

TOUCHSCREEN SPECIFICATION

ver: 11.10.0

MODEL: AM-2135-F180

DATE: 10-01-2011

Product that has been mounted and removed is not returnable for cosmetic defects; scratches, chips or cracks.

Approved

Signature

Printed Name

Company

Date

ATTENTION: REGARDING HIGH-RISK APPLICATIONS

The Products have not been designed, manufactured, tested or qualified for use in any high-risk application (a "High-Risk Application"), including, but not limited to, the following: life support or life sustaining, "medical device" as defined by applicable law, nuclear, vehicle control (including airplane, automotive, train and other vehicle) or any other application in which failure of the Product, or the product into which it is incorporated, could foreseeably result in personal injury, death, or significant property damage.

To contact us, please call us toll-free at (425) 774-8151 or
send email to sales@hantouchUSA.com
Visit us on the web at www.hantouchUSA.com

INSPECTION

Inspection

Within 30 days after delivery customer will inspect the products and give written notice of rejection to Hantouch USA detailing the manner in which any products do not conform to specifications. Upon receiving authorization and shipping instructions from Hantouch USA, customer may return rejected products. If the customer retains the products after their delivery without giving Hantouch USA such notice within the designated period, customer will be deemed to have irrevocably accepted the products. Customer's inspection and acceptance tests shall not exceed the inspection and test procedures customary in the industry for the products and shall be at customer's expense. Hantouch USA may charge to the customer any costs resulting from the testing, handling, and disposition of any products returned by the customer which are not found by Hantouch USA to be non-conforming.

Hantouch USA reserves the right to make changes in the specifications, characteristics, data, materials, structures and other contents described herein at any time without notice in order to improve design or reliability. Contact Hantouch USA in order to obtain the latest specification sheets before using any Hantouch USA device. Manufacturing locations are also subject to change.

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1. Warranty

For warranty, please see section 7 of attached Hantouch USA terms and conditions.

2. Features

Type: 5-Wire Analog Resistive Type Touch Panel

Input Mode: Pen or Finger

Structure: PET - Anti glare hard coating and anti Newton ring ITO film, 188 μ m

Glass - ITO Glass, 2.0mm

Spacer - .1m

Dot Pitch - 3.0mm x 3.0mm

Connector: FPC

3. General Specification

Item	Specification	Unit
Dimensional Outline	Length x Width x Thickness	mm
Viewing Area	Length x Width	mm
Active Area	Length x Width	mm
ITO Glass	2.0 \pm 0.1	mm
PET (ITO Film)	188 \pm 15	μ m
Connector	FPC, 5-Pin	

4. Rating

4.1 The Maximum Voltage: 5V(DC), 1mA

4.2 Usable Temperature Range: From -10 $^{\circ}$ C to +60 $^{\circ}$ C

4.3 Storage Temperature Range: From -20 $^{\circ}$ C to +70 $^{\circ}$ C

5. Electrical Specification

5.1 Resistance Between Leads: 30-800 Ω

5.2 Linearity: \pm 5% or less

5.3 Insulation Resistance: 10M Ω or more @25V(DC)

5.4 Chattering Time: 30msec or less

6. Mechanical Specification

6.1 Input Method: Pen or Finger

6.2 Operating Force: 80g or less with \varnothing 2mm Polyacetal Stylus

6.3 Surface Hardness: 3H (pencil test) & Hard Coated PET

6.4 Light Transmission: 80 \pm 3% at 550nm wavelength.

7. Durability

7.1 Durability Against Writing Characters

After writing 10,000 times in the same length (10-100mm) with R2.0mm Polyacetal Stylus
Force: 80g. max, Speed:60mm/sec, it must be satisfied with:

7.1.1 Resistance between leads: 30-800Ω

7.1.2 Linearity: ±5% or less

7.1.3 Insulation resistance: 10MΩ or more @25V(DC)

7.2 Punching Life

After Punching 20,000,000 Times with R 8.0mm Silicone Rubber.

Force: 80g, Speed: 2 times/sec, it must be satisfied with:

7.2.1 Resistance between leads: 30-800Ω

7.2.2 Linearity: ±5% or less

7.2.3 Insulation resistance: 10MΩ or more @25V(DC)

7.3 Impact Resistance

No damage when ø6mm steel ball is dropped on the surface from 30cm height at 1 time.

