

**SYNTHESIZER ACTION KEYBOARD**



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## REVISION HISTORY

REV	DATE	MAJOR CHANGE
0.1	05/05/2009	First Draft
0.2	14/09/2010	Standard specifications
0.3	10/02/2014	New specs with Spring n.109
0.4	09/03/2018	Removed right AFT ledge
0.5	04/02/2019	Mechanical specs revision
0.6	24/11/2020	Drilling pattern 44

## DEVICE SELECTION TABLE

Part	DESCRIPTION
6509xxxx	TP/9S
C(DF)	Contact Board with Forward Diodes
P	Semi-weighted
AFT	n.1 Mono-Aftertouch strip

## FEATURES

- 25-37-44-49-61-76 Synth action keyboard
- Universal keyboards appliance
- Keyboard endurance: 1 million times at fortissimo level
- Temperature range:
  - Operation: -5° to +45 °C
  - Storage: -25° to +65 °C

## DESCRIPTION

The TP/9S keyboard produces a quick and light feel and works well for certain types of music and for playing a wide range of sounds.

Due to its features, TP/9S is a universal keyboard for any kind of instrument: Synthesizers, Organs, Arrangers, Workstations and Controllers.

The keyboard is available in various configurations: 25, 37, 44, 49, 61 and 76 weighted or unweighted keys, dynamic rubber contacts and Monophonic aftertouch.

## BLOCK DIAGRAM

Below is the block diagram of TP/9S keyboard where all its parts are showed.

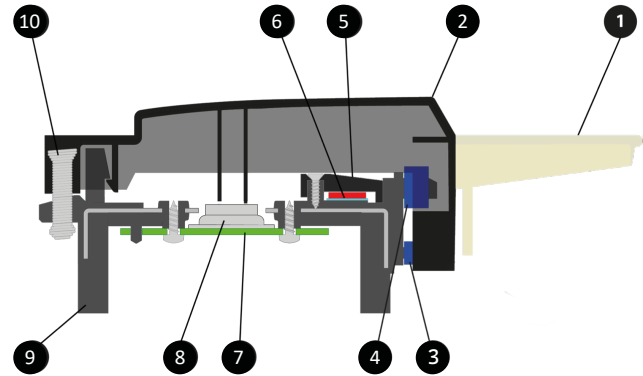


Figure 1: TP/9S Block Diagram

With reference to the Figure 1 above, below are terms and definitions:

1. White key
2. White key weight
3. Black key
4. Black key weight
5. White key rubber travel guide
6. Black key rubber travel guide
7. Aftertouch locker
8. Aftertouch sensor + felt-foam pack
9. PCB
10. Rubber contact strip
11. Frame (plastic + metal core)
12. Spring

## MECHANICAL CHARACTERISTICS

The TP/9S keyboard produces a quick and light feel and is very comfortable for a wide range of music styles. The keyboard is made of plastic keys and uses springs to let the key return to its initial position. The frame is made by a special over-molding process to get a solid body with

the flexibility of the polymer materials and the stability of the metal core. The TP/9S keyboard with his features comes in a compact size and it is adaptable to different uses in various types of cabinets.

