IC Socket Technical Information. (Version 10)

(NQPACK/ YQPACK/ HQPACK/ YQSOCKET)

October 11, 2007

I Instruction for Use

(1) Mounting NQPACK on Target Board

1. Standard Type (When using NQ-GUIDE)

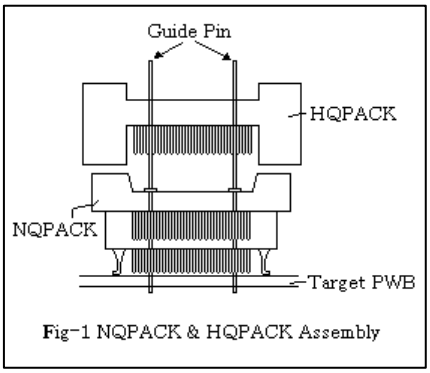


Fig-1 NQPACK & HQPACK Assembly

1-1 Insert the NQ-Guide pins, which enclosed in packing box with NQPACK to the holes on the NQPACK for precise positioning of NQPACK leads and foot pattern on Target board, as illustrated in **Fig-1**.
The non through holes are 1.0mm or 0.8mm in diameter.
When not using guide pins, refer to the item on page 2 that describes the use of positioning stickers.

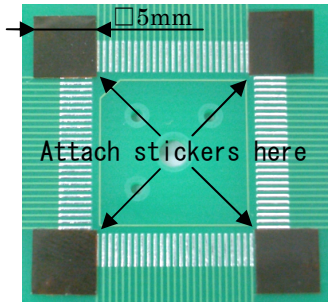
1-2 Solder NQPACK after HQPACK is assembled. This prevents leads of NQPACK from sticking flux or other sorts of dust.

・ Soldering Temperature; Manual Soldering: 350 ◦C for 5 seconds or less (1 pin) Reflow Soldering: 260 ◦C for 10 seconds or less

Note: Do not insert leads into flux bathe. Do not clean leads with steam.
Mounting with flow soldering is not possible for the NQPACK.

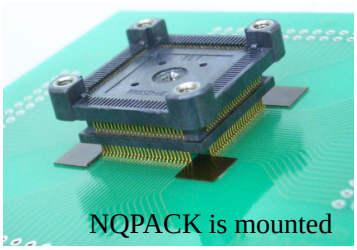
1-3 Remove the HQPACK and guide pins.

2. Standard Type (When using positioning stickers.)



2.1 The positioning stickers included with the NQPACK are used to help align the NQPACK with the foot pattern on the user board.

2.2 Peel off the positioning stickers, and use tweezers or a similar tool to align and attach the stickers to each corner of the foot pattern on the user board. When attaching, take care to align the stickers accurately with the foot pattern lines at each corner. It is sufficient just to align two diagonally opposite corners if there is not enough space on the board.



※ There are five positioning stickers on one sheet.
The five stickers (one is spare) on the sheet are made from polyimide, so they have sufficient heat resistance during solder mounting.

2.3 Gently place the NQPACK onto the foot pattern on the user board.
Make sure that the leads of the NQPACK and the foot pattern are aligned.

2.4 For manual soldering
Solder mounting is difficult to perform for pads near to the positioning stickers. We recommend that solder mounting be performed from the center.
When performing solder mounting on the four corners of a surface mounting pad, first peel off the positioning stickers and then perform the mounting.

・ Soldering Temperature; Manual Soldering: 350 ◦C for 5 seconds (1 pin)

2. SL Type

After soldering NQPACK leads on to a Target board, NQPACK-SL can be fixed firmly with a screw and a nut provided on the bottom, as illustrated under.

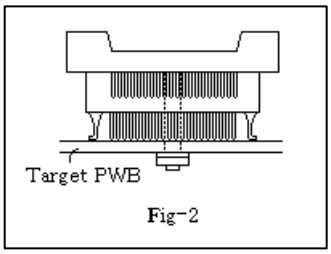


Fig-2

In case of external forces applied to NQPACK, we recommend NQPACK-SL type, fastening with screw and nut type. Mounting hole should be provided at the center of NQPACK. Please refer to product drawing for details on the hole. Tighten the NQPACK with nut from the other side of the PWB.
The whole sizes differ from IC packages. Refer to the individual specifications and technical drawing for details.

