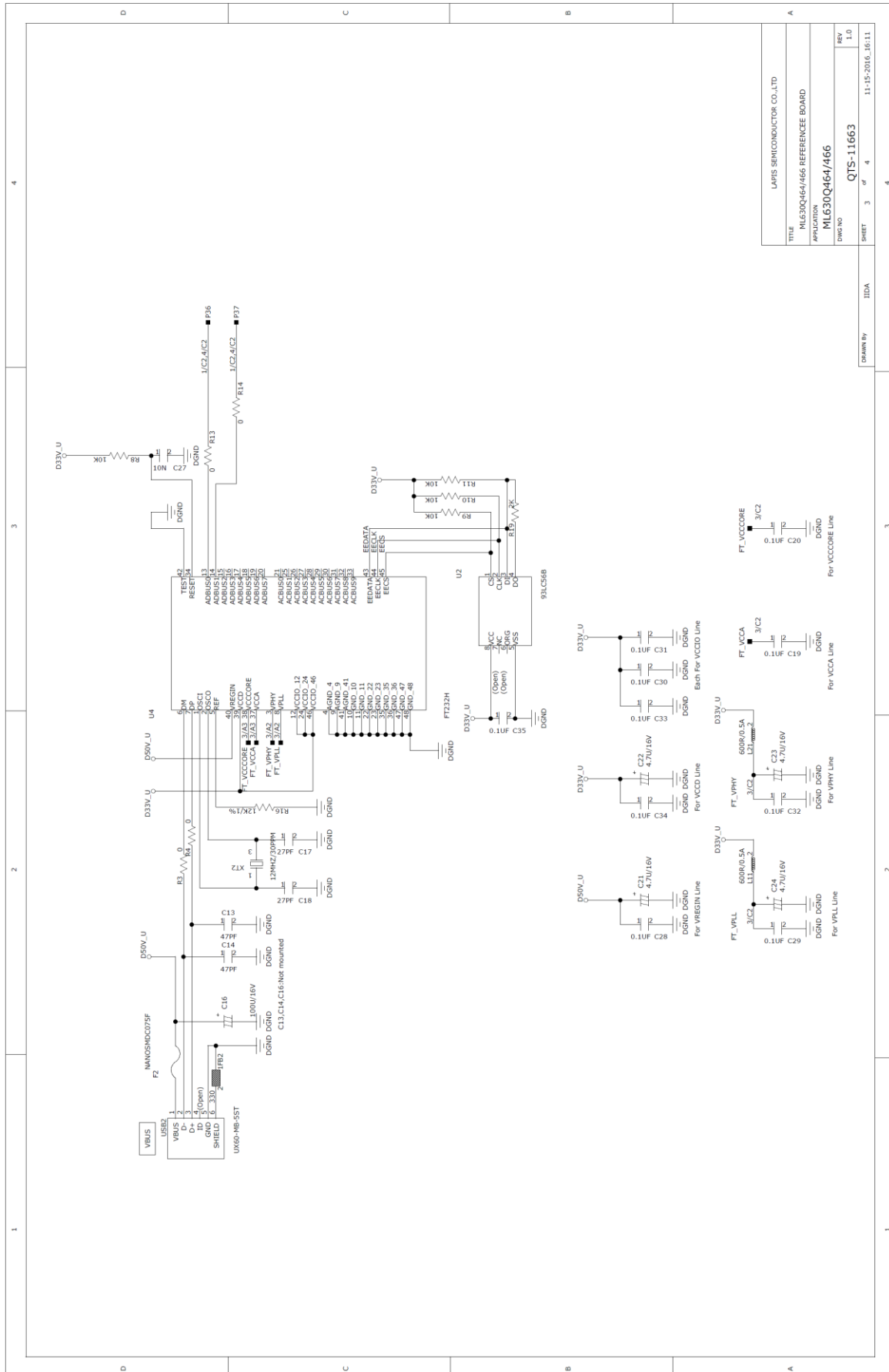




| | |
|-------------|-------------------------------|
| TITLE | LAPIS SEMICONDUCTOR CO.,LTD |
| MODEL | ML630Q464/466 REFERENCE BOARD |
| APPLICATION | ML630Q464/466 |
| DWG NO | QTS-11663 |
| REV | 1.0 |
| DATE | 11-15-2016 16:25 |