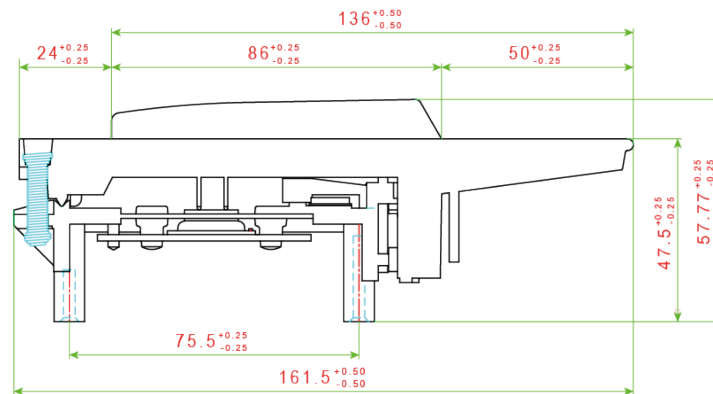


Figure 2: TP/9S Side View

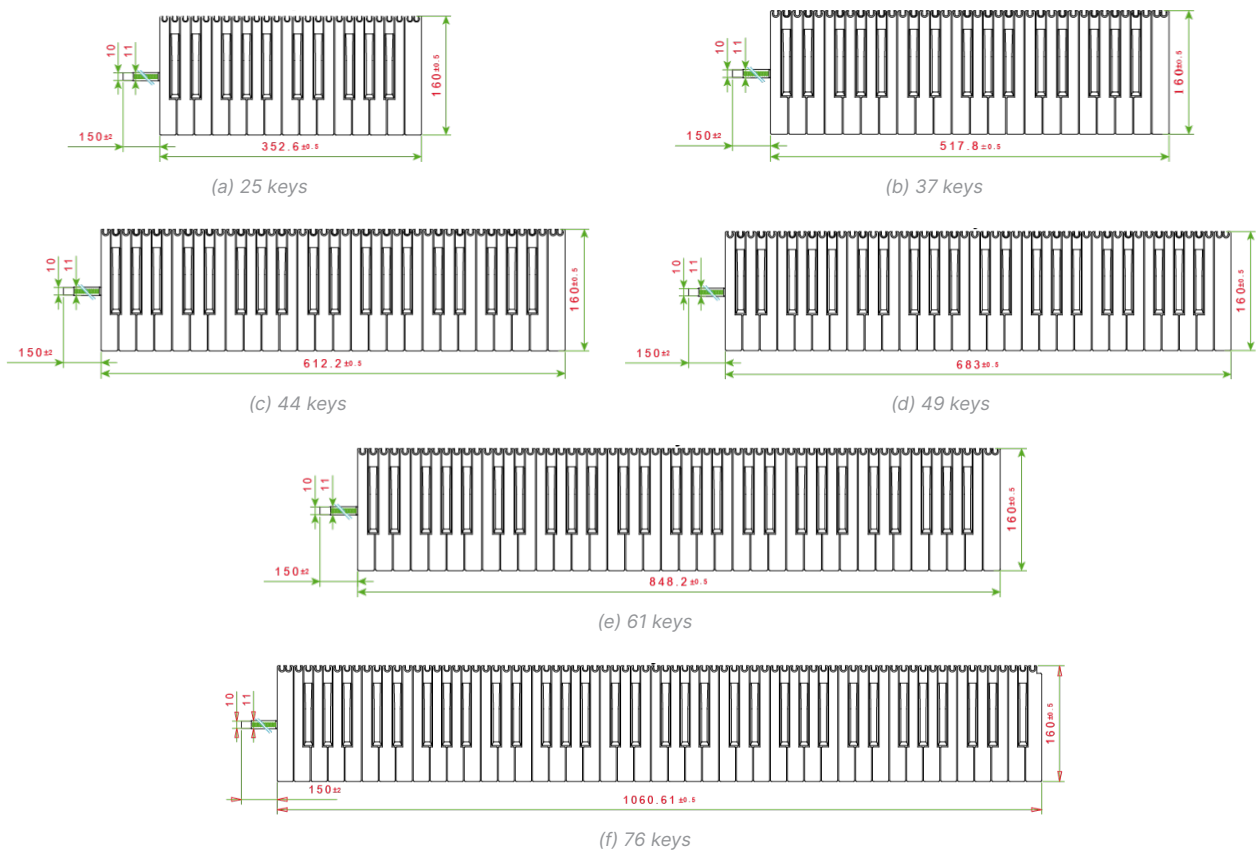


Figure 3: TP/9S top view

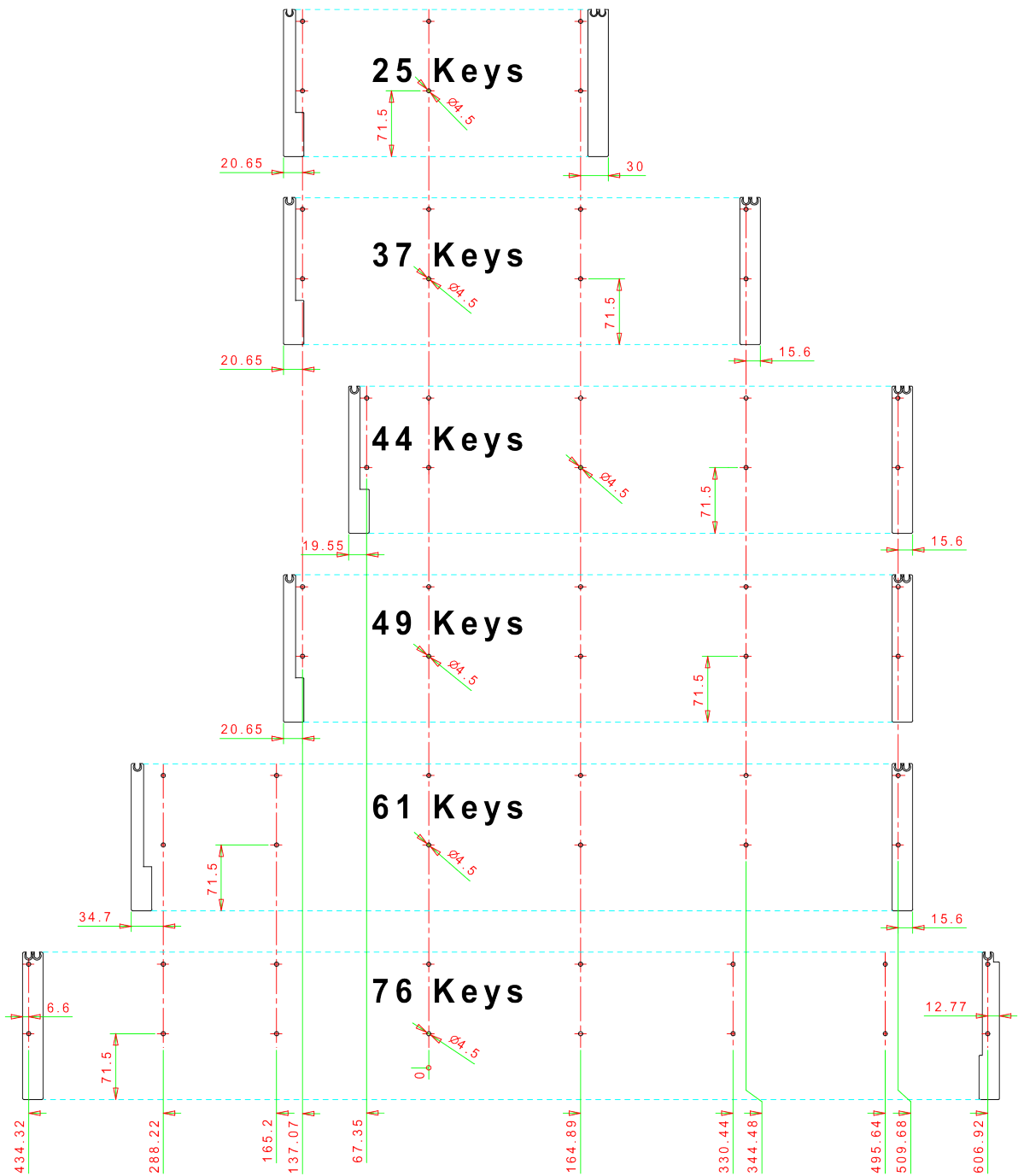


Figure 4: TP/9S Drilling pattern

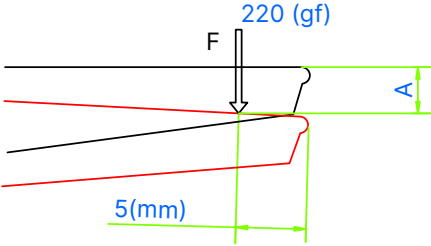
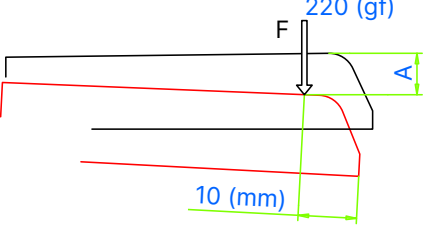
**TABLE 1-1 PRESS FORCE OF KEY**