2-1 Drill a hole on PWB. The location of the hole is at the center of NQPACK. M1.4, M2 or M3 screws are available. Select the screw depending on IC size. For details, refer to the product drawing.
The soldering method and usage method for the positioning stickers are the same as for the standard type.

3. How to design PWB for NQPACK assembly.

3-1 The shape and sizes of NQPACK contact pin are same as those of IC lead. Therefore the same foot pattern for IC lead can be used for NQPACK. Recommended foot pattern are shown in the catalog.
If YQPACK is mounted on a big PWB, strong force will be applied to soldered portions of NQPACK lead. In this case, the bigger foot pattern should be used. (Please refer to applicable IC dimensions and sizes shown in the catalog.)

3-2 There are guide holes in the NQPACK for aligning it with the user board.
When using the guide, part holes must be made on the corresponding position of the board.
For details, refer to the individual drawings for the recommended foot pattern and Figure 1 that describes the NQPACK mounting.

Note : When there are no guide holes in the user board, refer to the item on page 2 that describes the use of positioning stickers.
When using the SL type, the washer section on the rear of the user board is a prohibited area for wiring.
For details, refer to the prohibited areas described in the individual drawings and technical materials.

(2) IC Package loading

1. Loading Procedures

1-1 Refer to the catalog. Please check whether IC package is suitable for NQPACK. Please contact us if you have any queries. Our Emulator connectors and sockets are developed for test or evaluation of systems only. So that the products are not approved by safety rules or EMI regulations in any countries.

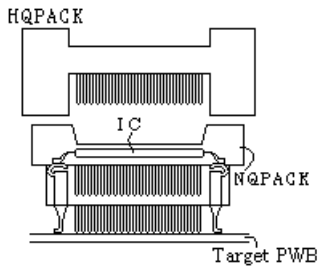


Fig-3 IC Package Installation

1-2 As shown in **Fig-3**, IC will be placed onto the HQPACK after NQPACK are soldered on Target board.

1-3 Use screws attached to HQPACK. There are 4 places to screw, (M2x6mm). Fasten HQPACK, IC and NQPACK, together.
Use the screwdriver included with the NQPACK or a torque screwdriver to tighten the four corners evenly and in sequence. The setting of torques screw driver is 0.054N·m（0.55kgf・cm）. Over-tightening can cause a conduction fault, so be careful if using a large screwdriver.
IC leads are held with NQPACK and HQPACK contact pins. IC leads are isolated with the plastic grooves around NQPACK, therefore IC leads will never touch adjacent leads.

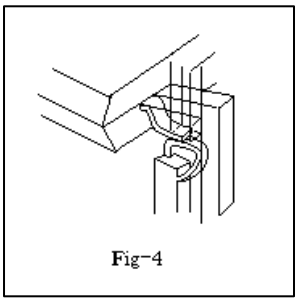


Fig-4

2. Precautions for use

2-1 Please check a broken or a bent leads of IC package by visual. Also check burrs of IC lead and mold by visual before IC package is built in NQPACK.

2-2 Please check a broken or a bent pins on HQPACK by visual before fixing HQPACK.
If a broken or a bent pins are found, please repair them with a knife or the likes of thin flat shape.

2-3 IC package can be built in between NQPACK and HQPACK. But this is allowed for test or evaluation purpose only.

(3) PWB assembly on YQPACK / YQSOCKET

1. Procedure

1-1 PWB should be soldered to YQPACK before YQPACK is assembled on NQPACK.