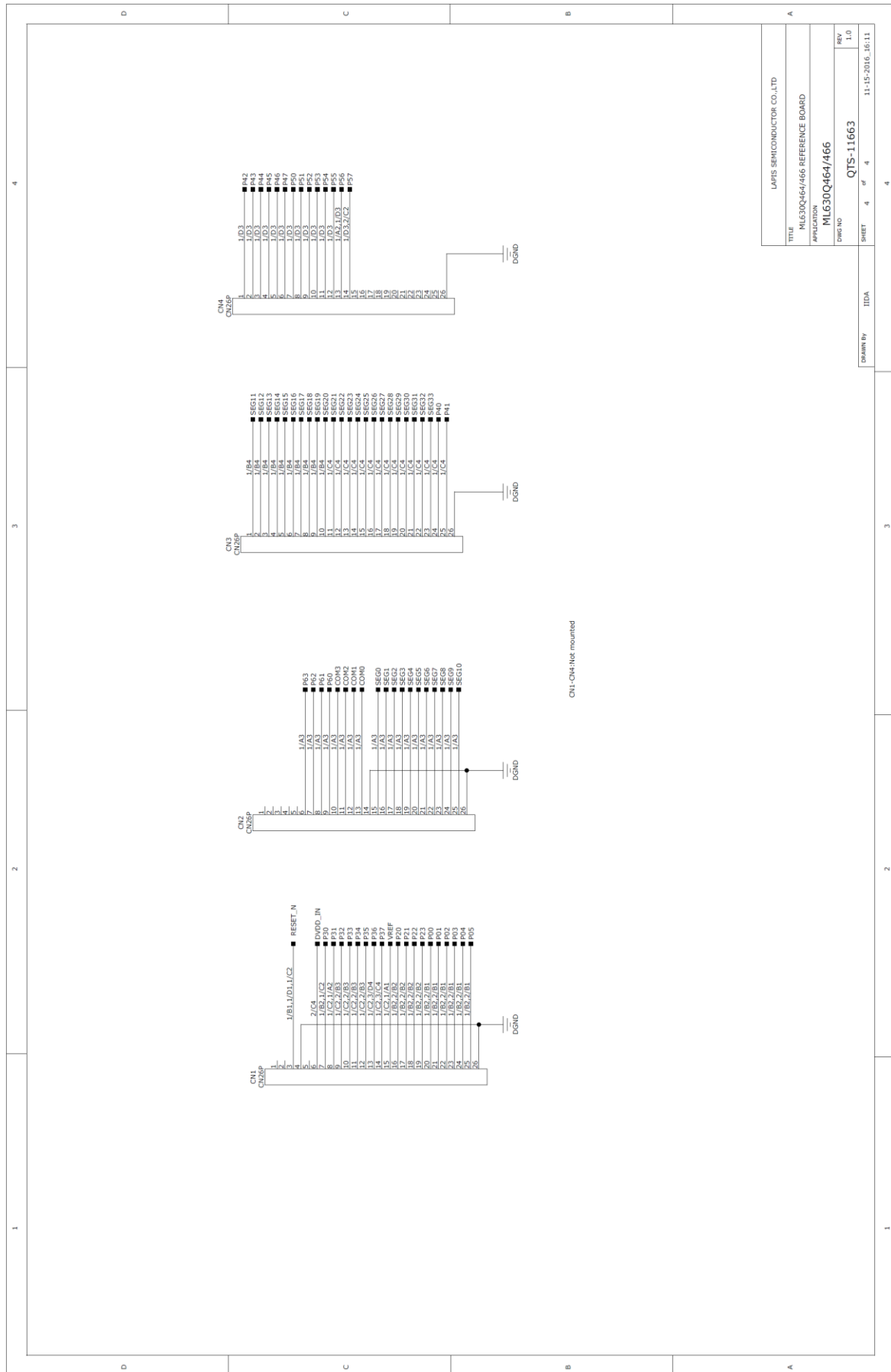
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SHEET 2 of 4



| | |
|-------------|-------------------------------|
| TITLE | LAPIS SEMICONDUCTOR CO.,LTD |
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