

Features

- 1/3 bias, 1/4 duty, 32 × 4 pattern, 3.0V LCD driver
- Built-in sound generator which can generate 11 kinds of sound effects
- RC oscillator
- Consists of nine major and three minor stages

General Description

HT1137A is a motorcycle LCD game designed by HOLTEK. The race can run over straight or crooked roads, exercising the players skill in not only trying to overtake other contestants but in negotiating severe turns at high speed. The exciting game is sensational and gripping. This game consists of nine major stages and each major stage contains three minor stages. Each minor stage is different. The first minor stage is normal motor-

cycle racing, in which the player needs to avoid and overtake the opponent's motorcycle. In the second minor stage, the opponent's motorcycle will change lane in different directions at different time. At the third stage, the motorcycle is on a slippery surface. The player's motorcycle will slip to the left or to the right. The direction needs to be controlled so that collisions with the other motorcycles is avoided.

LCD Pattern

Functional Description

Key description

- **START/ON**
During power OFF state, pressing this key turns on the power and starts the game. In the power ON condition, pressing this key starts a new game.
- **RESET**
This key can be pressed at any time to reset the game thus returning it to the starting mode, and the highest score is cleared.
- **PAUSE**
When the game is in progress, pressing this key can temporarily stop the game. The screen is frozen and all sound is muted. Press it again, and the game continues. In the pause condition, all keys are disabled except OFF, START/ON, MUTE and PAUSE keys.
- **MUTE**
This key switches the sound ON or OFF. Sound is automatically on at reset or start. Press once to switch the sound off.
- **OFF**
The power is switched off when this key is pressed.
- **ACC**
Relative to the current speed and present gear setting, the motorcycle increases or maintains its speed when the ACC or acceleration is pressed.
- **BRAKE**
Pressing this key can decrease the speed quickly. If the ACC key and this key are pressed at the same time, then the speed gradually decreases.
- **Hi-Lo**
In Lo gear, the highest speed is 150 kph. If, for instance, you are riding at 100 kph and then change to Hi, it's possible to reach 300 kph. However, if the speed drops below 100 kph and you're still in Hi gear, the speed will gradually decrease to zero.
- **LEFT**
Shifting to the left can balance the left bound centrifugal force in a left turn so that the motorcycle will not be thrown to the right side of the road.
- **RIGHT**
Shifting to the right can balance the right bound centrifugal force in a right turn so that the motorcycle will not be thrown to the left side of the road.
- **RESET+ ACC+ BRAKE**
Press all of these keys at the same time and then release the RESET key, all the patterns will be shown.

Operational description

- When START/ON is pressed, a prelude is played and the highest record and score are shown. When "GO!" is displayed, the motorcycles are revved-up to start.
- The time limit for each minor stage is 90 seconds. The higher the stage is, the more the opponents appear on the road. Hence, the player must avoid time wasting collisions and reach the destination within the given time in order to pass through to the next stage.

- When the speed is higher than 100, press the Hi-Lo key to change the low gear to high gear up to 300 kph. If the speed is lower than 100 kph in high gear, the speed will gradually decrease to zero.
- During the competition, the player must constantly press the ACC key to maintain or increase the speed, otherwise the speed will gradually decrease. In high gear the speed will decrease to 150 kph; in low gear the speed will decrease to 0. When the speed is lower than 100 kph, the player should avoid a collision because the speed is slow that the other opponents will catch up with him.
- When turning to the left or to the right, press the opposite direction key to balance the centripetal force. Otherwise, the centrifugal force will throw the motorcycle off the road.
- The first and second minor stage is a chasing contest in the road. The difference is that in the first stage the opponent cannot change lane as he/she wishes. However, in the second stage lanes can be changed. It increases the difficulty and preference.
- The third minor stage is a contest on a slippery road. The player's motorcycle will slip around so that direction control is important.
- When one of the following five situations occur, player's motorcycle will be destroyed so the game needs to be restarted.
 - Hit the front motorcycle
 - Player is hit by the opponent from the back
 - Wrong direction so the motorcycle is off line
 - Direction control is not good, so the motorcycle is thrown off line by centrifugal force
 - Player's motorcycle collided while shifting
- At each minor stage, the number of collision is not counted.

