

ML62Q1552 Reference Board User's Manual

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Preface

This manual describes about the ML62Q1552 Reference Board : RB-D62Q1552GA64.

Refer to following documents when necessary.

- ML62Q1500 Group User's Manual
Provides the detailed information about the microcontroller ML62Q1500 Group.

- EASE1000 User's Manual
Provides the information on how to use the On-chip emulator EASE1000.

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1. Overview

1.1. Features

The ML62Q1552 Reference Board can be used for learning 'how to use' the ML62Q1552, on which the user needs to provide additional external components if necessary. By using the ML62Q1552 Reference Board together with the LAPIS Semiconductor's on-chip emulator EASE1000 and the provided software development environment, the user can develop software, debug and program the Flash.

1.1.1. ML62Q1552 Reference Board features

- The board is provided with ML62Q1552 64pin QFP.
- Mounted with the linked connector to EASE1000.
- Through-holes for connecting the pins of LSI to external peripheral boards.
- Power supply is selectable; supplied from the on-chip emulator EASE1000 or CN1_3pin /CN2_2pin.
- Mounted with LED (P20,P21,P22).
- Mounted with Crystal (32.768KHz)

1.1.2. ML62Q1552 Reference Board Hardware specifications

Table 1 shows the hardware specifications of ML62Q1552 Reference Board.

Table 1 ML62Q1552 Reference Board Hardware specifications

| | |
|---|--|
| Mounted LSI | U1 : ML62Q1552 64pin QFP |
| Other Mounted components | PWR: Jumper for selecting the power supply input (3pin pin-header and short pin) |
| | J1: Jumper for selecting RESET_N pin (3pin pin-header and short pin) |
| | J2: Jumper for selecting P00/TEST0 pin (3pin pin-header and short pin) |
| | P20-P22: LEDs |
| | R1-R3: Resistors for LEDs by P20 to P22 |
| | J3-J5: Jumper Chip for connecting LEDs |
| | X1, C3, C4: Crystal Oscillator (32.768kHz) and capacitors |
| | J8-J12: Jumper Chip for connecting P75-P71 |
| | CNE: Connector for EASE1000 (14pin connector) |
| | C1, C2: Capacitors for VDD and VDDL |
| R4: Pull-up resistor for RESET_N | |
| Pads (or/and) Through holes for mounting components | CN1-CN2: Connectors for user application system (25pin, 2.54mm pitch, φ0.8mm) |
| Power check pin | VDD, VSS, UVDD: φ0.8mm |
| Operating voltage | +1.6V to +5.5V (Supply the VDD with up to 1.8V or higher during power up.) |
| Board size | 55.88 mm x 93.98 mm |

For more information about the connection of the mounted components, see the schematic.

1.2. ML62Q1552 Reference Board Outline Diagram

Fig. 1 shows the ML62Q1552 Reference Board.