ITEM	CONDITION	STANDARD
Measured force on white key after 1mm of travel at 5mm depth from the front.		$F = 50 \pm 7 \text{ gr}$
Measured force on black key after 1mm of travel at 10mm depth from the front.		$F = 65 \pm 7 \text{ gr}$

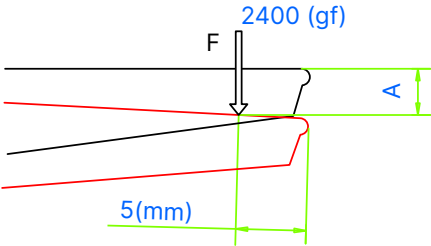
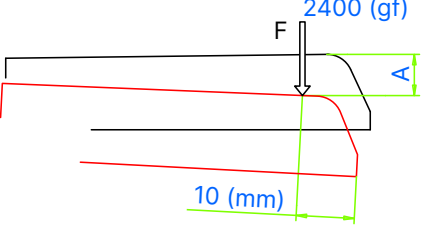
**TABLE 1-2 CONTACT TRAVEL**

ITEM	CONDITION	STANDARD
<b>WHITE KEY</b> A: Travel at first contact B: Travel at second contact B-A: Gap between 1st and 2nd contact		$A = 3.5 \pm 0.8 \text{ mm}$ Weight at A = $70 \pm 7 \text{ gr}$ $B = 6.5 \pm 0.8 \text{ mm}$ Weight at B = $85 \pm 7 \text{ gr}$ $B - A = 3.0 \pm 0.5 \text{ mm}$
<b>BLACK KEY</b> A: Travel at first contact B: Travel at second contact B-A: Gap between 1st and 2nd contact		$A = 1.8 \pm 0.8 \text{ mm}$ Weight at A = $80 \pm 7 \text{ gr}$ $B = 3.8 \pm 0.8 \text{ mm}$ Weight at B = $105 \pm 7 \text{ gr}$ $B - A = 2.0 \pm 0.5 \text{ mm}$

### TABLE 1-3 ENTIRE TRAVEL

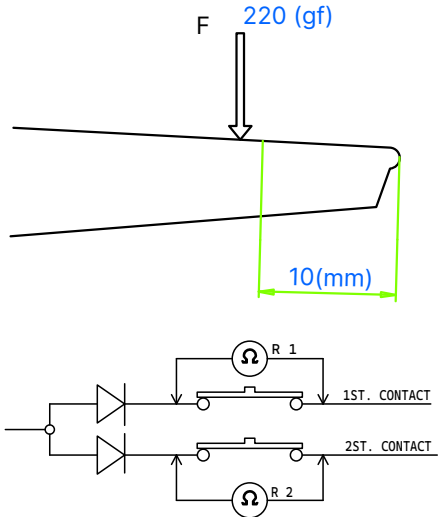
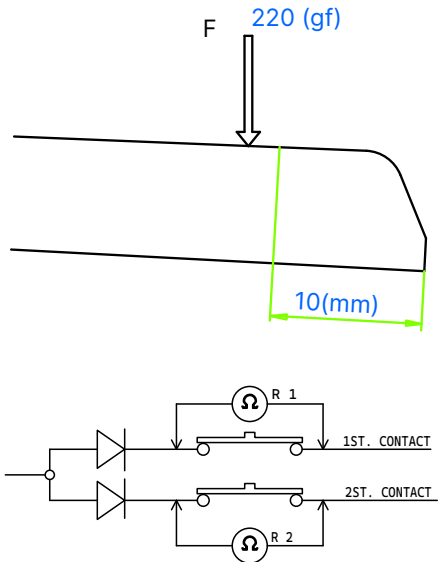
ITEM	CONDITION	STANDARD
<p>WHITE KEY                      F: Applied force on white key to go at maximum travel                      A: Measured travel of white key</p>		<p><math>A = 10.0 \pm 1.0 \text{ mm}</math></p>
<p>BLACK KEY                      F: Applied force on black key to go at maximum travel                      A: Measured travel of black key</p>		<p><math>A = 5.7 \pm 1.0 \text{ mm}</math></p>

### TABLE 1-4 EXTRA TRAVEL

ITEM	CONDITION	STANDARD
<p>WHITE KEY                      F: Applied force on white key to go at maximum travel                      A: Measured travel of white key</p>		<p><math>A = 15.0 \pm 1.0 \text{ mm}</math></p>
<p>BLACK KEY                      F: Applied force on black key to go at maximum travel                      A: Measured travel of black key</p>		<p><math>A = 7.0 \pm 1.0 \text{ mm}</math></p>

## ELECTRICAL CHARACTERISTICS

**TABLE 2-1 CONTACT RESISTANCE**

ITEM	CONDITION	STANDARD
<p>WHITE KEY                      F: Applied force on white key to go at maximum travel                      R1: Measured resistance of the first contact                      R2: Measured resistance of the second contact</p>		<p>R1: less than 100 ohm                      R2: less than 100 ohm</p>
<p>BLACK KEY                      F: Applied force on black key to go at maximum travel                      R1: Measured resistance of the first contact                      R2: Measured resistance of the second contact</p>		<p>R1: less than 100 ohm                      R2: less than 100 ohm</p>