Counting method

- Beating the opponent: every win over an opponent, 10 points are scored.
- Bonus score: when a minor stage is over, the number of seconds left multiplied by 10 is the bonus score.

Sound effects

- Brake sound
- Low gear driving sound
- High gear driving sound
- Collision sound
- Brushing past the opponent
- Counting sound for start
- Starting music (prelude)
- Pass-through music
- Game over music
- Slip sound
- Wrong gear sound

LCD Display Label



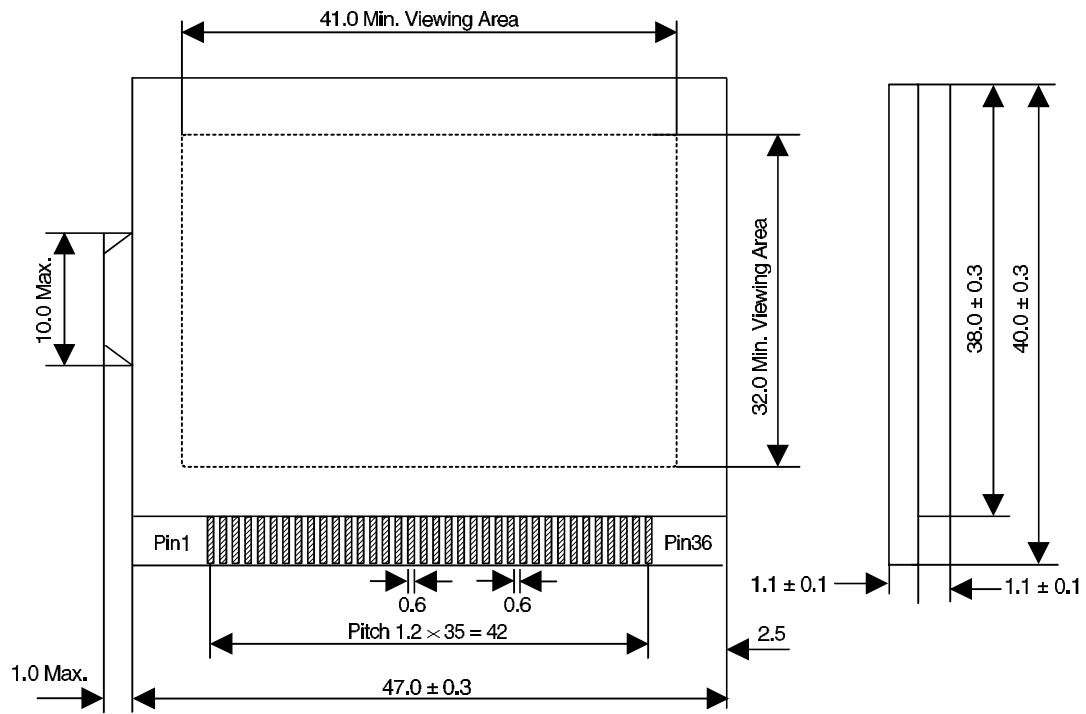
LCD Pattern Contrast Table

| Pad No. | Pin No. | COM0 | COM1 | COM2 | COM3 | SEGMENT |
|---------|---------|------|------|-------|------|---------|
| 65 | 1 | R11 | B2 | SPEED | S0 | SEG31 |
| 64 | 2 | S6 | R8 | R10 | R9 | SEG30 |
| 63 | 3 | R1 | M2 | H2 | C2 | SEG29 |
| 62 | 4 | 5-0 | 4c | 4b | 4a | SEG28 |
| 61 | 5 | 4d | 4e | 4g | 4f | SEG27 |
| 60 | 6 | T1 | 3c | 3b | 3a | SEG26 |
| 59 | 7 | 3d | 3e | 3g | 3f | SEG25 |
| 58 | 8 | B1 | 2c | 2b | 2a | SEG24 |
| 57 | 9 | 2d | 2e | 2g | 2f | SEG23 |

