

User's Manual

(SKR-2006)

Sejin Electron Inc.

FCC NOTICE

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES.
OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:
(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND
(2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED,
INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRABLE
OPERATION.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that interference will not

occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures :

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTE : The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

1.0 ELECTRICAL

1.1 Power

1.1.1 5VDC \pm 10%, 40mA .

2.0 POWER ON ROUTINE

2.1 Power on Reset-POR-

2.2.1 The keyboard will perform a power on reset -POR- within a minimum of 150 ms and a maximum of 2 ms.

2.2 Basic Assurance Test -BAT-

2.2.1 The keyboard will conduct a basic assurance test -BAT- of the processor.

2.2.2 Turn the LED's(if so equipped) on at the beginning of the test and off at the end of the test.

2.2.3 Transmit the completion code AAH if the test was successful.

2.2.4 The -BAT- takes a maximum of 500 ms. During this time all activity on the clock and data lines will be ignored.

2.2.5 The completion code will be transmitted within 450 ms and not more than 2.5sec after -POR-, and within 500 ms after a reset command is acknowledge.

3.0 DATA TRANSMISSION

3.1 Clock and Data lines

3.1.1 The click and data lines are used for communication in both directions between the system and the keyboard. These lines are driven by an open collector device which allows either the system or the keyboard to force the line to an inactive(low)level. When no communication is occurring both lines are active(high).

3.1.2 The keyboard provides the clocking signals used to clock serial data to and from the keyboard.

3.1.3 The data line is used for transmission of data by both the system and the keyboard. The system issues a 'Request to Send' -RTS- by pulling the data line to logic'0'.

3.2 DATA format

3.2.1 The data protocol is an 11-bit data stream that consists of 1 start bit(always Logic 0), 8 data bits(least significant bit to most significant bit respectively), 1 odd parity bit, and 1 stop bit(always Logic 1).

3.2.2 See figure 14 for graphic representation of these signals.

3.3 Keyboard to System line protocol

3.3.1 Keyboard checks clock line, if Logic 1 continue, if Logic 0 store keystrokes if protocol is 11-bit(inhibited); otherwise check for possible reset.

3.3.2 Keyboard checks data line, if Logic 1 continue, if Logic 0 prepare to receive data from system if protocol is 11-bit; otherwise store keystrokes(inhibited).

3.3.3 Keyboard transmits data. While transmitting in the 11-bit protocol, the keyboard checks the clock line for logic level 1 at least every 60 μ s.(See line contention below).

3.4 Line Contention

3.4.1 The system may interrupt keyboard data transmission at any time up to the 10th clock by pulling the system must receive the keyboard data.

3.5 Line Contention

3.5.1 System inhibits keyboard by lowering clock line to logic 0 for a minimum of 60 μ s.

3.5.2 System requests transmission by lowering the data to logic 0(-RTS-)and allows the clock line to go active.

- 3.5.3 Keyboard monitors the clock line(10 ms intervals)and detects the active level.
- 3.5.4 Keyboard detects -RTS-on the data line and clocks it in as the logic 0 start bit. then clocks 8 data bits and parity.
- 3.5.5 Keyboard looks for a logic 1 on the data line then forces it low clocks one more bit. This action signals the system that the keyboard has received the data. If the data line is not at logic level 0 following the 10th bit, the keyboard will continue to clock bits until the line becomes active. The keyboard then pulls data line low and transmits a resends.

4.0 FIFO

4.1 FIFO Capacity

- 4.1.1. The keyboard contains at least a 16-byte first-in-first-out(FIFO)buffer. The keyboard stores the scan codes until the system is ready to receive them.

4.2 Overrun Conditions

- 4.2.1 A buffer-overflow condition occurs when the keyboard tries to place more characters than the keyboard buffer can hold. When this occurs, an overrun code(FFH for scan code set 1, and 00H for scan code sets 2&3)replaces the last byte. If more keys are pressed before the system allows keyboard output, the additional data lost.

4.3 Special Cases

- 4.3.1 When the keyboard is allowed send data, the bytes in the buffer will be sent as in normal operation, and new data entered is detected and sent. Response codes do not occupy a buffer position.
- 4.3.2 If keystrokes generate a multiple-byte sequence, the entire sequence must fit into the available buffer space or the keystroke is discarded and a buffer overrun condition occurs.