**TABLE 2-2 INSULATION RESISTANCE**

ITEM	CONDITION	STANDARD
Resistance of the open contacts	At 500 VDC	More than 100Mohm

**TABLE 2-3 RATED VOLTAGE/CURRENT**

ITEM	CONDITION	STANDARD
Rated voltage/current		5V 10mA per line

**TABLE 2-4 AFTERTOUC**

ITEM	CONDITION	STANDARD
<p><b>WHITE KEY</b> Resistance of the AFT sensor, measured after 10 sec. while keeping pressing the key with a force F.</p>		F = 800gr R <sub>sensor</sub> = 600 +/-50%
		F = 1600gr R <sub>sensor</sub> = 200 +/-50%
		F = 2400gr R <sub>sensor</sub> = 180 +/-50%
<p><b>BLACK KEY</b> Resistance of the AFT sensor, measured after 10 sec. while keeping pressing the key with a force F.</p>		F = 800gr R <sub>sensor</sub> = 1500 +/-50%
		F = 1600gr R <sub>sensor</sub> = 350 +/-50%
		F = 2400gr R <sub>sensor</sub> = 250 +/-50%



## ELECTRICAL SCHEMATICS

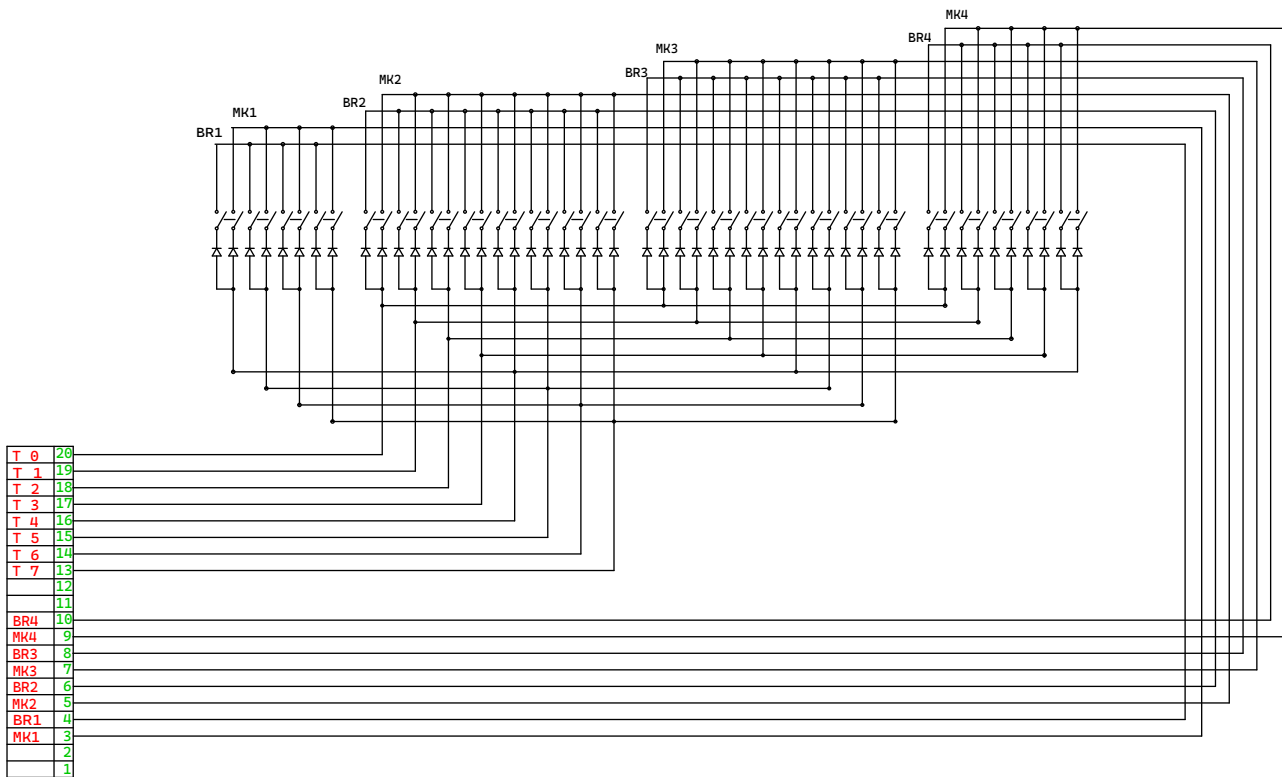


Figure 5: 25 notes, 2 switches contact board.