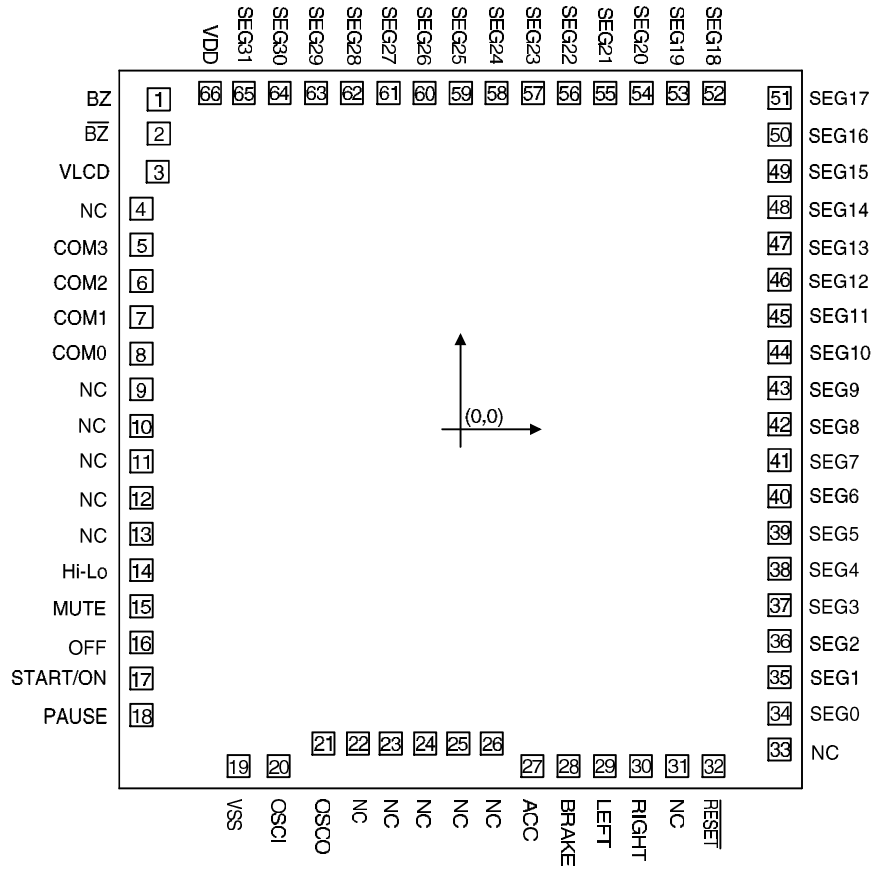
| Pad No. | Pin No. | COM0 | COM1 | COM2 | COM3 | SEGMENT |
|----------------|----------------|-------------|-------------|-------------|-------------|----------------|
| 56 | 10 | M1 | H1 | C1 | 1b,c | SEG22 |
| 55 | 11 | T3 | GO | LEVEL | SCORE | SEG21 |
| 54 | 12 | R6 | R7 | L1 | S5 | SEG20 |
| 53 | 13 | W1 | L2 | S4 | P1 | SEG19 |
| 52 | 14 | T2 | R5 | S3 | S13 | SEG18 |
| 51 | 15 | S23 | R2 | R3 | R4 | SEG17 |
| 50 | 16 | S11 | P2 | S12 | P3 | SEG16 |
| 49 | 17 | S2 | S7 | S1 | R21 | SEG15 |
| 48 | 18 | W2 | P5 | S9 | S18 | SEG14 |
| 47 | 19 | L3 | S10 | P4 | S14 | SEG13 |
| 46 | 20 | S8 | S17 | S16 | R20 | SEG12 |
| 45 | 21 | W3 | S19 | P6 | S20 | SEG11 |
| 44 | 22 | L4 | S21 | P7 | S15 | SEG10 |
| 43 | 23 | R17 | R16 | R14 | R13 | SEG9 |
| 42 | 24 | T5 | R18 | L5 | S22 | SEG8 |
| 41 | 25 | T4 | R15 | R12 | S24 | SEG7 |
| 40 | 26 | R19 | T6 | C4 | GAME OVER | SEG6 |
| 39 | 27 | H4 | 8c | 8b | 8a | SEG5 |
| 38 | 28 | 8d | 8e | 8g | 8f | SEG4 |
| 37 | 29 | M4 | 7c | 7b | 7a | SEG3 |
| 36 | 30 | 7d | 7e | 7g | 7f | SEG2 |
| 35 | 31 | T7 | B3 | C3 | 6b,c | SEG1 |
| 34 | 32 | M3 | H3 | L0 | Hi | SEG0 |
| 8 | 33 | COM0 | — | — | — | COM0 |
| 7 | 34 | — | COM1 | — | — | COM1 |
| 6 | 35 | — | — | COM2 | — | COM2 |
| 5 | 36 | — | — | — | COM3 | COM3 |

LCD Package Outline

Unit : mm



Pad Assignment



Chip size: 2790 × 3000 (μm)²

* The substrate should be connected to VSS in the PCB layout artwork.