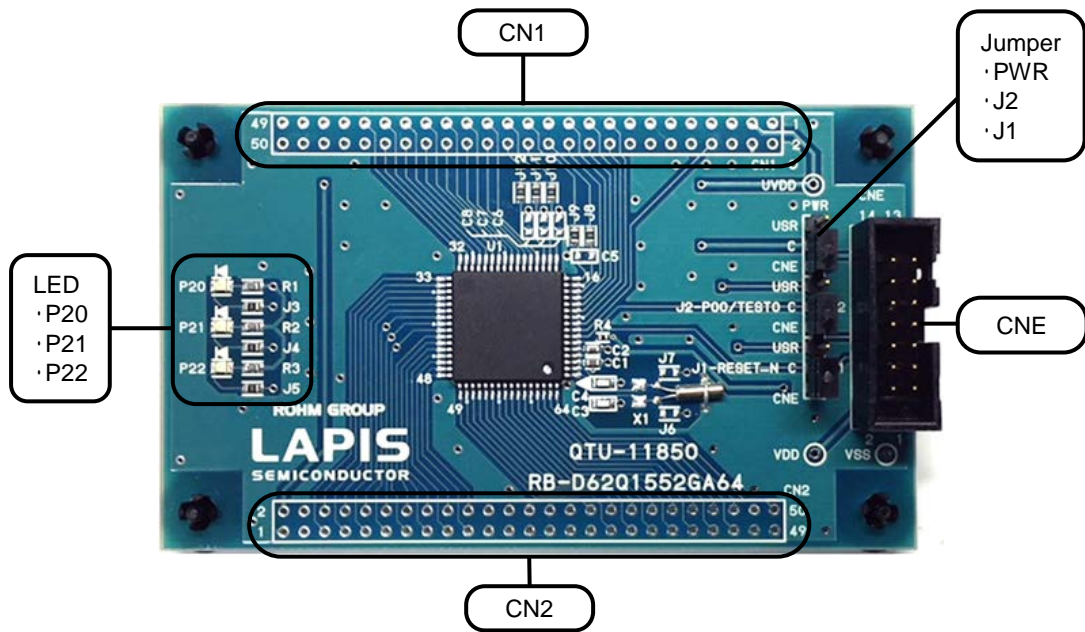


Fig. 1 ML62Q1552 Reference Board Outline Diagram

2. Function of ML62Q1552 Reference Board

2.1. Power Circuit

The input to V_{DD} can be selected from 3.3VOUT of EASE1000 or CN1_3pin / CN2_2pin by PWR jumper.

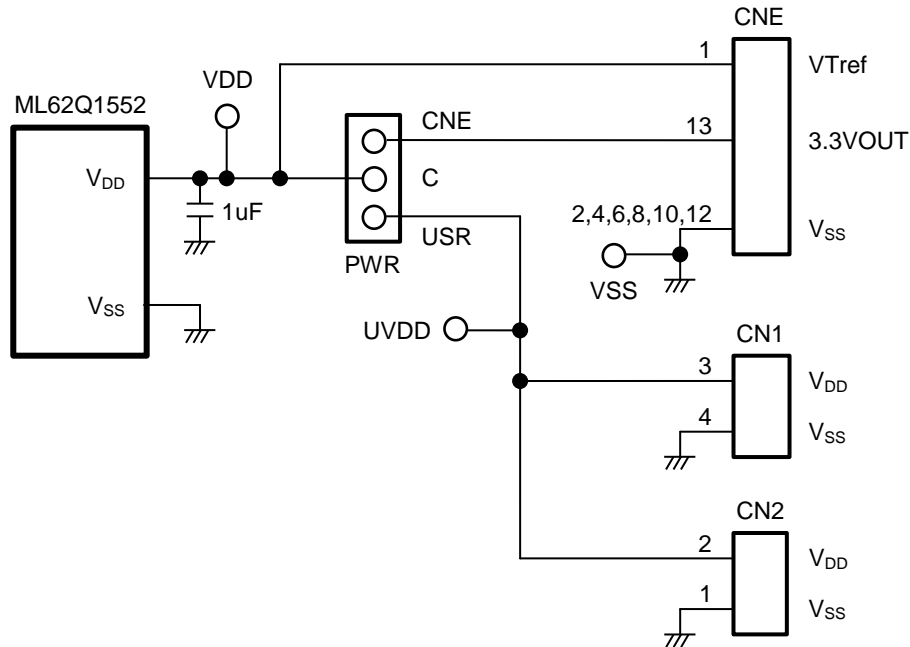


Fig. 2 Power Circuit

[Note]

The power supply ON/OFF procedure in case of setting PWR jumper to the USB-side when using EASE1000.

- The procedure of power supply ON
 1. The USB cable of EASE1000 is connected.
 2. The power supply of user's target system is turned on.

- The procedure of power supply OFF
 1. The power supply of user's target system is turned off
 2. The USB cable of EASE1000 is removed

2.2. Connection for EASE1000 (CNE)

EASE1000 can be used if J1 and J2 jumper are set to “CNE”.

