

PAMS Technical Documentation

Chapter 4

UI Module UE4S

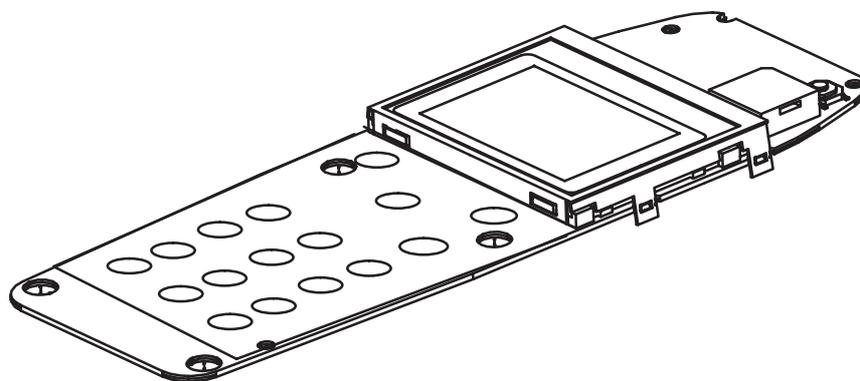
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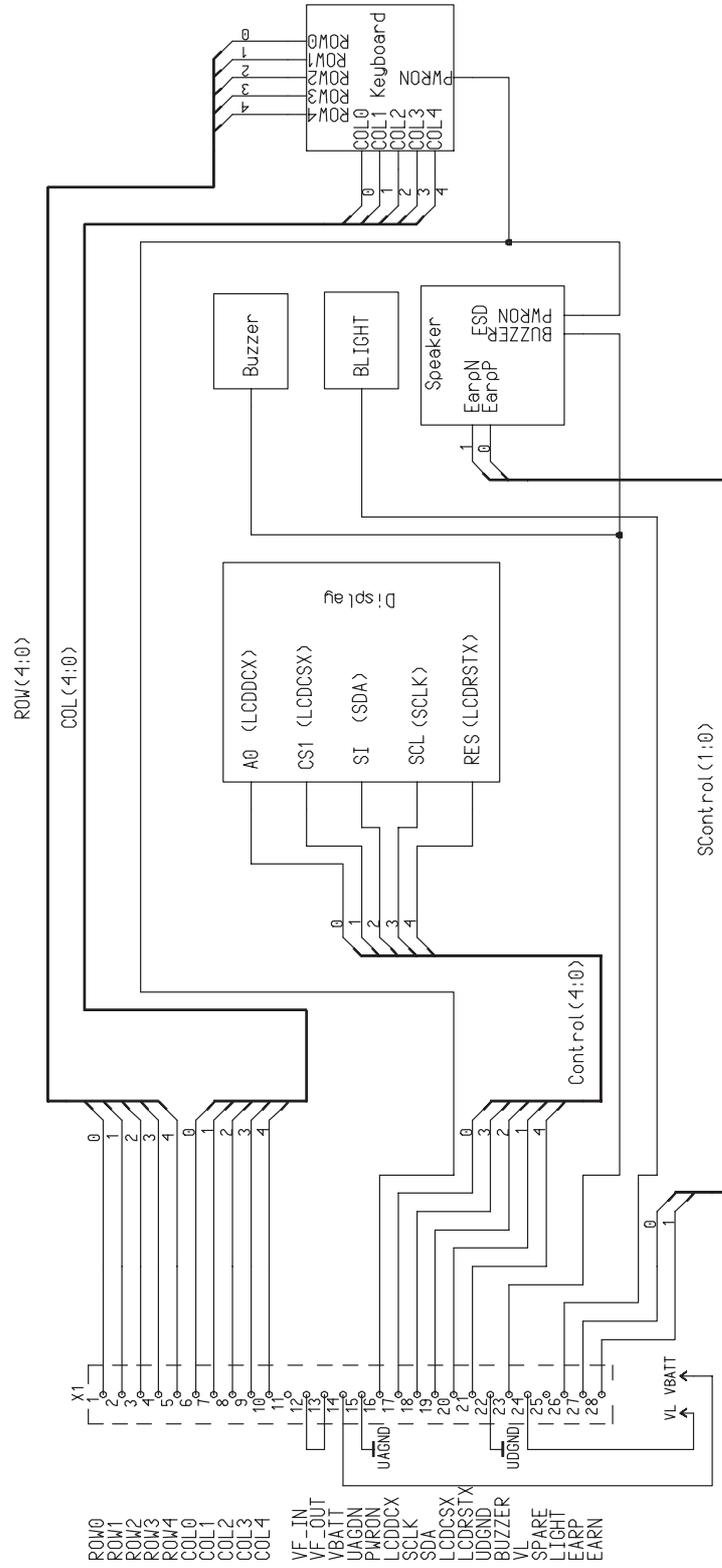
UIF Module

Introduction

The UI module UE4S is a four layer PCB, which is connected to the system/RF PCB with a 28-pin spring connector.