7.4 ITO Connector Insert / Pull-Out Resistance: 5 times at least.

The requirements in 4.1 shall be satisfied

8. Reliability

8.1 High Temperature Test

After putting panels at 60°C for 120 hours, then leaving for 24 hours at room temperature,
it must be satisfied with:

8.1.1 Resistance between leads: 30-800Ω

8.1.2 Linearity: ±5% or less

8.1.3 Insulation resistance: 10MΩ or more @25V(DC)

8.1.4 Operating Force: 80g or less with ø2mm Manuscript Pen

8.2 Low Temperature Test

After putting panels at -20°C for 120 hours, then leaving for 24 hours at room temperature,
it must be satisfied with:

8.2.1 Resistance between leads: 30-800Ω

8.2.2 Linearity: ±5% or less

8.2.3 Insulation resistance: 10MΩ or more @25V(DC)

8.2.4 Operating Force: 80g or less with ø2mm Manuscript Pen

8.3 Temperature and Humidity Test

After putting panels at 40°C, 90%RH for 120 hours, then leaving for 24 hours at room temperature,
it must be satisfied with:

8.3.1 Resistance between leads: 30-800Ω

8.3.2 Linearity: ±5% or less

8.3.3 Insulation resistance: 10MΩ or more @25V(DC)

8.3.4 Operating Force: 80g or less with ø2mm Manuscript Pen

8.4. Keep Out Area

Do not put buttons or other touch fetures within 3mm of the internal spacer.
Design your system in such a way that a touch right next to the bezel is
3mm or more from said internal spacer.

9. Visual Inspection

The following are applied to viewing areas only. They are ignored in the non-viewing areas as long as the electrical performance of the TP is functional. W=Width L=Length D=Diameter. GT=Glass Thickness. Contamination that can be cleaned using a soft cloth with ethyl alcohol does not apply to these inspection criteria. If the object is 3 times larger in one direction than in a perpendicular direction, then it is considered a linear foreign object. Extra dielectric dots are treated as a granular foreign object. Extra silver or carbon is regarded as a defect.

9.1 Scratch

CRITERIA	DECISION
$W < 0.04\text{mm}$	In case of $L < 20\text{mm}$, the scratch is ignored.
$0.04\text{mm} < W < 0.06\text{mm}$	In case of $L < 20\text{mm}$ where the scratch is $> 20\text{mm}$ in distance from any other scratch or foreign object, it is ignored. In case of $L < 20\text{mm}$ where the scratch is $< 20\text{mm}$ in distance from any other scratch or foreign object, the TP is defective. In case of $L > 20\text{mm}$, the TP is regarded as a defect.
$W > 0.06\text{mm}$	The TP is regarded as a defect.

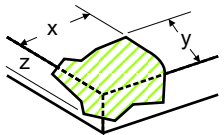
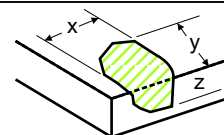
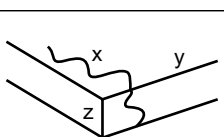
9.2 Granular Foreign Object

CRITERIA	DECISION
$D < 0.3\text{mm}$	Ignored
$0.04\text{mm} < W < 0.5\text{mm}$	In case of where the object is $> 20\text{mm}$ in distance from any other scratch or foreign object, it is ignored. In case where the object is $< 20\text{mm}$ in distance from any other scratch or foreign object, the TP is defective.
$D > 0.6\text{mm}$	The TP is defective.

9.3 Linear Foreign Object

CRITERIA	DECISION
$W < 0.04\text{mm}$	In case of $L < 4\text{mm}$, the object is ignored.
$0.04\text{mm} < W < 0.09\text{mm}$	In case of $L < 4\text{mm}$ where the object is $> 20\text{mm}$ in distance from any other scratch or foreign object, it is ignored. In case of $L < 4\text{mm}$ where the scratch is $< 20\text{mm}$ in distance from any other scratch or foreign object, the TP is defective. In case of $L > 4\text{mm}$, the TP is regarded as a defect.
$W > 0.09\text{mm}$	The TP is regarded as a defect.

9.4 Glass Fragment

Corner Fragment		$X < 3.0\text{mm}$ and $Y < 3.0\text{mm}$ and $Z < GT$, it is ignored.
Side Fragment		$X < 6.0\text{mm}$ and $Y < 2.0\text{mm}$ and $Z < GT$, it is ignored.
Progressive		TP is regarded as defective.

10. Test

- 10.1 Linearity: Direction +/- 5% or less.
- 10.2 Open and short circuit test.
- 10.3 Insulation resistance: 10megohms or more @ 25v (dc).
- 10.4 Finished product functional test.