5.0 KETS

5.1 Key Type Description

- 5.1.1 While using scan code sets 1&2, all the keys on the keyboard are make/break (M/B) except station 16. Scan code set 3 default conditions are given in the code tables. The make scan code is sent to the system when the key is depressed and the break code is sent when the key is released.

5.2 Auto-Repeat Protocol

- 5.2.1 If a key is typmatic (auto-repeats), the key will auto-repeat after the initial delay has expired. Rollover to another auto-repeat key will stop repeating operation and will produce the scan code for the second key. After an initial delay, the keyboard will the second code.

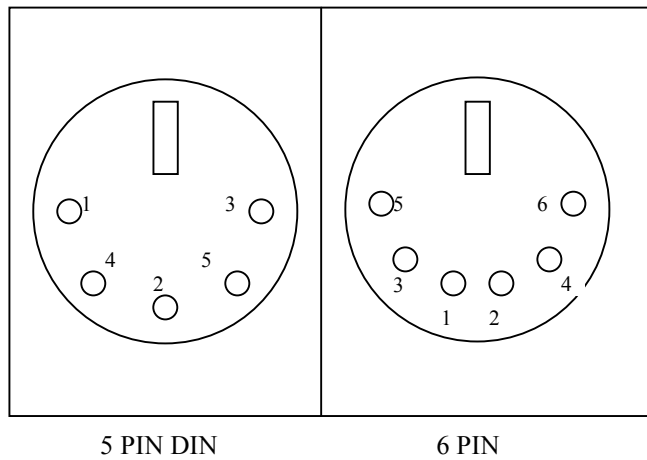
6.0 PC CABLE CONNECTOR

6.1 Pinout Table

6pin	5pin DIN	Signal	Type
5	1	KBD Clk	I/O
1	2	KBD data	I/O
2	3		
3	4	Ground	Power
4	5	+5.0Vdc	Power

Shield	Shield	Fram GND	
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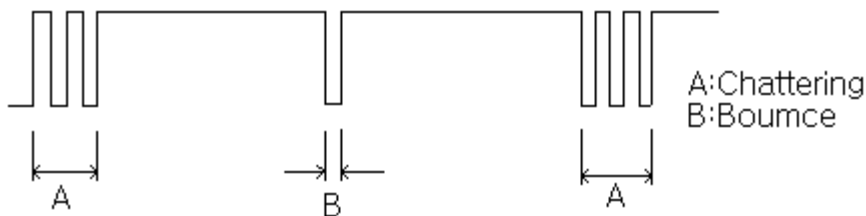
6.2 Connector Schematics



7.0 CHATTERING AND BOUNCE

Operation force shall be applied according to the normal operating method at 5V DC, 5mA. There shall be no bounce and chattering within 10msec when it is measured using a specially prepared tester or a synchroscope.

※ Chattering and bounce are defined in the following diagram :



8.0 TEMPERATURE AND HUMIDITY

12.0.1 Based on laboratory test conditions, there shall be no electrical or mechanical damage to the keyboard as a result of the following tests.

12.1 Operating

12.1.1 The keyboard will be capable of withstanding 10 to 40 degrees C with a 40 degree C maximum wet bulb temperature (20% to 95% max. relative humidity non condensing) cycled for 10 days.

12.2 Storage

12.2.1 The keyboard will be capable of withstanding a temperature of -20 degrees C to +60 degrees C with a 48 degree C maximum wet bulb temperature (90% max. humidity non condensing) cycled for ten days.

9.0 DROP TEST (NON-OPERATION)

Purpose of test: To verify the keyboard's ability to withstand being dropped from lap and desk heights.

Test Parameters/Conditions: 25°C @ 50% R.H.

Standard: After test, If the keyboard is recoverable (able to be re-assembled), it is

acceptable.

Packing Condition	Drop surface	Height	Test Description
Non-packing	Hard wood	70Cm	2 drops for each corner
	Carpet	70Cm	1drop for 6 surfaces
Inner box	Concrete	90Cm	1drop for 6 surfaces and 4 corners. (Totally 10drop)
Out box	Concrete	60Cm	1drop for 6 surfaces and 4 corners. (Totally 10drop)

10.0 VIBRATION

10.1 Pack non operate

14.1.1 The keyboards as packaged in individual boxes (exclusive of bulk pack or overpack containers) shall withstand 24 hours of vibration of 50 Hz and 5 G's without electrical or mechanical damage to the keyboard. The shipping container will be rigidly mounted with the key array in the up position.