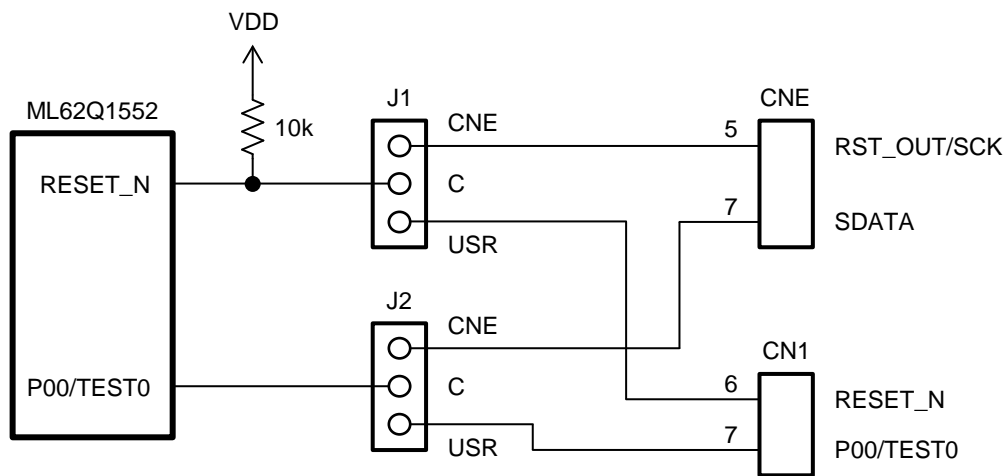


Fig. 3 EASE1000 Interface

[Note]

P00/TEST0 pin:

P00/TEST0 pin of ML62Q1552 is initially set as a pull-up input mode

When using EASE1000, do not set it as an output mode by using an application program, otherwise EASE1000 cannot communicate with the ML62Q1552.

2.3. LED (P20, P21, P22)

The P20-P22 pins of the ML62Q1552 are ports that can directly drive LED. The Ports are connected to the LEDs through jumper-chip. Remove the jumper-chip when not using the LEDs.

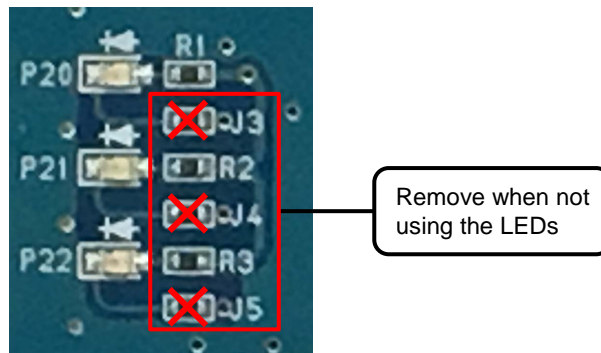


Fig. 4 Jumper-chip removal of LEDs

2.4. XT0/PIO0 , XT1/PIO1

ML62Q1552 Reference Borad can be mounted with cylinder type or SMD type crystal oscillator.

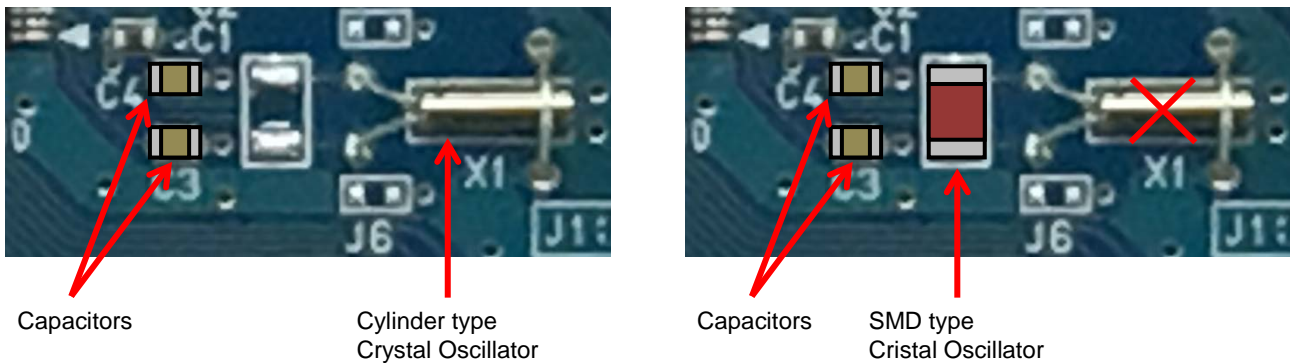


Fig. 5 Example of processing of Crystal Oscillator

2.5. P75, P74, P73, P72, P71

P75, P74, P73, P72 and P71 are connected with CN1 using jumper chip.
 ML62Q1552 Reference Board cannot use C5, C6, C7 and C8.
 Therefore, please do not mount various parts on C5, C6, C7 and C8.