11. Handling Remarks

11.1 Storage:

- 1.1.1 Store the products at the temperature and humidity range presented in the specification.
- 1.1.2 Store the products in the original package.
- 1.1.3 Do not expose the products directly to the sun

1.2 Unpack:

- 1.2.1 Do not hold FPC tail to take touch panels out of package.
- 1.2.2 Open box after checking the "Up/Down" indicator

1.3 Handling:

- 1.3.1 Use gloves and finger cot when handling touch panels.
- 1.3.2 Hold Touch Panels at the outside of view area and do not touch where tails are heat-sealed in order to avoid disconnection.
- 1.3.3 Please do not pile up touch panels in order to avoid the edge of the touch panel scratching the surface of other touch panels.
- 1.3.4 Do not put heavy objects on touch panels

1.4 Assembly:

- 1.4.1 After protective film is released, and when protective film is laminated to TP again, please check to see that there is no dirt on it.
- 1.4.2 While designing the housing, try to minimize the stress of housing to the touch panels.
- 1.4.3 Please pay attention not to harm touch panels with your tools that may be used to assemble. (Plastic tools are recommended)
- 1.4.4 Please pay the best attention not to create any stress to the heat-sealed tails. Heavy stress may cause disconnection.
- 1.4.5 If Touch Panels have slender holes to make inner pressure and outer pressure evenly please design housing not to store any water or lubricants near this hole.

12. Mounted Product

12.1 Removed Product

Product that has been mounted and removed is not returnable for cosmetic defects: scratches, chips and/or cracks

12.2 Bezel/Top Gasket Caution

The top film must be allowed to move (expand and contract)
Do not bond the top film directly to the bezel. Do not use a gasket that does not allow the top film to move (expand and contract). Do not use a clamping force so great that the top film can not move (expand and contract).

12.3 Cleaning

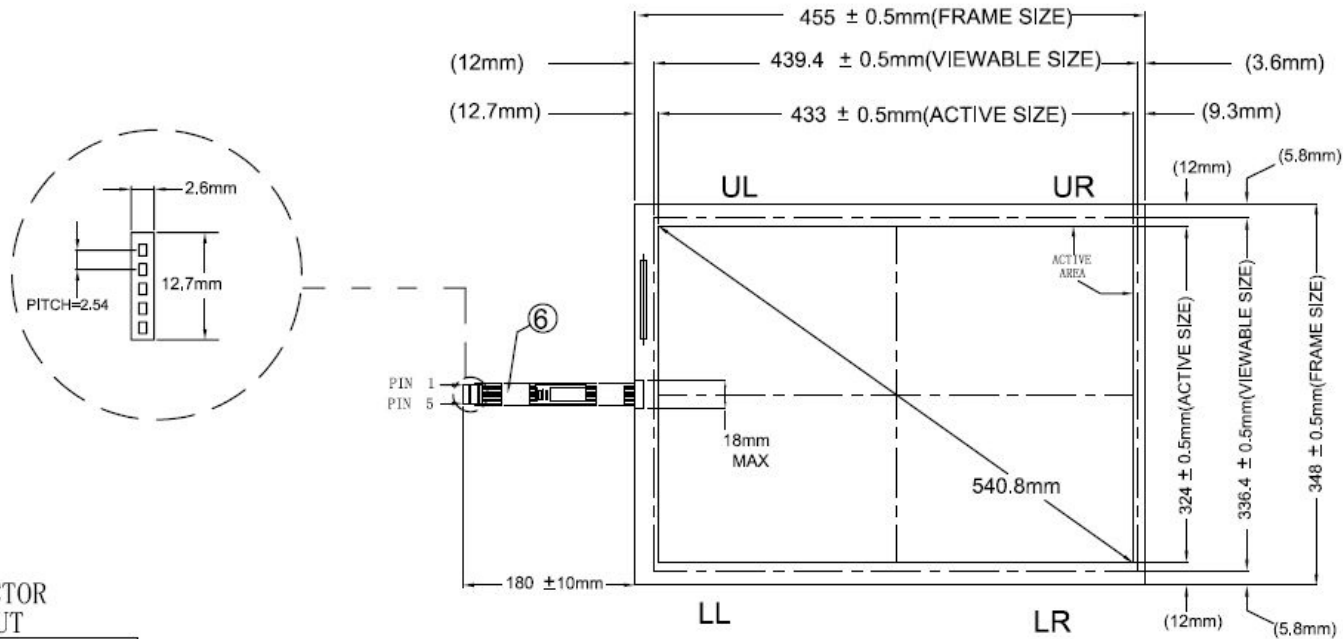
Be sure the cloth is slightly dampened, not wet. Never apply cleaner directly to the touch panel surface. Do not use a water based cleaning product.
Do not allow liquids to come into contact with the edges of the touch panel.