Baseband Block Diagram

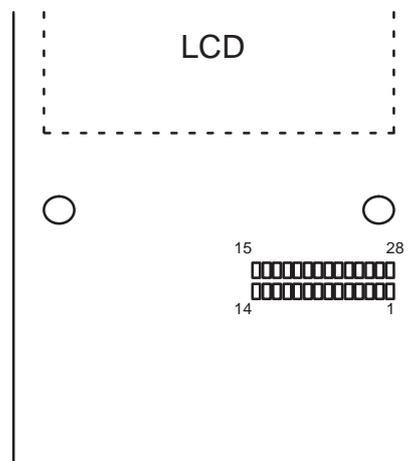


The Engine Interface

| Pin | Line Symbol | Parameter | Min | Typ | Max | Unit | Notes |
|-----|-------------|---|--------------|-----|----------------|------|--------------------------|
| 1 | ROW0 | Keyboard matrix row 0 | 0 0.7xVBB | | 0.3xVBB VBB | V | Low High |
| 2 | ROW1 | Keyboard matrix row 1 | 0 0.7xVBB | | 0.3xVBB VBB | V | Low High |
| 3 | ROW2 | Keyboard matrix row 2 | 0 0.7xVBB | | 0.3xVBB VBB | V | Low High |
| 4 | ROW3 | Keyboard matrix row 3 | 0 0.7xVBB | | 0.3xVBB VBB | V | Low High |
| 5 | ROW4 | Keyboard matrix row 4 | 0 0.7xVBB | | 0.3xVBB VBB | V | Low High |
| 6 | COL0 | Keyboard matrix column 0, used for flip identification | 0 0.7xVBB | | 0.3xVBB VBB | V | Flip Open Flip Closed |
| 7 | COL1 | Keyboard matrix column 1 | 0 0.7xVBB | | 0.3xVBB VBB | V | Low High |
| 8 | COL2 | Keyboard matrix column 2 | 0 0.7xVBB | | 0.3xVBB VBB | V | Low High |
| 9 | COL3 | Keyboard matrix column 3 | 0 0.7xVBB | | 0.3xVBB VBB | V | Low High |
| 10 | COL4 | Keyboard matrix column 4 | 0 0.7xVBB | | 0.3xVBB VBB | V | Low High |
| 11 | Signal1 | Flip interrupt, not used | 0 0.7xVBB | | 0.3xVBB VBB | V | |
| 12 | VF_IN | Flash in | 4.8 | 5.0 | 5.2 | V | Connected #13 |
| 13 | VF_OUT | Flash out | 4.8 | 5.0 | 5.2 | V | Connected #12 |
| 14 | VBATT | Battery voltage | 3.0 | | 5.1 | V | |
| | | | 60 | 75 | 100 | mA | For lights |
| | | | | 110 | 300 | mA | For buzzer |
| 15 | UAGND* | Analog ground | | 0 | | V | |
| 16 | PWRON | Power on key | 0 0.7xVBB | | 0.3xVBB VBB | V | Low / Power on High |
| 17 | LCDCDX | LCD driver code/data selection | 0 0.7xVBB | | 0.3xVBB VBB | V | Low High |
| 18 | SCLK | LCD driver serial clock | 0 0.7xVBB | | 0.3xVBB VBB | V | Low High |