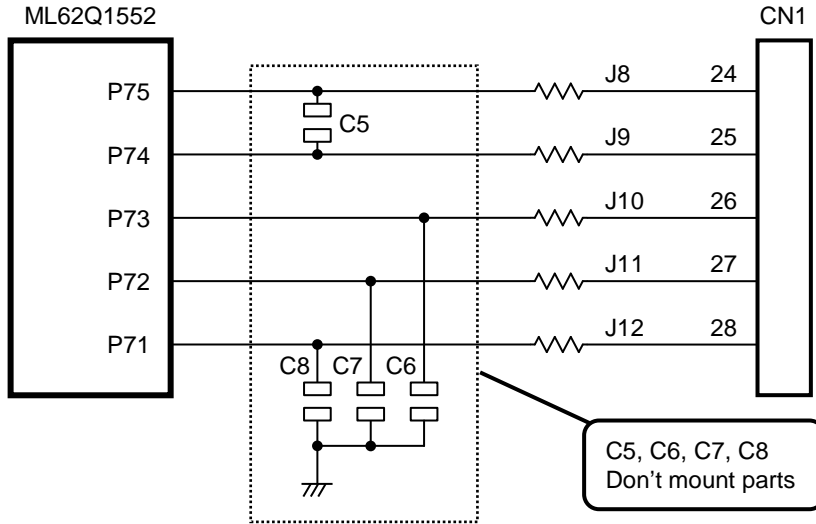


Fig. 6 P75, P74, P73, P72 and P71 Circuit

3. User Interface

Table 2 shows the pin list of the ML62Q1552 Reference Board user interface connection CN1 and CN2.

Table 2 ML62Q1552 Reference Board CN1/CN2

| CN1 | NAME | CN1 | NAME | CN2 | NAME | CN2 | NAME |
|-----|-----------|-----|------|-----|------|-----|------|
| 1 | XT0/PIO0 | 26 | P73 | 1 | VSS | 26 | N.C. |
| 2 | XT1/PIO1 | 27 | P72 | 2 | VDD | 27 | N.C. |
| 3 | VDD | 28 | P71 | 3 | N.C. | 28 | N.C. |
| 4 | VSS | 29 | P70 | 4 | N.C. | 29 | N.C. |
| 5 | N.C. | 30 | P04 | 5 | P54 | 30 | N.C. |
| 6 | RESET_N | 31 | P05 | 6 | P55 | 31 | N.C. |
| 7 | P00/TEST0 | 32 | P06 | 7 | P14 | 32 | P40 |
| 8 | P01 | 33 | P07 | 8 | P15 | 33 | P41 |
| 9 | N.C. | 34 | P10 | 9 | P16 | 34 | P30 |
| 10 | N.C. | 35 | P11 | 10 | P17 | 35 | P31 |
| 11 | N.C. | 36 | P12 | 11 | P20 | 36 | P32 |
| 12 | N.C. | 37 | P13 | 12 | P21 | 37 | P33 |
| 13 | N.C. | 38 | P50 | 13 | P22 | 38 | P60 |
| 14 | N.C. | 39 | P51 | 14 | P23 | 39 | P61 |
| 15 | N.C. | 40 | P52 | 15 | P24 | 40 | P62 |
| 16 | N.C. | 41 | P53 | 16 | P25 | 41 | P63 |
| 17 | P44 | 42 | N.C. | 17 | P26 | 42 | P64 |
| 18 | P45 | 43 | N.C. | 18 | P27 | 43 | P65 |
| 19 | P02 | 44 | N.C. | 19 | P56 | 44 | P66 |
| 20 | P03 | 45 | N.C. | 20 | P57 | 45 | P67 |
| 21 | P46 | 46 | N.C. | 21 | N.C. | 46 | P42 |
| 22 | P47 | 47 | N.C. | 22 | N.C. | 47 | N.C. |
| 23 | N.C. | 48 | N.C. | 23 | N.C. | 48 | N.C. |
| 24 | P75 | 49 | N.C. | 24 | N.C. | 49 | N.C. |
| 25 | P74 | 50 | N.C. | 25 | N.C. | 50 | P43 |