NOTE: The Hantouch USA Incoming Inspection Standard is part of this drawing. This quality and performance document can be viewed at: www.hantouchUSA.com, under Incoming Inspection Standards.

REV.MO.	REVISED	DATE	DRAWN	CHECKED	APPROVED
0	NEW DRAW				

NOTES:

1. ITO FILM TYPE: CLEAR FILM OR ANTI-GLARE FILM
2. GLASS THICKNESS TYPE: 1.1mm 1.8mm OR 2.8mm
3. FINISHED PART THICKNESS TYPE: 1.45mm 2.15mm OR 3.15mm
4. PANEL CABLE LENGHT TYPE: 100mm OR 180mm
5. CABLE IS ATTACHED TO THE LEFT SIDE OF TOUCHSCREEN AT CENTER POINT AS SHOWN
- ⑥. LABEL TO BE ATTACHED AT FRONT SIDE OF CABLE



CONNECTOR PINOUT

PIN NO.	DESIGNATION
1	UR
2	LR
3	Sense
4	UL
5	LL

RoHS Compliant

APPROVE	UNIT	mm	PROJECTION	DRAWING NO.	REV.
CHECKE	SCALE	NONE		AM-2135-F180	
DESIGN	Han touch USA Touch Screen Specialists			DESCRIPTION	SHEET
DRAW				21.3"	1/1