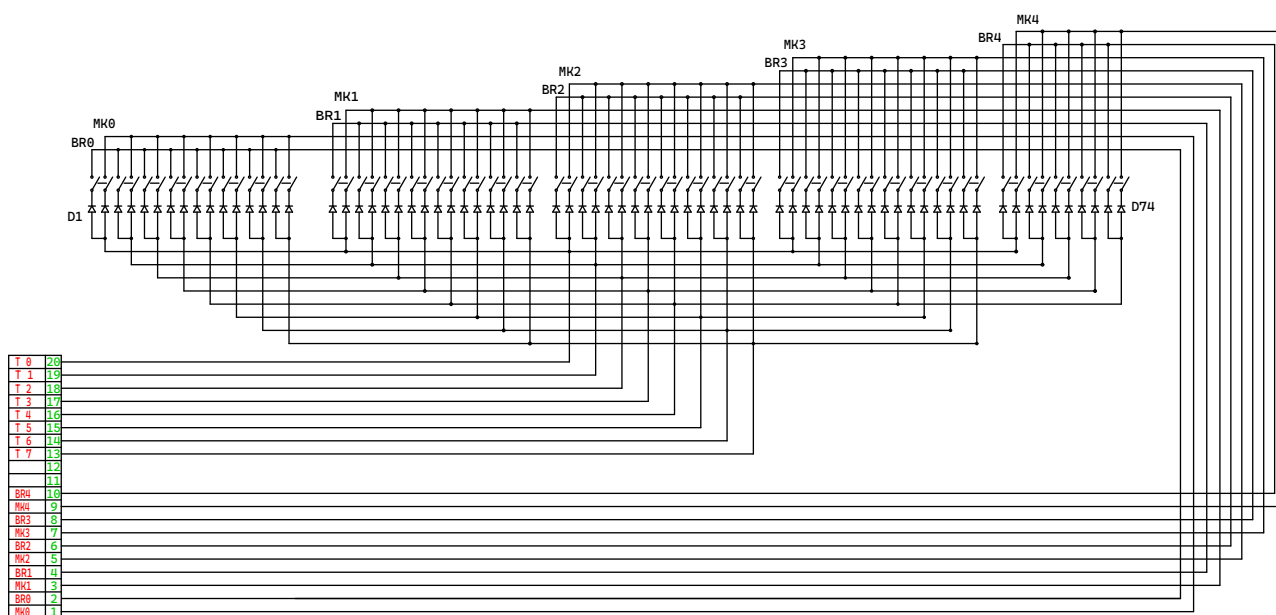


Figure 6: 37 notes, 2 switches contact board.

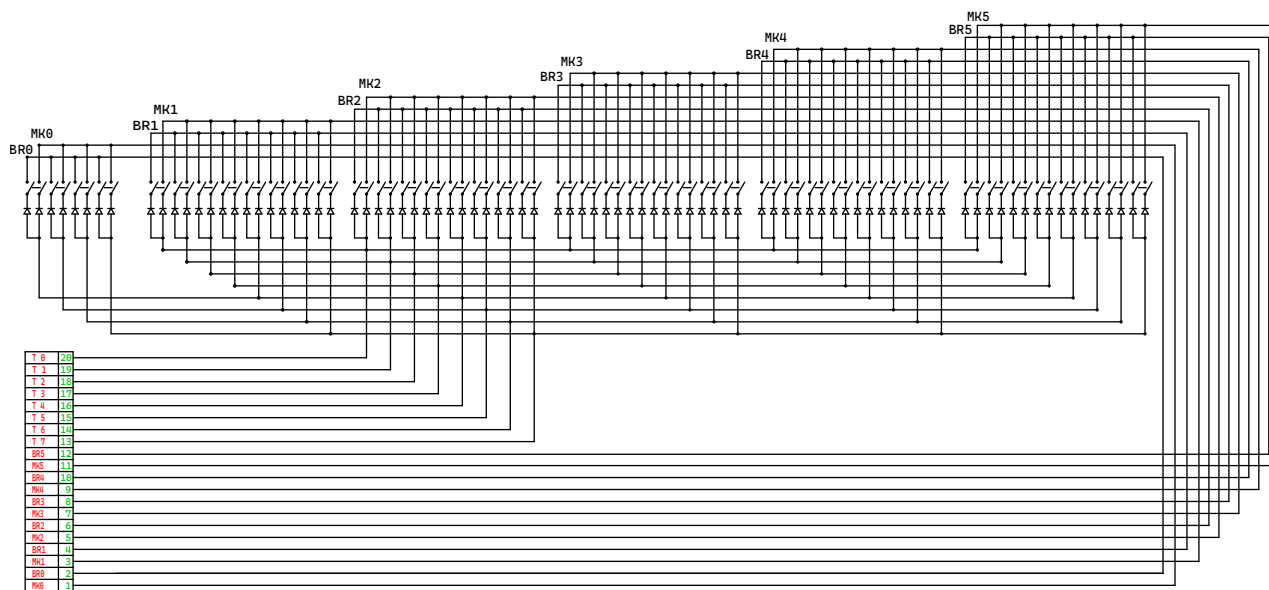
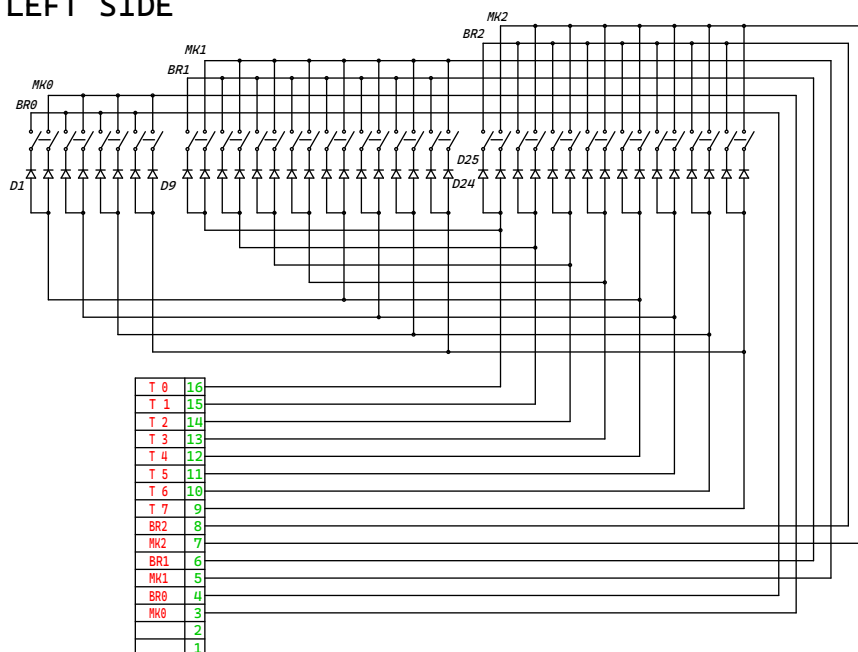


Figure 7: 44 notes, 2 switches contact board.