| Pin | Line Symbol | Parameter | Min | Typ | Max | Unit | Notes |
|-----|-------------|------------------------|--------------|-----|----------------|-----------------|----------------------|
| | | | 0 | | 4.0 | MHz | |
| 19 | SDA | LCD driver serial data | 0 0.7xVBB | | 0.3xVBB VBB | V | Low High |
| 20 | LCDCSX | LCD driver chip select | 0 0.7xVBB | | 0.3xVBB VBB | V | Low / Active High |
| 21 | LCDRSTX | LCD driver reset | 0 0.7xVBB | | 0.3xVBB VBB | V | Low / Active High |
| 22 | UDGND* | Digital ground | | 0 | | V | |
| 23 | BUZZER | Buzzer PWM control | 0 | | 2.85 | V | |
| 24 | VL | Supply voltage | 2.7 | 2.8 | 2.85 300 | V uA | |
| 25 | SPARE | Call indicator LED | 0 0.7xVBB | | 0.3xVBB VBB | V | Not used in UI |
| 26 | LIGHT | Illumination control | 0 0.7xVBB | | 0.3xVBB VBB | V | Low High / Active |
| 27 | EARN | Speaker neutral | 0 | | 1.78 | V _{pp} | |
| 28 | EARP | Speaker positive | 0 | | 1.78 | V _{pp} | |

* Ground position is on connector NOT BATTERY.



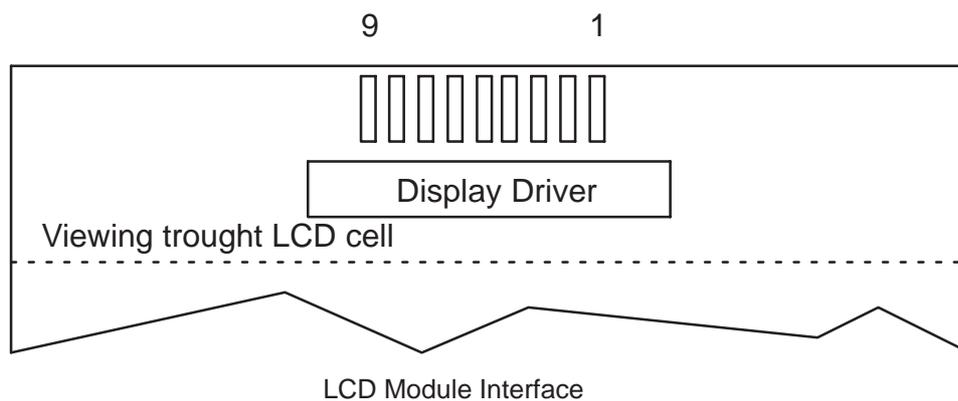
UIM connector pads viewed from the GND side

The LCD Module Interface

| Pin | Line Symbol | Parameter | Minimum | Typical / Nominal | Maximum | Unit | Notes |
|-----|-------------|---------------------------------|---------|-------------------|---------|------|------------------------|
| 1 | VL | Supply voltage | 2.7 | 2.8 | 2.85 | V | |
| | | | | | 300 | uA | |
| 2 | SCLK | Serial clock input | 0 | | 4.0 | MHz | VBB = 2.7V |
| | | | 0 | | VBB | V | |
| 3 | SDA | Serial data input | 0 | | 0.3xVBB | | |
| | | | 0.7xVBB | | VBB | | |
| 4 | LCDCDX | Control/display data flag input | 0 | | 0.3xVBB | | Control Data |
| | | | 0.7xVBB | | VBB | | Active |
| 5 | LCDCSX | Chip select input | 0 | | 0.3xVBB | | |
| | | | 0.7xVBB | | VBB | | |
| 6 | OSC** | External clock for LCD | 30.4 | 32.0 | 33.6 | kHz | Connected to VBB on UI |
| 7 | UDGND* | Ground | | 0 | | V | |
| 8 | VOUT | DC/DC voltage converter output | | | 9 | | |
| 9 | LCDRSTX | Reset | 0 | | 0.3xVBB | | Active |
| | | | 0.7xVBB | | VBB | | |