N.C. : Not Connected

4. Precaution for usage

- (1) The ML62Q1552 Reference Board is an unfinished product and intended for research and development and for expert use in the research and development facility only. The ML62Q1552 Reference Board is not intended to be used for volume production or parts thereof.
- (2) Since the content specified herein is subject to change for improvement without notice, confirm the latest content when using the board.
- (3) See the other documents, the ML62Q1500 group user's manual and EASE1000 user's manual when using the ML62Q1552 Reference Board.
- (4) Confirm the final electrical characteristics by using the mass production parts on your mass production boards.
- (5) LAPIS supports replacing the board for an initial failure soon after the shipment. However LAPIS doesn't support repairing the board.
- (6) ML62Q1552 Reference Board have signal patterns on the underside, it might work abnormally if using on conductive materials. Use it on insulating materials or having any preventable parts.

5. PCB specification, BOM and Schematic

5.1. ML62Q1552 Reference Board PCB specification

Fig. 7 shows the Reference Board PCB dimensional outline diagram and layout of components.

PCB part number:
RB-D62Q1552GA64

Dimension:
55.88mm x 93.98mm

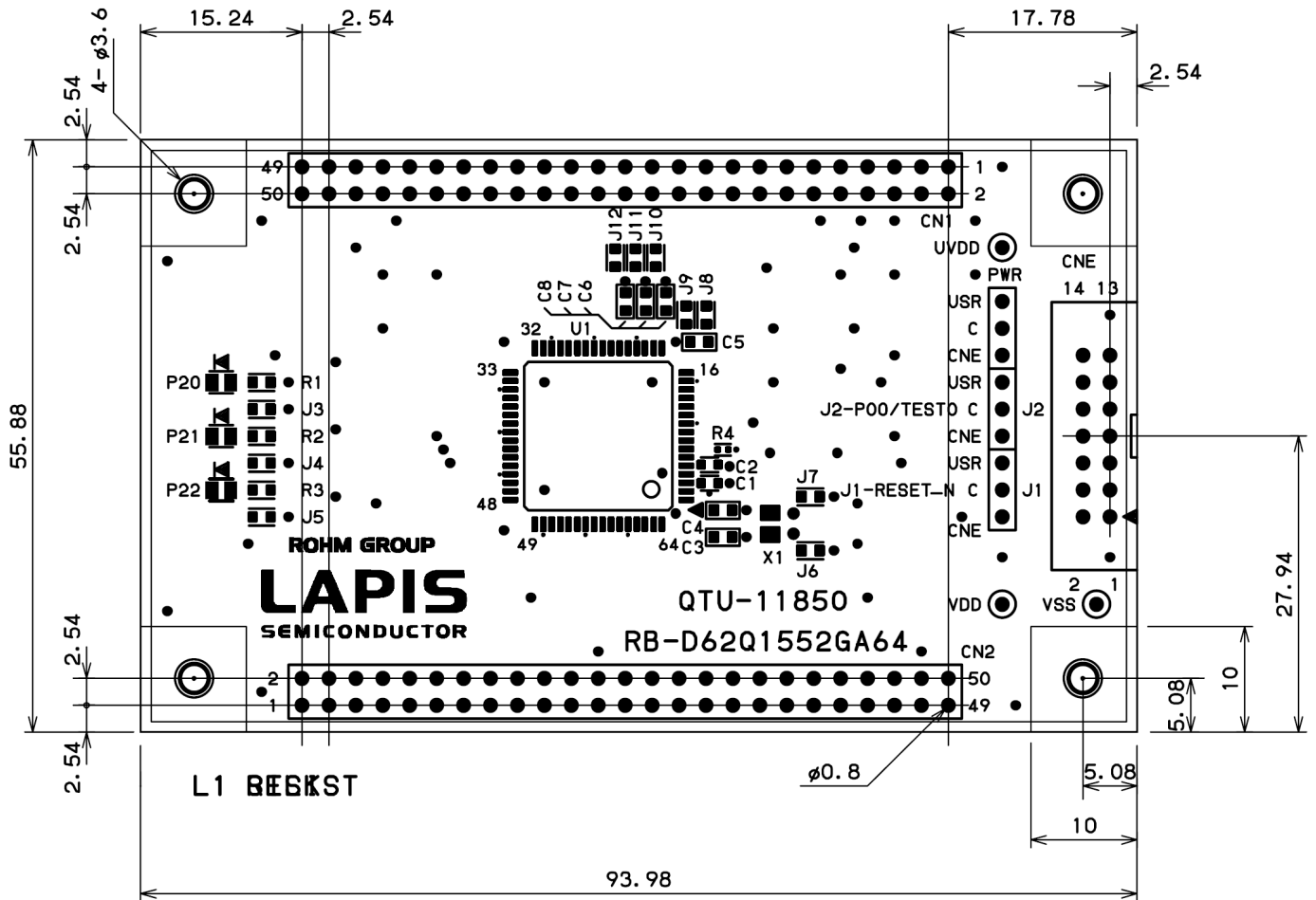


Fig. 7 Reference Board PCB dimensional outline diagram and layout of components (Top view)