## LEFT SIDE



## RIGHT SIDE

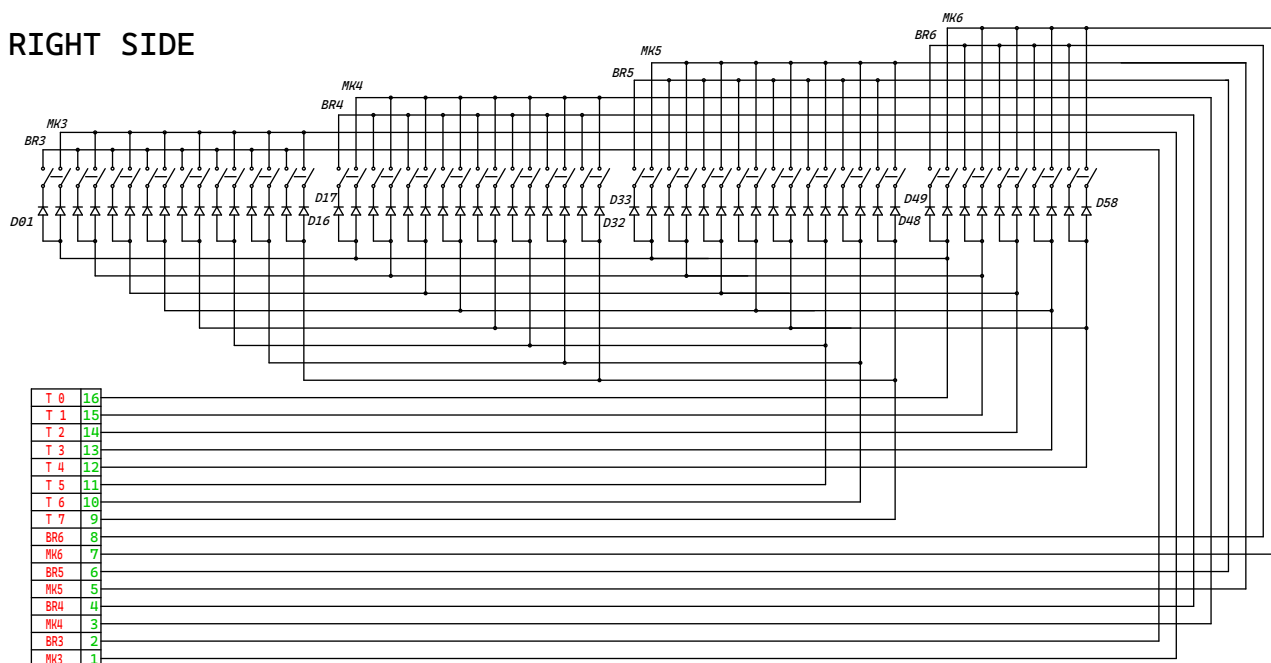
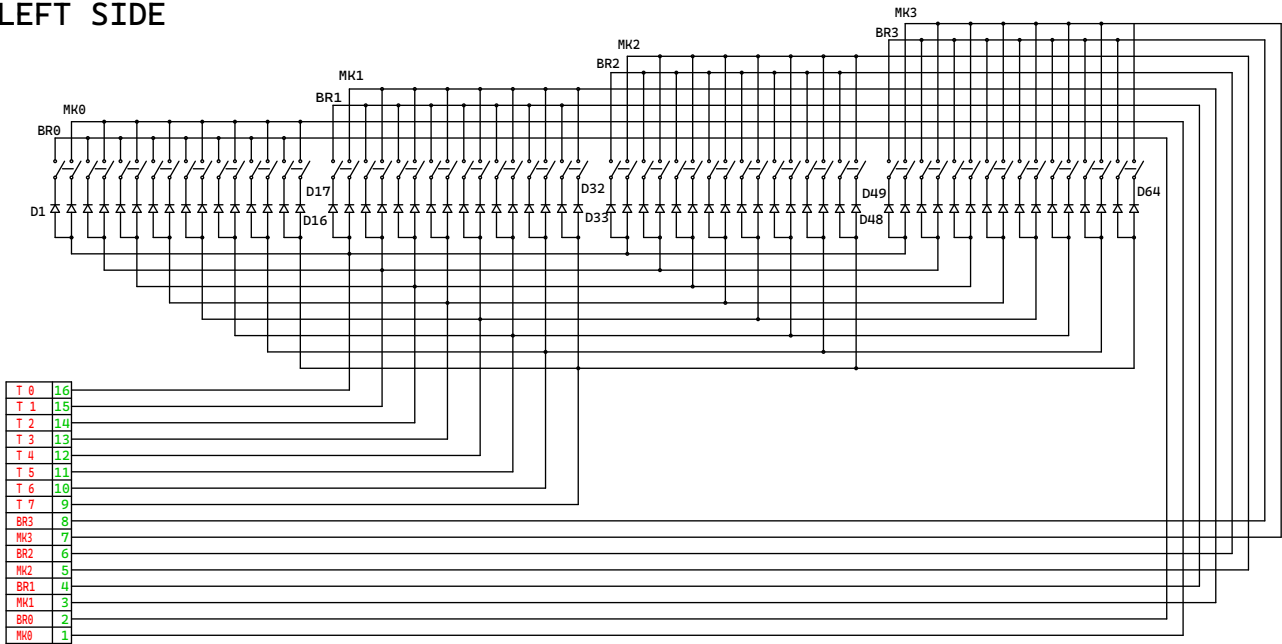


Figure 8: 49 notes, 2 switches contact board.