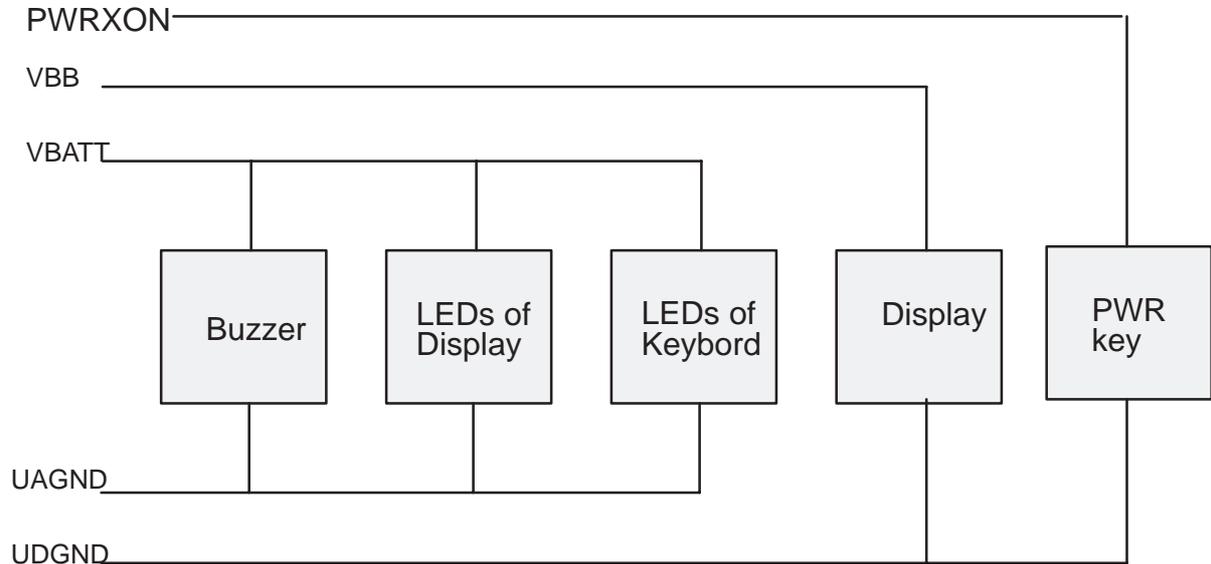
* Ground position is on connector NOT BATTERY.