Terms and Conditions of Sale

1. **ACCEPTANCE**
THE SALES TERMS AND CONDITIONS OF SALE CONTAINED HEREIN APPLY TO ALL QUOTATIONS MADE AND PURCHASE ORDERS ACCEPTED BY HantouchUSA FOR THE PURCHASE AND SALE OF ELECTRONIC COMPONENTS PRODUCTS. SOME OF THE SALES TERMS AND CONDITIONS SET OUT HERE MAY DIFFER FROM THOSE IN CUSTOMER'S PURCHASE ORDER AND SOME MAY BE NEW. **THIS ACCEPTANCE IS CONDITIONAL ON CUSTOMER'S ASSENT TO THE SALES TERMS SET OUT HERE IN LIEU OF THOSE IN CUSTOMER'S PURCHASE ORDER.** HantouchUSA'S FAILURE TO OBJECT TO PROVISIONS CONTAINED IN ANY COMMUNICATION FROM CUSTOMER SHALL NOT BE SEEMED A WAIVER OF THE PROVISIONS OF THIS ACCEPTANCE. YOUR AGREEMENT WITH OUR TERMS AND CONDITIONS SHALL BE CONCLUSIVELY EVIDENCED BY YOUR ACCEPTANCE OF ANY SHIPMENT. ANY CHANGES IN THE SALES TERMS CONTAINED HEREIN MUST SPECIFICALLY BE AGREED TO IN WRITING BY AN AUTHORIZED OFFICIAL OF HantouchUSA BEFORE BECOMING BINDING ON EITHER HantouchUSA OR CUSTOMER. All Orders must be approved and accepted by HantouchUSA at its headquarters office in Lynnwood Washington.
2. **SPECIFICATIONS**
Unless different specifications are established and agreed to in writing, the specifications for the Products are the written specifications issued by HantouchUSA for the part number assigned by HantouchUSA to the Products. Customer's part numbers are used for reference only. HantouchUSA may, without affecting the obligations of Customer, make insignificant changes to the specifications of the Products from time to time.
3. **PRICES**
If Customer does not purchase the entire quantity upon which these prices were based, Customer will pay the higher price specified by HantouchUSA for the quantity actually purchased. Prices do not include taxes and any tax HantouchUSA may be required to collect or pay upon the sale, use or delivery of the Products will be paid by Customer upon invoice.
4. **PAYMENT**
Unless otherwise set forth on the face hereof payment Sales Terms are net 30 days from date of invoice with interest on all unpaid amounts at the rate of 1.5% per month or the highest lawful rate, whichever is less. HantouchUSA reserves a purchase money security interest in the Products delivered until all of HantouchUSA's claims have been paid. HantouchUSA may change these credit Sales Terms if Customer's financial condition changes. Each shipment shall be considered a separate and independent transaction.
5. **DELIVERY**
Delivery will be f.o.b. HantouchUSA's location and will occur when the Products are ready for pickup by the carrier. In the absence of specific instructions, HantouchUSA will select a carrier. HantouchUSA does not assume any liability for the shipment. Customer will be responsible for all transportation and insurance charges, including those associated with warranty repairs. Delivery dates set forth on the face hereof are estimates only. HantouchUSA will use its best efforts to deliver in accordance with these dates but will not be responsible for failure to deliver as estimated.
6. **INSPECTION**
Within 30 days after delivery Customer will inspect the Products and give written notice of rejection to HantouchUSA detailing the manner in which any Products do not conform to the specifications. Upon receiving authorization and shipping instructions from HantouchUSA, Customer may return rejected Products. If Customer retains the Products after their delivery without giving HantouchUSA such notice within the designated period, Customer will be deemed to have irrevocably accepted the Products. Customer's inspection and acceptance tests shall not exceed the inspection and test procedures customary in the industry for the Products and shall be at Customer's expense. HantouchUSA may charge to Customer any costs resulting from the testing, handling, and disposition of any Products returned by Customer which are not found by HantouchUSA to be non-conforming.
7. **WARRANTY**
HantouchUSA warrants to Customer that the Products will be free from defects in material and workmanship under normal use and service for a period of one year from the date of manufacture. Customer's exclusive remedy for breach of this warranty is that HantouchUSA will either (i) repair or replace, at its option, any Product which fails during the warranty period because of such defect (if Customer promptly reported the failure to HantouchUSA in writing) or, (ii) if HantouchUSA is unable to repair or replace, HantouchUSA will refund the purchase price of the Product upon its return to HantouchUSA. This warranty does not apply to any Product which has been subjected to misuse, abnormal service or handling, or which has been altered or modified in design or construction, or which has been serviced or repaired by anyone other than HantouchUSA. The warranties set forth herein are in lieu of, and exclusive of, all other warranties, express or implied. **ALL EXPRESS AND IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR USE AND FITNESS FOR A PARTICULAR PURPOSE ARE SPECIFICALLY EXCLUDED.**
8. **CANCELLATION AND RESCHEDULING**
ALL ORDERS ARE NON-CANCELABLE AND NON-RETURNABLE (NCNR). CUSTOMER MUST ACCEPT DELIVERY OF ALL ITEMS PLACED ON ORDER. All quantities must be released and shipments scheduled no more than 12 months from the date hereof. HantouchUSA may cancel this order or any portion in the event of Customer's default or a material adverse change in Customer's financial condition without affecting HantouchUSA's right and remedies. Except as otherwise provided herein orders accepted by HantouchUSA are firm and non-cancelable.
9. **CONTINGENCIES**
HantouchUSA shall not be responsible for any failure to perform due to unforeseen circumstances or to causes beyond HantouchUSA's reasonable control. Examples of such causes are acts of God, war, riot, embargoes, acts of civil or military authorities, fire, floods, accidents, strikes or shortages of transportation facilities, fuel, energy, labor or materials. HantouchUSA may defer delivery for a period equal to the delay caused by such contingency in the event of shortages for any reason whatsoever. HantouchUSA may allocate production among its customers.
10. **LIMITATION OF LIABILITY**
Liability of HantouchUSA to Customer, if any, under this contract for breach of contract or warranty, negligence or otherwise shall in no event exceed the total contract price specified herein less the purchase price of any items delivered and accepted hereunder. In no event shall HantouchUSA be liable to Customer or others for special, incidental or consequential damages for breach of any of the provisions of this contract, including without limitation, provisions regarding warranties, guaranties, indemnities, and patent infringement, or based upon any claims, demands, settlements, or lawsuits arising from or in connection with, the Products sold hereunder, such damages including, but not limited to, costs of removal and reinstallation of items, loss of good will, loss of profits, or loss of use. Customer assumes all liability for any and all damages arising from or in connection with, the use or misuse of the Products by Customer, its employees, or others.
11. **HIGH-RISK APPLICATIONS**
The Products have not been designed, manufactured, tested or qualified for use in any high-risk application (a "High-Risk Application"), including, but not limited to, the following: all military, life support or life sustaining, "medical device" as defined by applicable law, nuclear, vehicle control (including airplane, automotive, train and other vehicle) or any other application in which failure of the Product, or the product into which it is incorporated, could foreseeably result in personal injury, death, or significant property damage.
12. **GENERAL**
This is the complete and exclusive statement of the agreement between the parties and supersedes all prior agreements and communications about the subject matter. Neither this agreement nor individual transactions under it may be assigned by Customer without the prior written consent of HantouchUSA. Regardless of any disclosure made by Customer to HantouchUSA of an ultimate destination of the Products, Customer will not export, directly or indirectly, any Product without first obtaining all required licenses from appropriate government agencies.

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