Pad Coordinates

 Unit: μm

| Pad No. | X | Y | Pad No. | X | Y |
|----------------|----------|----------|----------------|----------|----------|
| 1 | -1192.10 | 1305.20 | 34 | 1261.10 | -1122.30 |
| 2 | -1192.10 | 1169.80 | 35 | 1261.10 | -979.80 |
| 3 | -1196.70 | 1019.80 | 36 | 1261.10 | -836.30 |
| 4 | -1261.10 | 873.70 | 37 | 1261.10 | -693.80 |
| 5 | -1261.10 | 731.20 | 38 | 1261.10 | -550.30 |
| 6 | -1261.10 | 587.70 | 39 | 1261.10 | -407.80 |
| 7 | -1261.10 | 445.20 | 40 | 1261.10 | -264.30 |
| 8 | -1261.10 | 301.70 | 41 | 1261.10 | -121.80 |
| 9 | -1261.10 | 159.20 | 42 | 1261.10 | 21.70 |
| 10 | -1261.10 | 15.70 | 43 | 1261.10 | 164.20 |
| 11 | -1261.10 | -126.80 | 44 | 1261.10 | 307.70 |
| 12 | -1261.10 | -270.30 | 45 | 1261.10 | 450.20 |
| 13 | -1261.10 | -412.80 | 46 | 1261.10 | 593.70 |
| 14 | -1261.10 | -556.30 | 47 | 1261.10 | 736.20 |
| 15 | -1261.10 | -698.80 | 48 | 1261.10 | 879.70 |
| 16 | -1261.10 | -842.30 | 49 | 1261.10 | 1022.20 |
| 17 | -1261.10 | -984.80 | 50 | 1261.10 | 1165.70 |
| 18 | -1261.10 | -1128.30 | 51 | 1261.10 | 1311.20 |
| 19 | -876.70 | -1331.40 | 52 | 1001.00 | 1331.40 |
| 20 | -719.70 | -1331.40 | 53 | 858.50 | 1331.40 |
| 21 | -542.10 | -1241.00 | 54 | 715.00 | 1331.40 |
| 22 | -406.70 | -1241.00 | 55 | 572.50 | 1331.40 |
| 23 | -276.30 | -1241.00 | 56 | 429.00 | 1331.40 |
| 24 | -140.90 | -1241.00 | 57 | 286.50 | 1331.40 |
| 25 | -10.50 | -1241.00 | 58 | 143.00 | 1331.40 |
| 26 | 124.90 | -1241.00 | 59 | 0.50 | 1331.40 |
| 27 | 284.90 | -1331.40 | 60 | -143.00 | 1331.40 |
| 28 | 427.40 | -1331.40 | 61 | -285.50 | 1331.40 |
| 29 | 570.90 | -1331.40 | 62 | -429.00 | 1331.40 |
| 30 | 713.40 | -1331.40 | 63 | -571.50 | 1331.40 |
| 31 | 856.90 | -1331.40 | 64 | -715.00 | 1331.40 |
| 32 | 999.40 | -1331.40 | 65 | -857.50 | 1331.40 |
| 33 | 1261.10 | -1265.80 | 66 | -990.50 | 1331.40 |

Absolute Maximum Ratings*

Supply Voltage V_{DD} -0.3V to 5.5V Storage Temperature..... -50°C to 125°C
 Input Voltage..... V_{SS} -0.3V to V_{DD} +0.3V Operating Temperature..... 0°C to 70°C