** External oscillator is not used in UE4S.



Functional Description

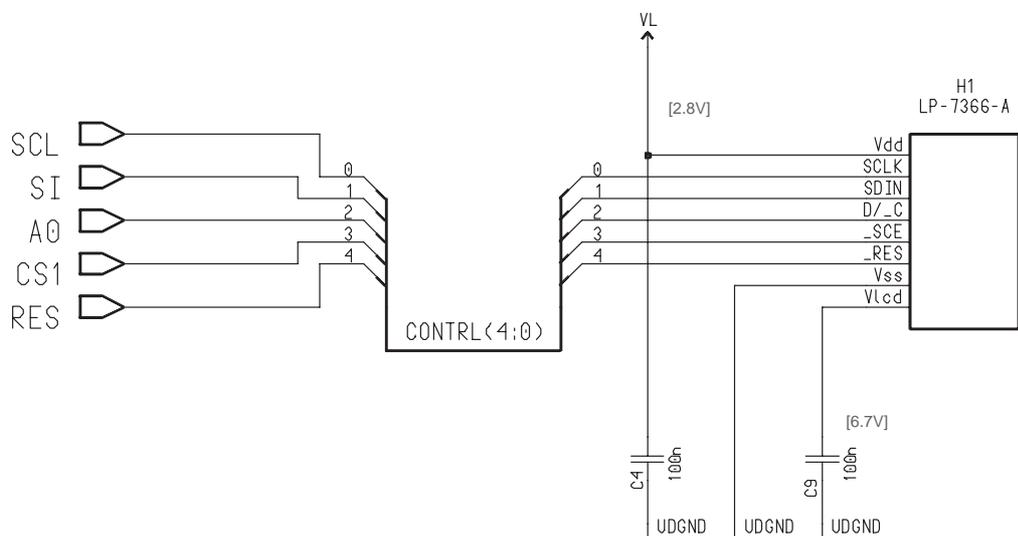
Power Distribution Diagram



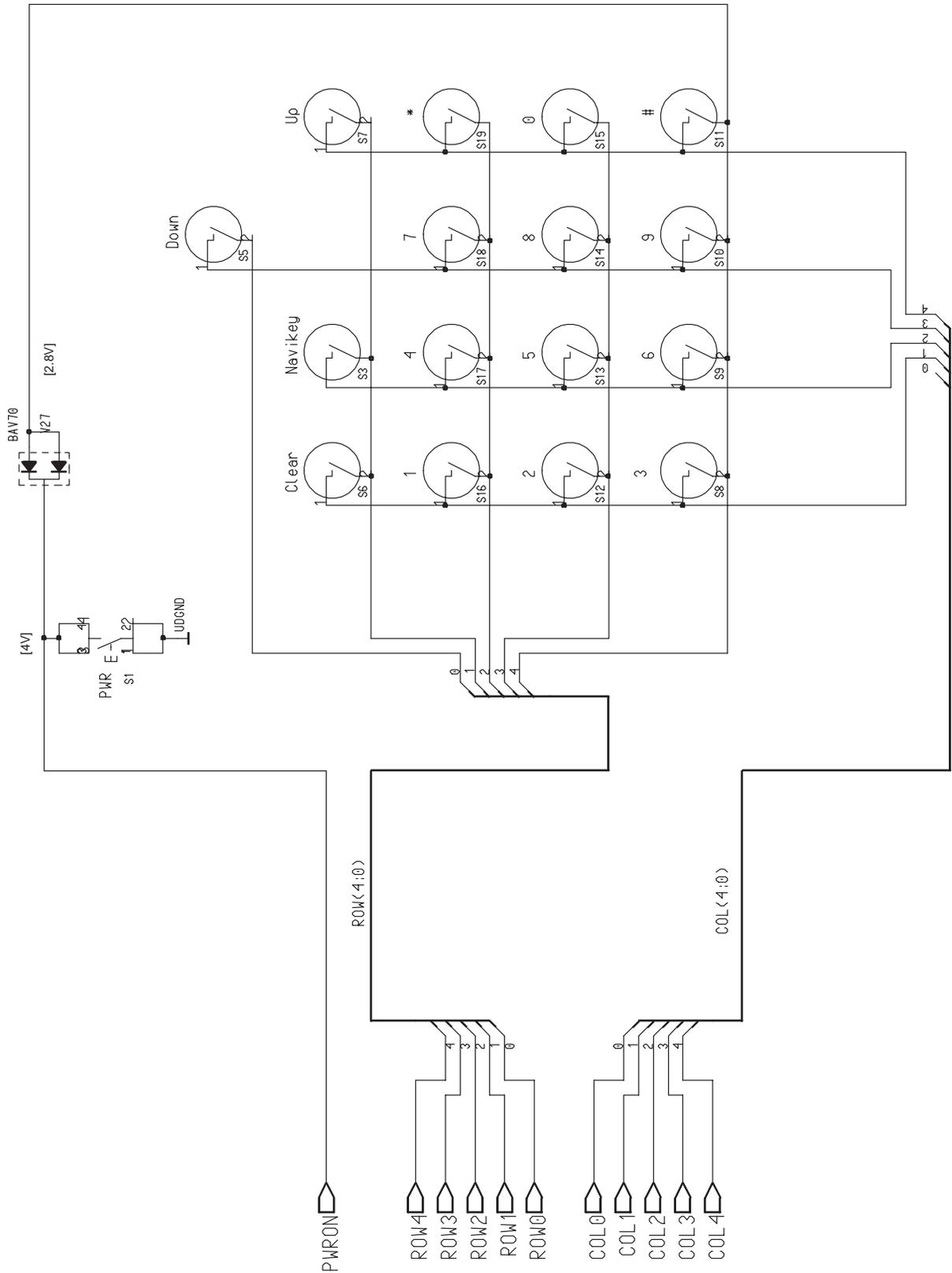
Display Circuit

The display circuit includes LCD module GD40 and two capacitors. The LCD module is COG (Chip on Glass) technology. The connection method for chip on the glass is ACF, Adhesive Conductive Film. The LCD module is connected to UI board with gold wired elastomer. Capacitors are placed on UI PCB.

The display driver includes hw-reset, voltage tripler or quadrupler which depends on temperature, temperature compensating circuit and low power control. Driver includes 84x48 RAM memory which is used when some elements are create on display. Elements can be create with software. Driver doesn't include CG-ROM. One bit in RAM is same as one pixel on display.



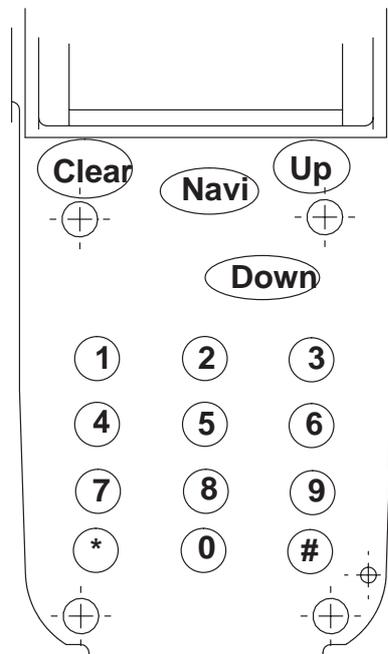
Keyboard



Keyboard Matrix

| ROW/COL | 0 | 1 | 2 | 3 | 4 |
|---------|------------|-------|---------|------|----|
| 0 | NC | NC | NC | Down | NC |
| 1 | NC | Clear | Navikey | NC | Up |
| 2 | NC | 1 | 4 | 7 | * |
| 3 | NC | 2 | 5 | 8 | 0 |
| 4 | PWR switch | 3 | 6 | 9 | # |