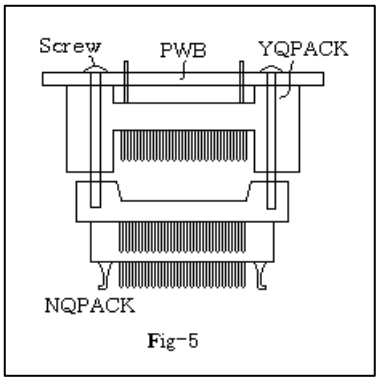


Fig-5

1-2 Check YQPACK leads are not damaged, before YQPACK and NQPACK are mated together and firmly locked by screws.
And also every time before insertion and extraction , please check leads are not damaged. Please repair damaged leads by a knife or the likes.

1-3 Four (4) holes are required at designated location for YQPACK installation. (See **Table-1**)
As shown **Fig-5**, YQPACK soldered with PWB is mated with NQPACK on a user board. Then YQPACK is mounted by the screws, M2 x 10mm, which is good for PWB thickness from 1.0mm to 2.0mm. Use the screwdriver included with the NQPACK or a torque screwdriver to tighten the four corners evenly and in sequence. The setting of torques screw driver is 0.054N·m（0.55kgf･cm）. Over-tightening can cause a conduction fault, so be careful if using a large screwdriver.

1-4 Screws, M2x10mm, is attached to YQPACK to fix it to NQPACK after soldering. (See **Fig-5**)

Note: IC package should not be built in between NQPACK and YQPACK.

1. Board design related to the fixing screws for NQPACK~YQPACK.

Table-1: Screw head vs. runner restricted area. [Unit: mm]

Flathead Screws	Guide hole diameter on PWB (4 places) (*1)	Runner restricted area in diameter	
		Underneath screw heads	Underneath washer(*2)
M2 x 10mm	ø2.4	ø4.4	ø4.8

(*1) Please refer drawing of YQPACK for guide hole in details.

(*2) Bigger sizes of flat and spring washer are used as standard.

2. YQPACK Lead Ends Details on Soldering Portion

Table-2 [Unit: mm]

Pitch	Pin cross section of YQPACK	Pin diagonal distance	Diameter of through hole on the PWB
0.4	0.20 x 0.3	0.36	ø0.45 or more
0.5～1.0	0.25 x 0.3	0.39	ø0.50 or more

(4) Stacking with YQSOCKET

(If the mating height should be 19.7 mm or higher)

1. As shown in **Fig-6**, NQPACK and YQPACK stacking on PWB is illustrated.
Distance between the top of user board and the bottom of PWB is 19.7 mm. The distance can be extended with additional YQSOCKET between PWB and YQPACK;
One YQSOCKET can extend the distance by 3.2 mm. After soldering NQPACK to a user board, YQPACK will be placed on NQPACK. NQPACK and YQPACK are stacked together with screws through YQGUIDE-S1 holes. The lower half of YQGUIDE-S1 provides threads for fixing NQPACK and YQPACK. The upper half helps blind mating to stack YQSOCKET onto YQPACK. YQSOCKET mates to YQPACK by means of YQGUIDE-S1.

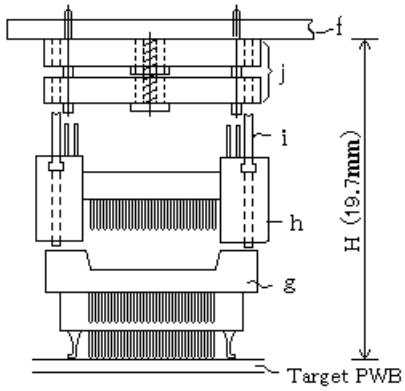


Fig-6 YQSOCKET Stacking

f:Emulator PWB
g:NQPACK
h:YQPACK
i:YQGUIDE-S1
j:YQSOCKET-F2 type

2. Multiple YQSOCKET stacking
As shown in **Fig-7**, YQSOCKET-F type should be used at the bottom for stacking directly on YQPACK. YQSOCKET-N type should be used in between Emulator PWB (f) and YQSOCKET-F. M2 or M3 screw firmly fixes together the total assembly.