10.2 Unpacked operated

14.2.1 The keyboard in its normal operation, shall withstand 24 hours of cycling between 10 and 59 Hz at 0.005inch displacement double amplitude.

10.3 Unpacked, Non operate

14.3.1 The keyboard in its normal operating position shall withstand 30 minutes of cycling 56 Hz to 500 Hz at 2.0G's in each of its three major axis.

11.0 ELECTROSTATIC DISCHARGE(ESD)

11.1 Test Method

15.1.1 Test per IEC 801-2

15.1.2 Direct Discharge applied to all areas which may be touched by an operator with the keyboard in it's normal operating position.

11.2 Field Limits

11.2.1 E-Field 0 to \pm 12KV

11.2.2 H-Field 0 to \pm 12KV

11.2.3 Direct Discharge 0 to 12 KV

11.3 Keyboard Operation

15.3.1 The keyboard shall be tested such that keyboard output can be monitored during test using a word processing program.

11.4 Error Definition

11.4.1 Soft Error-Temporary loss of function during test, however function can be restored without initiating a reset command, or cycling of the power.

11.4.2 Hard Error-The keyboard becomes locked up or hangs and operation continues only after a reset command or power to the keyboard is cycled.

11.4.3 Hardware Error-The keyboard has sustained damage such that continued operation cannot occur.

11.5 Performance Criteria

11.5.1 \pm 6KV No error Allowed

11.5.2 \pm 8KV Soft Errors Allowed

11.5.3 \pm 10KV Hard Error Allowed

11.5.4 \pm 12KV No Hardware Errors are permitted.

12.0 ALTITUDE

12.1 Operating and Storage

The keyboard shall withstand both an operating and storage altitude of sea level to 15,000 feet.

13.0 KEY LIFE TEST

- Standard: a. key-switch life: 10,000,000 cycles
b. Test equipment : Plunger Type.
Actuation speed : 4 times/sec
Press pressure : 200 ± 50 gf

14.0 AGENCY APPROVALS

- 18.0.1 SEJIN ELECTRON keyboards are UL recognized (UL file XXXXXXXX) and CSA certified (CSA file #XXXXXXXXX) components. Any proposed changes, to the generic keyboard design, must be reviewed by SEJIN ELECTRON Engineering to determine any impact on agency approvals prior to incorporation of said change into production keyboards.

15.0 GENERAL KEYBOARD REQUIREMENTS

15.1 Membrane.

Contact membrane switching technology is applied. The membrane consists of a two layers of EL grade polyester printed with a combination of silver/carbon and UV dielectric compounds.

15.2 Contact resistance

20.2.1 Closed circuit resistance 300Ω (max)

20.2.2 Open circuit resistance $100 M\Omega$ (min)

15.4 Insulation Resistance

19.4.1 (measured between any two adjacent sense or drive line) $100 M\Omega$ minimum, with 100 VDC test voltage.

15.5 Key top Height Variation

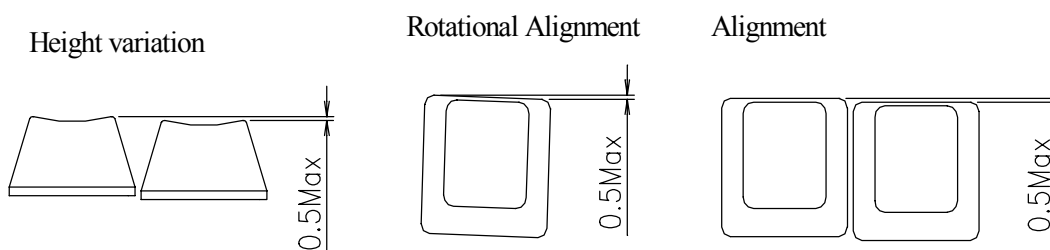
The key top height variation must not greater than 0.5mm when measured between the center to center of keys next to each other. The measurement will be performed with keys in the home positions.

15.6 Keytop Alignment

The key top alignment tolerances must not exceed 0.5mm when keytop measured between the center to center of keys next to each other. The measurement will be performed with keys in the home positions.

15.7 Rotational Alignment

The maximum rotation of key shall be less than 0.5mm as shown below.



15.8 End stroke strength

End stroke should withstand a static load of 500gf applied on the tip of the key stem in the perpendicular direction for 1minute.

15.9 Keytop pulling strength

The keytop pull out force shall be 0.5Kg or more at normal temperature during initial conditions.

The keytop shall be not pulled out by an ordinary typing operations.