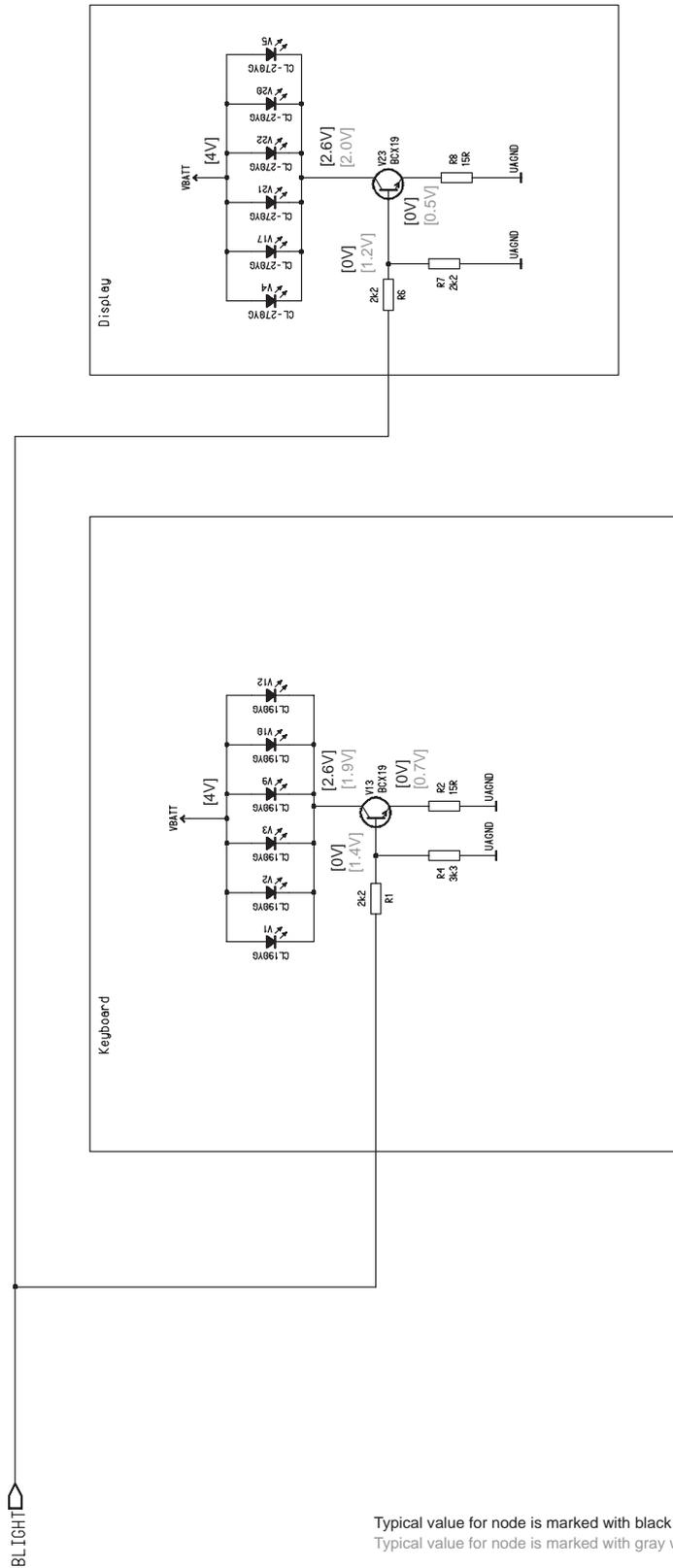
NC = Not Connected



Power Key

Micro switch is used as a power key on UI module. Circuitry includes micro switch and two diodes which is needed for MAD interface. Power key is connected to CCONT. Power switch is active in LOW state. The power key circuit can be seen from the Display Circuit diagram on page 8. The power key is connected to ROW4.

Backlighting



Typical value for node is marked with black when circuit is not active
 Typical value for node is marked with gray when circuit is active

Display

Backlighting is provided by LEDs, three LED on right and three on left side of display. LEDs are compatible with CL270–YG and those are side illuminating. Light is on when LIGHT–signal is in HIGH state.