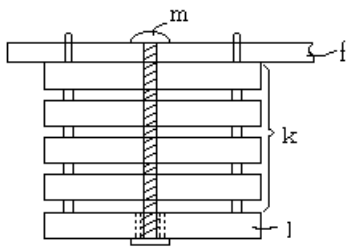


Fig-7 Multiple Stacking exchange

f:Emulator PWB
k:YQSOCKET-N type
l:YQSOCKET-F type
m:M2 or M3 type

3. Two YQSOCKET stacking
As shown in **Fig-6**, YQSOCKET-F2 types are fixed together with a hexagon socket set screw. Hole for the set screw is not necessary in Emulator PWB. But if three or more YQSOCKET are stacked, there must be a hole in Emulator PWB.

4. Single YQSOCKET stacking
As shown in **Fig-8**, single YQSOCKET is stacked on Emulator PWB. There must be a hole for YQGUIDE-S1. For details, refer to the individual drawings for the Recommended a PWB layout.

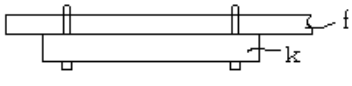


Fig-8 YQSOCKET Application example

f:Emulator PWB
k:YQSOCKET-N type

(5) Instruction for use on YQGUIDE-S1

1. YQGUIDE-S1 should be used as shown in **Fig-6** on page 5, when you stack NQPACK, YQPACK, and YQSOCKET. Over-tightening can cause a conduction fault, so be careful if using a large screwdriver.

* YQGUIDE-S1 is sold separately from YQSOCKET. 4 guide pins are packed in one plastic bag. But if you buy YQSOCKET-F2, YQ-Guide will be included.

Note:（ If mating and un-mating of YQPACK/YQSOCKET are done without YQGUIDE-S1, it will cause bent or loose pins of YQPACK.）

II YQPACK Application

(1) PWB and Ribbon Cable Connection

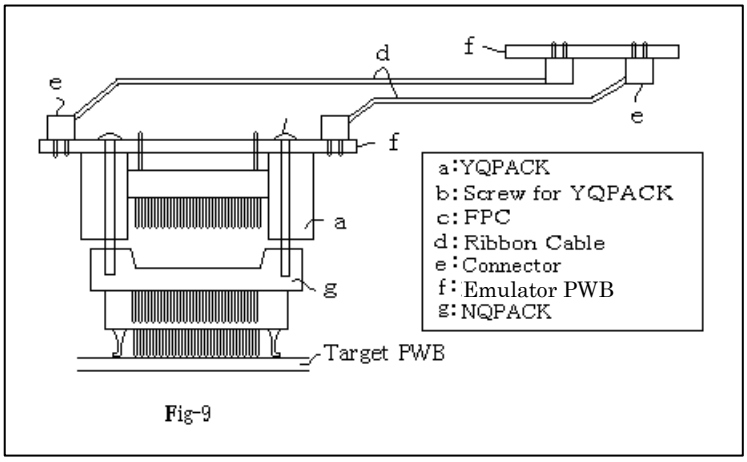


Fig-9

(2) FPC Connection

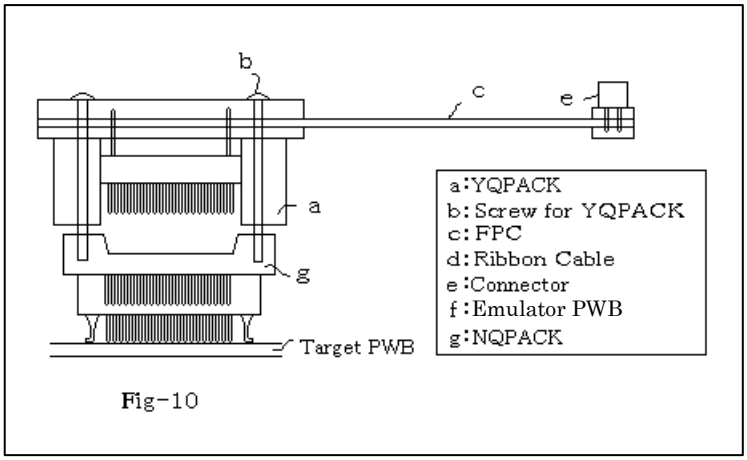


Fig-10

Note: PWB for YQPACK must have the screw holes for fixing NQPACK. Without the holes, NQPACK can not be fixed. Four (4) holes are required. For the further information, refer I· (3) ·1·1-3 at page 4.