5.2. ML62Q1552 Reference Board BOM

Table 3 Reference Board BOM

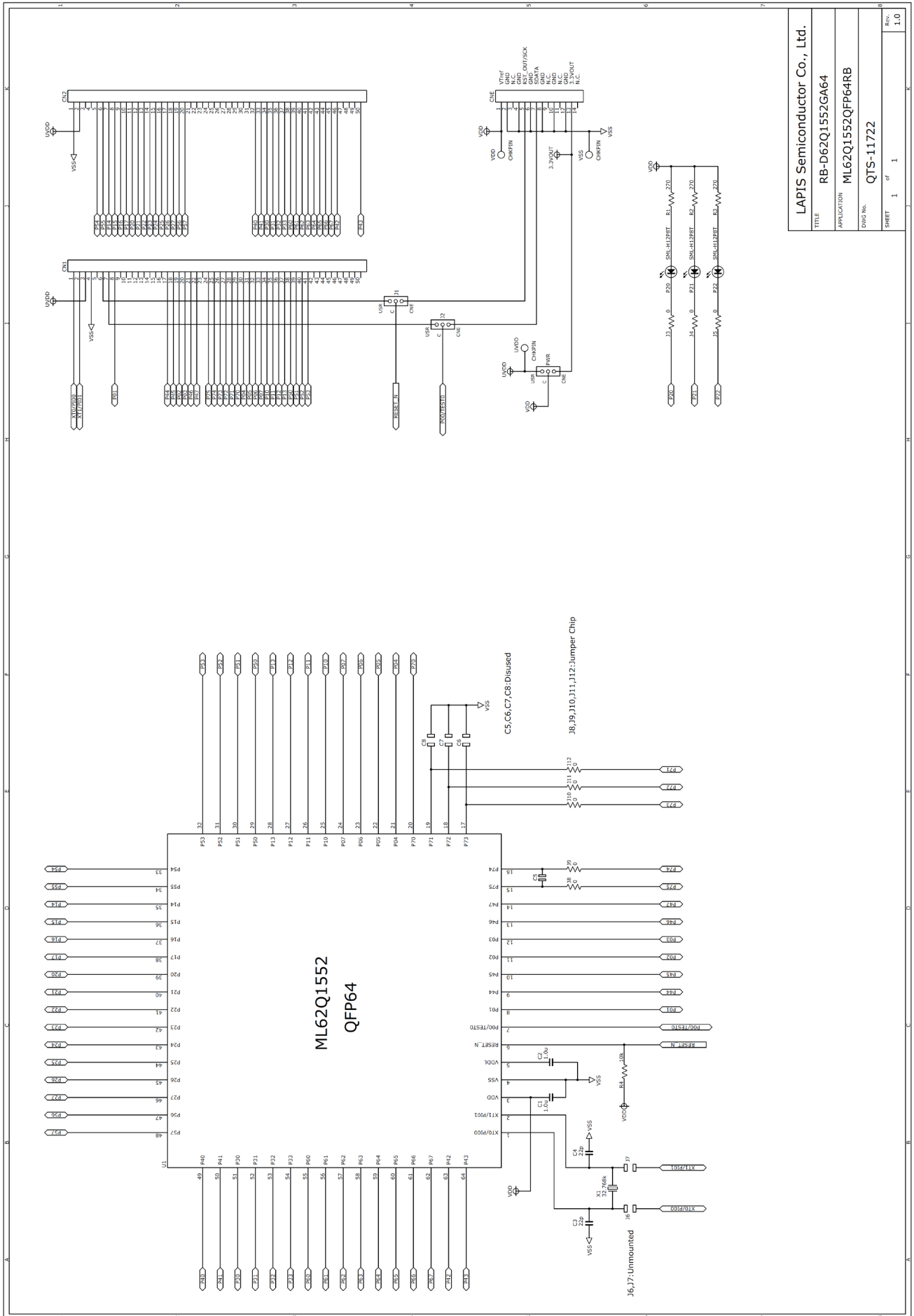
| | Parts Number | Silk | Contents | Package Type | Qty. | Maker |
|----|-------------------------|-----------------------------------|-------------------------------|-----------------|------|---------------|
| 1 | QTU-11850 | RB-D62Q1552GA64 | PWB | - | 1 | LAPIS |
| 2 | C1608X7R1E105K | C1, C2 | Ceramic Capacitor 1uF/25V | 1608(1.6x0.8mm) | 2 | TDK |
| 3 | GRM1885C1H220J | C3, C4 | Ceramic Capacitor 22pF/50V | 1608(1.6x0.8mm) | 2 | MURATA |
| 4 | HIF3FC-14PA-2.54DSA(71) | CNE | 14pin Header Connector | 14PIN DIP | 1 | HIROSE |
| 5 | A2-3PA-2.54DSA | J1, J2, PWR | 3pin Header Connector | 3PIN DIP | 3 | HIROSE |
| 6 | MCR03ERTJ000 | J3, J4, J5, J8, J9, J10, J11, J12 | Resistor 0Ω | 1608(1.6x0.8mm) | 8 | ROHM |
| 7 | SML-H12P8T | P20, P21, P22 | LED Green | 2012(2.0x1.2mm) | 3 | ROHM |
| 8 | MCR03EZPJ271 | R1, R2, R3 | Resistor 270Ω | 1608(1.6x0.8mm) | 3 | ROHM |
| 9 | MCR01MZPJ103 | R4 | Resistor 10kΩ | 1005(1.0x0.5mm) | 1 | ROHM |
| 10 | ML62Q1552-NNNGA | U1 | 16-bit Microcontroller | QFP64 | 1 | LAPIS |
| 11 | VT-200-F 12.5pF | X1 | X'tal 32.768kHz 12.5pF | 2PIN | 1 | SII |