Color of LED is for

| Pin | Line Symbol | Parameter | Minimum | Typical / Nominal | Maximum | Unit | Notes |
|-----|-------------|-----------------|---------|-------------------|---------|------|-----------------------------------|
| 14 | VBAT | Battery voltage | 3.0 | | 5.1 | V | Same supply for Buzzer & Keyboard |
| | | | 43.4 | 51.4 | 59.6 | mA | LEDs |

Keyboard

In keyboard backlighting is made by 6 LEDs. LEDs are compatible with CL190–YG. Backlighting is on when LIGHT–signal is on HIGH state.

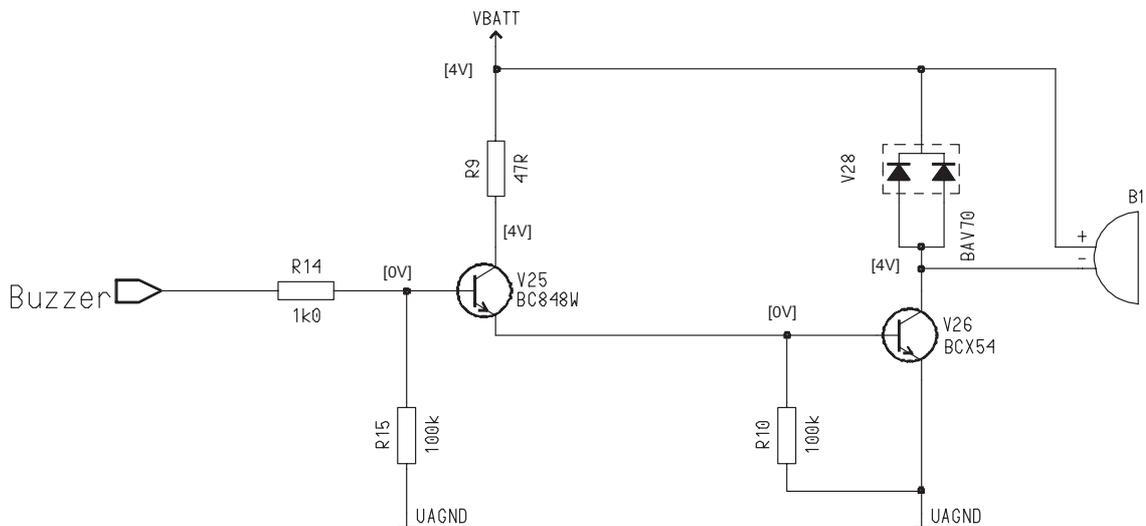
Color of LED is for

– Keyboard : yellow–green, $\lambda = 570\text{nm}$

| Pin | Line Symbol | Parameter | Minimum | Typical / Nominal | Maximum | Unit | Notes |
|-----|-------------|-----------------|---------|-------------------|---------|------|----------------------------------|
| 14 | VBAT | Battery voltage | 3.0 | | 5.1 | V | Same supply for Buzzer & Display |
| | | | 55.3 | 62.4 | 69.9 | mA | LEDs |

Buzzer

Buzzer for DCT3 generation phone is SMD type.

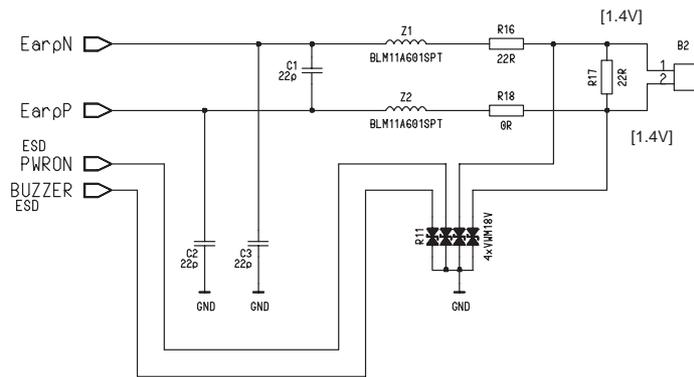


Typical value for node is marked with black when circuit is not active
 Typical value for node is marked with gray when circuit is active

Speaker

The speaker is sealed to A-cover and UI PCB with silicon gasket. With that the frequency response is more constant. Speaker needs 6pcs of 1.2mm holes under component for leaking sound pressure into RF-section through UI module and 7pcs of 0.9mm holes left corner of UIM to leak from RF-section back to up cavity of phone. RF-section between UI module and engine acts like sound cage which is known. This gives better sound quality for Ultra and Santra phone and it can be estimated in several environments.