Please contact us for consulting Emulator tool design and manufacturing. We are developing and manufacturing Emulator tool as well.

III Existing TQPACK and Emulator Tool Connection

Basically, the existing Emulator tools for TQPACK can be connected to NQPACK except a few exceptions. (There are some exceptions, call us for further information.)

1. Connection Procedures

1-1 Solder NQPACK (g) to Target board.

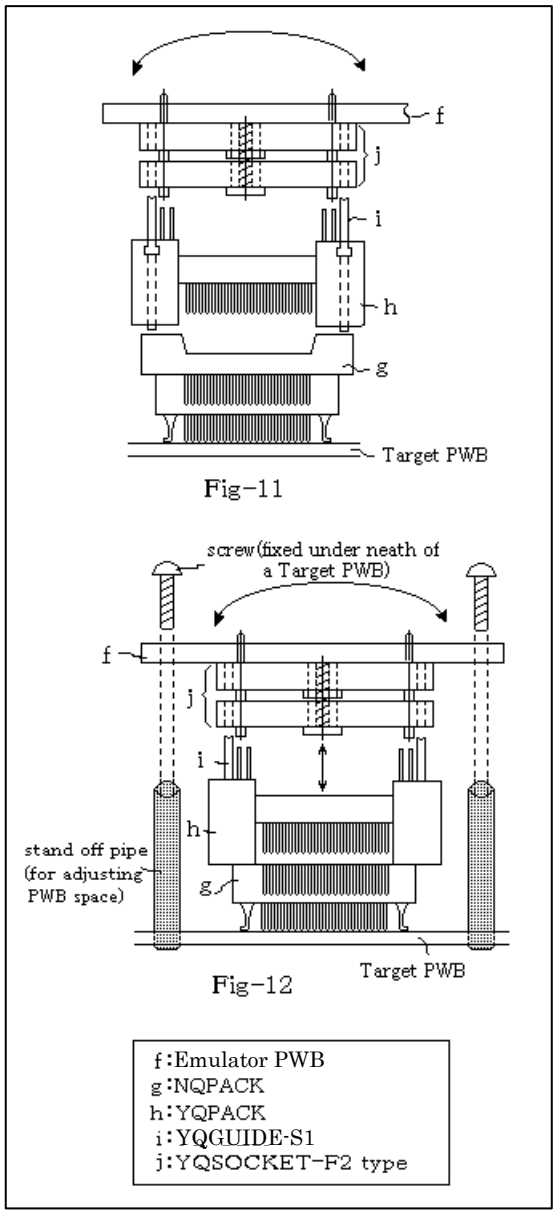
1-2 Mount YQPACK (h) on NQPACK.

1-3 YQPACK and NQPACK are screwed together with the lower portion of YQGUIDE-S1 pin, which are threaded. Tighten four screws on the corners equally with minus screwdriver. The setting of torques screw driver is 0.054N·m （0.55kgf･cm）.
Over-tightening can cause a conduction fault, so be careful if using a large screwdriver.

1-4 Solder YQSOCKET-F2 (j) (two YQSOCKET stacked) on Emulator PWB (f). When a TQSOCKET is already mounted on a emulator connection board, fit a YQSOCKET-F2 onto the TQSOCKET.

1-5 Mount YQSOCKET on YQPACK with upper portion of YQGUIDE-S1.