| 12 | HIF3GA-2.54SP | - | Short pin | - | 3 | HIROSE |
| 13 | FF013-P3555-AR791 | - | Rubber leg, Push rivet | - | 4 | KOYO FASTENER |
| 14 | - | C5, C6, C7, C8 | Unmounted | 1608(1.6x0.8mm) | 4 | - |
| 15 | - | CN1, CN2 | Unmounted | 50PIN DIP | 2 | - |
| 16 | - | J6, J7 | Unmounted | 1608(1.6x0.8mm) | 2 | - |
| 17 | - | VDD, VSS, UVDD | Unmounted | φ0.8mm | 3 | - |

[Note]

- The diameter of through hole of CN1 and CN2 is 0.8 mm.
Using CN1 and CN2, the diameter of connector pin should use the connector below 0.8mm, such as 0.5mm.
- The parts may be changed into another parts with equivalent part special quality.

5.3. ML62Q1552 Reference Board Schematic

The next page shows the schematic of ML62Q1552 Reference Board



| | |
|--------------------------------------|------------------|
| LAPIS Semiconductor Co., Ltd. | |
| TITLE | RB-D62Q1552GA64 |
| APPLICATION | ML62Q1552QFP64RB |
| DWG No. | QTS-11722 |
| SHEET | 1 of 1 |
| Rev. | 1.0 |

Revision History

| Document No. | Issue Date | Page | | Description |
|------------------|------------------|------------------|-------------|----------------|
| | | Previous Edition | New Edition | |
| FEBL62Q1552RB-01 | October 19, 2018 | – | – | First edition. |