Silicon gasket and speaker itself acts like water proofing elements in that area. Water can come in speaker space between speaker and A-cover but not further from there into the phone. On A-cover is 3pcs of leaking holes which are not located top of the speaker. This holes gives better sound quality and less sensitive for how well phone is pressed against of head.



Typical value for node is marked with black when circuit is not active
 Typical value for node is marked with gray when circuit is active

Parts list of UE4S (EDMS Issue 4.1)

Code: 0201144

| ITEM | CODE | DESCRIPTION | VALUE | TYPE |
|------|---------|-----------------------------------|----------|------------------------------|
| R001 | 1430043 | Chip resistor | 2.2 k | 5 % 0.063 W 0603 |
| R002 | 1430155 | Chip resistor | 15 | 5 % 0.063 W 0603 |
| R004 | 1430047 | Chip resistor | 3.3 k | 5 % 0.063 W 0603 |
| R006 | 1430043 | Chip resistor | 2.2 k | 5 % 0.063 W 0603 |
| R007 | 1430043 | Chip resistor | 2.2 k | 5 % 0.063 W 0603 |
| R008 | 1430155 | Chip resistor | 15 | 5 % 0.063 W 0603 |
| R009 | 1430167 | Chip resistor | 47 | 5 % 0.063 W 0603 |
| R010 | 1430087 | Chip resistor | 100 k | 5 % 0.063 W 0603 |
| R011 | 1825009 | Varistor network 4xvwm18v | 1206 | 1206 |
| R014 | 1430035 | Chip resistor | 1.0 k | 5 % 0.063 W 0603 |
| R015 | 1430087 | Chip resistor | 100 k | 5 % 0.063 W 0603 |
| R016 | 1430159 | Chip resistor | 22 | 5 % 0.063 W 0603 |
| R017 | 1430159 | Chip resistor | 22 | 5 % 0.063 W 0603 |
| C001 | 2320043 | Ceramic cap. | 22 p | 5 % 50 V 0603 |
| C002 | 2320043 | Ceramic cap. | 22 p | 5 % 50 V 0603 |
| C003 | 2320043 | Ceramic cap. | 22 p | 5 % 50 V 0603 |
| C004 | 2310784 | Ceramic cap. | 100 n | 10 % 25 V 0805 |
| C009 | 2310784 | Ceramic cap. | 100 n | 10 % 25 V 0805 |
| B001 | 5140087 | Buzzer 85db 2600hz 3.6v 10x10x3. | | 10x10x3.5 |
| Z001 | 3640035 | Filt z>450r/100m 0r7max 0.2a 0603 | | 0603 |
| Z002 | 3640035 | Filt z>450r/100m 0r7max 0.2a 0603 | | 0603 |
| H001 | 0200921 | Gd40 lcd module | | |
| V001 | 4864388 | Led | Green | 0603 |
| V002 | 4864388 | Led | Green | 0603 |
| V003 | 4864388 | Led | Green | 0603 |
| V004 | 4860005 | Led | Green | 0603 |
| V005 | 4860005 | Led | Green | 0603 |
| V009 | 4864388 | Led | Green | 0603 |
| V010 | 4864388 | Led | Green | 0603 |
| V012 | 4864388 | Led | Green | 0603 |
| V013 | 4200836 | Transistor | BCX19 | npn 50 V 0.5 A SOT23 |
| V017 | 4860005 | Led | Green | 0603 |
| V020 | 4860005 | Led | Green | 0603 |
| V021 | 4860005 | Led | Green | 0603 |
| V022 | 4860005 | Led | Green | 0603 |
| V023 | 4200836 | Transistor | BCX19 | npn 50 V 0.5 A SOT23 |
| V025 | 4210100 | Transistor | BC848W | npn 30 V SOT323 |
| V026 | 4200875 | Transistor | BCX54-16 | npn 45 V 1.5 A SOT89 |
| V027 | 4100278 | Diode x 2 | BAV70 | 70V 200mA COM CAT.SOT23 |
| V028 | 4100278 | Diode x 2 | BAV70 | 70 V 200 mA COM CAT.SOT23 |
| S001 | 5200120 | Push button switch 6.4x5.2 smd | | |

9795044 Keydomes DMC01289 NSE-1NX
9854259 PCB UE4S 41.0X121.0X0.8 M4 4/PA

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