## LEFT SIDE



## RIGHT SIDE

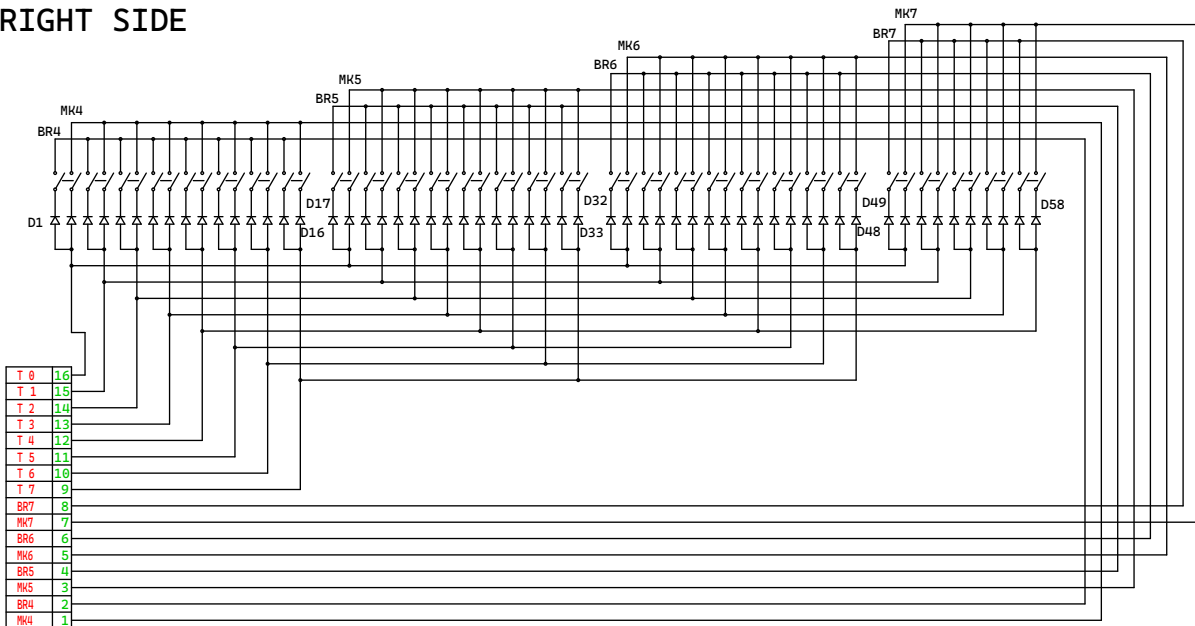
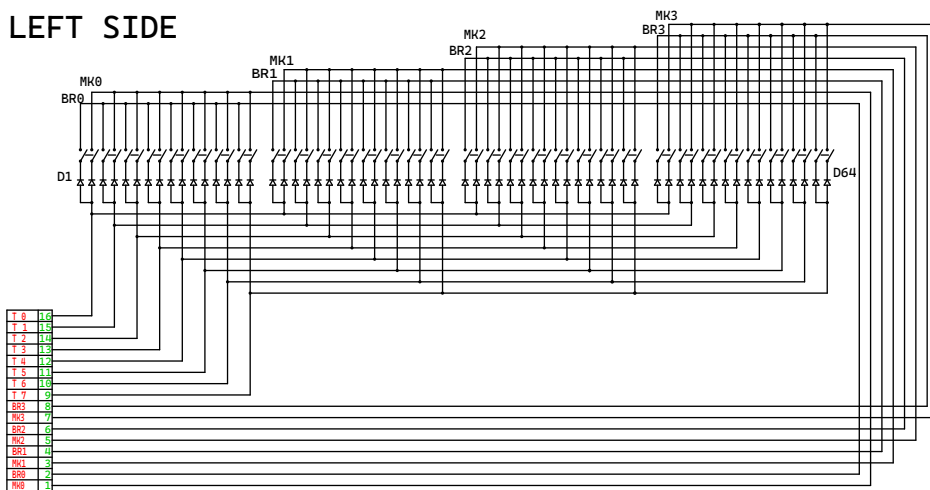


Figure 9: 61 notes, 2 switches contact board.

## LEFT SIDE



## RIGHT SIDE

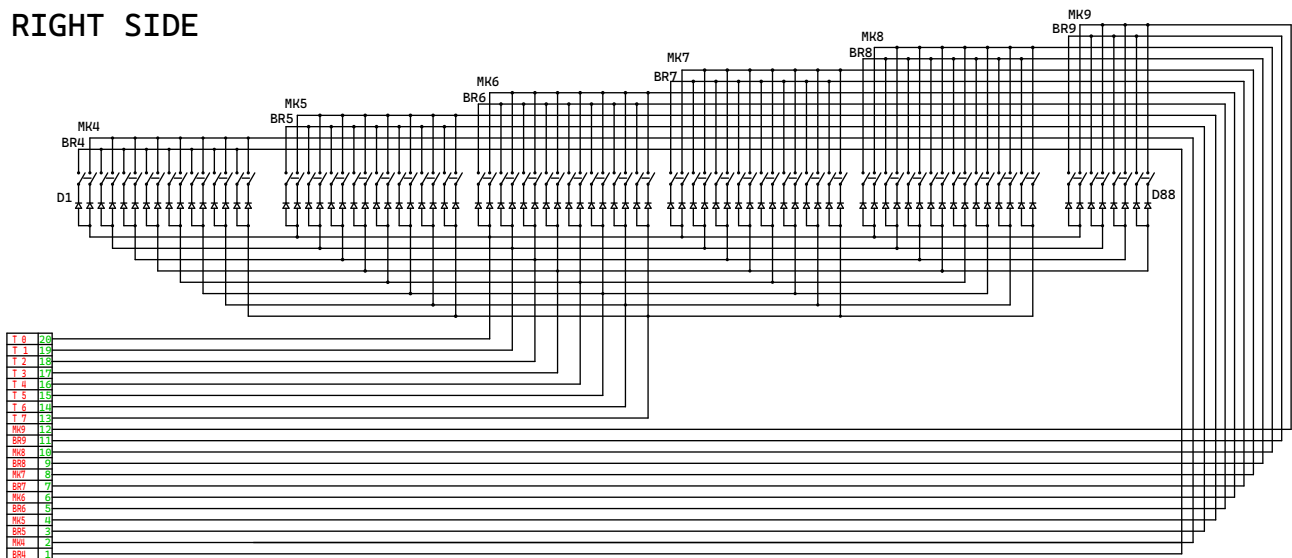
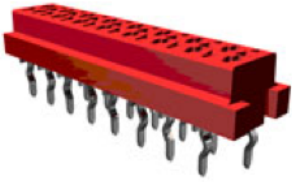
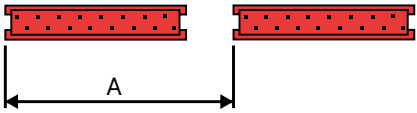