*Note: These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability

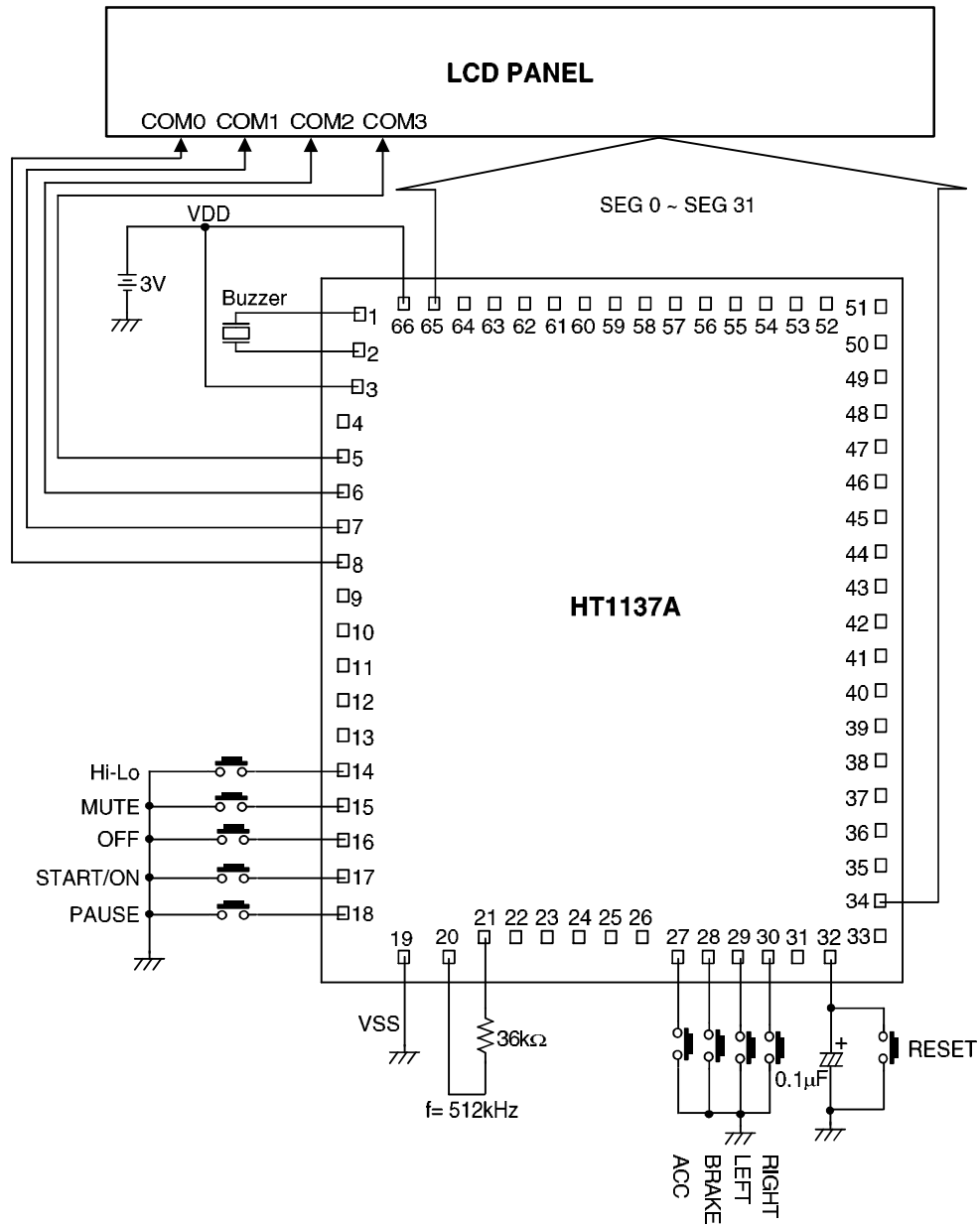
Electrical Characteristics

Ta=25°C

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|------------------|---------------------|-----------------|-----------------------------------|------|------|------|------|
| | | V _{DD} | Conditions | | | | |
| V _{DD} | Operating Voltage | — | — | 2.4 | 3 | 3.3 | V |
| I _{DD} | Operating Current | 3V | No load, f _{SYS} =512kHz | — | 300 | 500 | μA |
| I _{STB} | Standby Current | 3V | No load | — | 1 | 5 | μA |
| V _{LCD} | LCD Supply Voltage | 3V | — | — | 3 | — | V |
| f _{SYS} | Operating Frequency | 3V | R= 36kΩ | — | 512 | — | kHz |