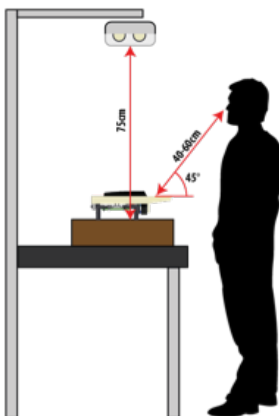
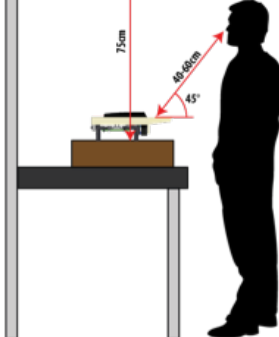
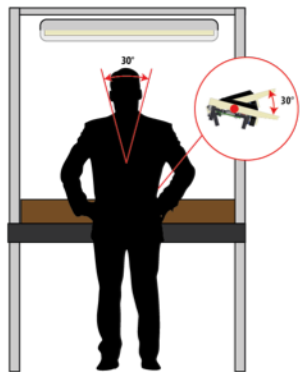
Figure 10: 76 notes, 2 switches contact board.

## CONNECTORS

	<p>Connector: Tyco/AMP Micro-Match          Type: Female-On-Board          Mount Angles: Vertical</p>  <p>A: distance between connectors          A = 54,7 mm</p> <p>Pin:</p> <ul style="list-style-type: none"> <li>• 25 notes: 1x 20vie</li> <li>• 37 notes: 1x 20vie</li> <li>• 44 notes: 1x 20vie</li> <li>• 49 notes: 2x 16vie</li> <li>• 61 notes: 2x 16vie</li> <li>• 76 notes: 1x 16vie + 1x 20vie</li> </ul>
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## COSMETIC INSPECTION

### TEST CONDITIONS

<p>Definition of appearance part</p>	<p>A-zone: important zone B-zone: not important zone</p>	
<p>Photometric condition</p>	<p>The light source must be cold and illuminate the keyboard vertically; Source: 2 x 36W/865 neon; Distance from top table: 75cm.</p>	
<p>Operator position</p>	<p>Distance between eyes and top keys surface: from 40 to 60 cm; View angle: 45° (approx.) Operator Visual Acuity: 1.00 decimal (including lens correction and no color blindness).</p>	
<p>Procedure</p>	<p>Check the A-zone varying the inclination of the keyboard by 30° and the inclination of the head by 30° as well; Test duration: 10sec max.</p>	

## APPEARANCE CRITERIA

TEST ITEM	TEST METHOD	ACC. CRITERIA		
Gap of adjacent white keys	Caliber	1.1 ± 0.5mm		
Height tolerance of adjacent white keys	Ruler	≤ 0.50mm		
Scratches	Check by film	Scratches dimension	A-Zone	B-Zone
		≤ 0.8mm	≤ 2pcs	≤ 4pcs
		≤ 1.5mm	0pcs	≤ 2pcs
Contaminations	Check by film	Spots dimension	A-Zone	B-Zone
		≤ 0.3mm	≤ 2pcs	≤ 4pcs
		≤ 0.5mm	0pcs	≤ 3pcs
Color	Visual	Not acceptable any visible color variation between different keys		
Shrink	Visual	Not acceptable any visible shrink		

## QC – INCOMING INSPECTION

### SAMPLING PLAN

According to ISO2859, ANSI/ASQ Z1.4-2003, NF06-022, BS 6001, DIN 40080, use the following:

- General Level I
- AQL 1.5

### INCOMING INSPECTION TEST

- Cosmetic Inspection
- Measurement of the AFTERTOUCHE values (TABLE 2-4)

## QC – ASSEMBLY LINE INSPECTION

### ASSEMBLY LINE QC

- 100% inspection
- Play all the keys
  - Every key must play sound
  - o Noise across the whole keyboard must be consistent such that no one key sounds louder or lower than any other. Noise character must remain consistent across the keyboard



## CERTIFICATIONS



### DECLARATION OF CONFORMITY

Fatar srl  
 Zona Ind.le Squartabue  
 62019 Recanati MC Italy

Declares that this product complies with the following European Directives and related standards:

<b>2006/95/EC</b>		Low Voltage Directive
<b>EN 60065</b>	<b>1998</b>	Safety Requirement for Audio, Video and audio-visual apparatus for professional use
<b>2004/108/EC</b>		Electromagnetic Compatibility Directive (EMC)
<b>EN 55103-1/E1:</b>	<b>1997</b>	Product Standard – Audio, Video and audio-visual apparatus for professional use, Electromagnetic compatibility of audio equipment: Emission
<b>EN 55103-2/E1</b>	<b>1997</b>	Product Standard – Audio, Video and audio-visual apparatus for professional use, Electromagnetic compatibility of audio equipment: Immunity

Technical files are maintained at corporate head-quarter of Fatar Srl, 62019 Recanati MC, Italy.  
 Above declarations are void by modification of the device without approval, or unauthorized servicing.



### RoHS CONFORMITY

This is to certify that the product is RoHS compliant and meets the requirements and specified limits of restricted substances according to 2002/95/EC directive.



### WEEE

This product is marked with the WEEE symbol to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. The symbol indicates that this product should not be treated as household waste. It must be disposed and recycled as electronic waste. Please assist to keep our environment clean.

## FATAR srl

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