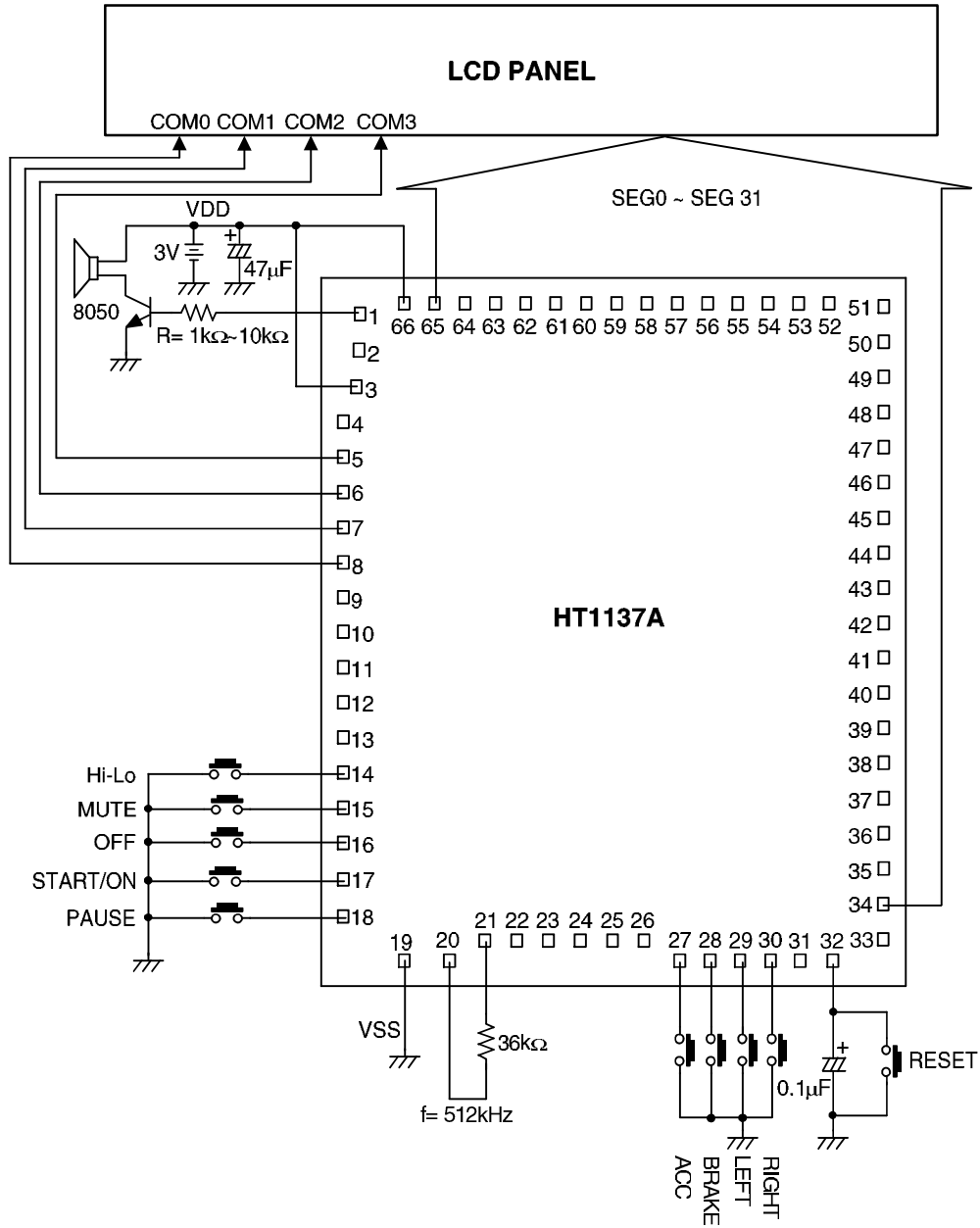
Application Circuits

Buzzer application



Note: The IC substrate should be connected to VSS in the PCB layout artwork.

Speaker application



Notes: The IC substrate should be connected to VSS in the PCB layout artwork.
 User can change the volume by changing the resistance 1kΩ-10kΩ.