1-6 When withdraw Emulator tools, remove them gradually from 4 corners of YQSOCKET with minus screwdriver. As illustrated in **Fig-12**, it will cause bent or loose pins on YQPACK to withdraw a tool by twisting YQSOCKET. **Please hold NQPACK and YQPACK by fingers to prevent the soldered portions of a user board and YQPACK contact pins from stress, when withdraw a tool.**



It will cause a bent pin on YQPACK to withdraw YQSOCKET with twisting force, during extraction process of YQSOCKET and YQPACK. PWB fixed with YQSOCKET is big, and it might be withdrawn with twisting force, please follow instruction as illustrated right (**Fig-12**).

IV Connector Selection

You should choose Emulator connectors that can mate with a connector fixed on a tool. Please confirm the details with tool manufactures.

1. Example; Stacking connector, YQPACK, is fixed to a tool.

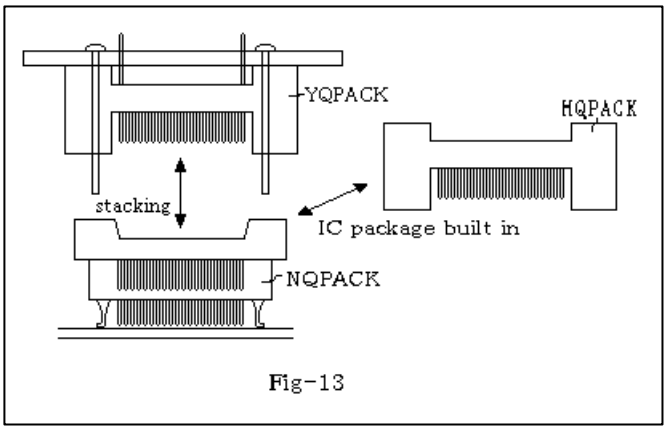


Fig-13

	Suitable Connectors
Emulator Connection	NQPACK, YQPACK
IC Built in	NQPACK, HQPACK

2. Example; Stacking connector, YQSOCKET, is fixed to a tool.

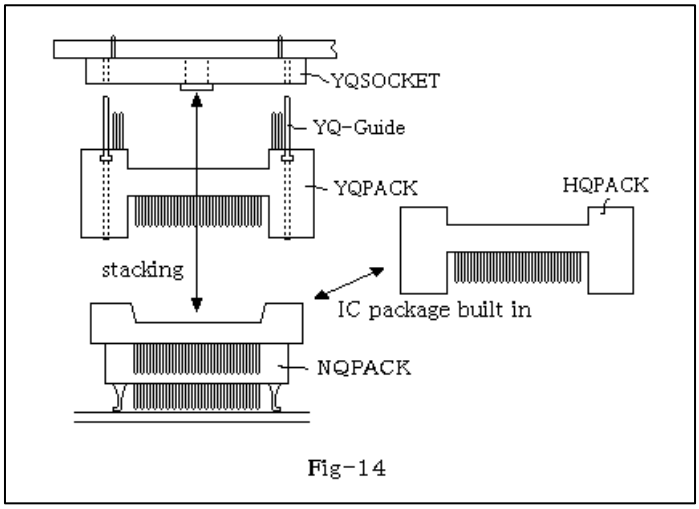


Fig-14

	Suitable Connectors
Emulator Connection	NQPACK, YQPACK, YQ-Guide, YQSOCKET
IC Built in	NQPACK, HQPACK

3. NQPACK, HQPACK, YQPACK Attachments

NQPACK

- NQ-Guide, 2 or 3 pcs. (Precise positioning of leads for soldering)
- Screw driver, one piece (for fixing HQPACK and NQPACK, or YQPACK and NQPACK)
- Positioning Stickers, one sheet (Five stickers on one strip)

HQPACK

- Screws M2x6 mm, 4 pcs. (for fixing HQPACK onto NQPACK)

YQPACK

- Screws M2x10 mm, 4 pcs. (for fixing YQPACK and NQPACK soldered on PWB)

V NQPACK Various Applications

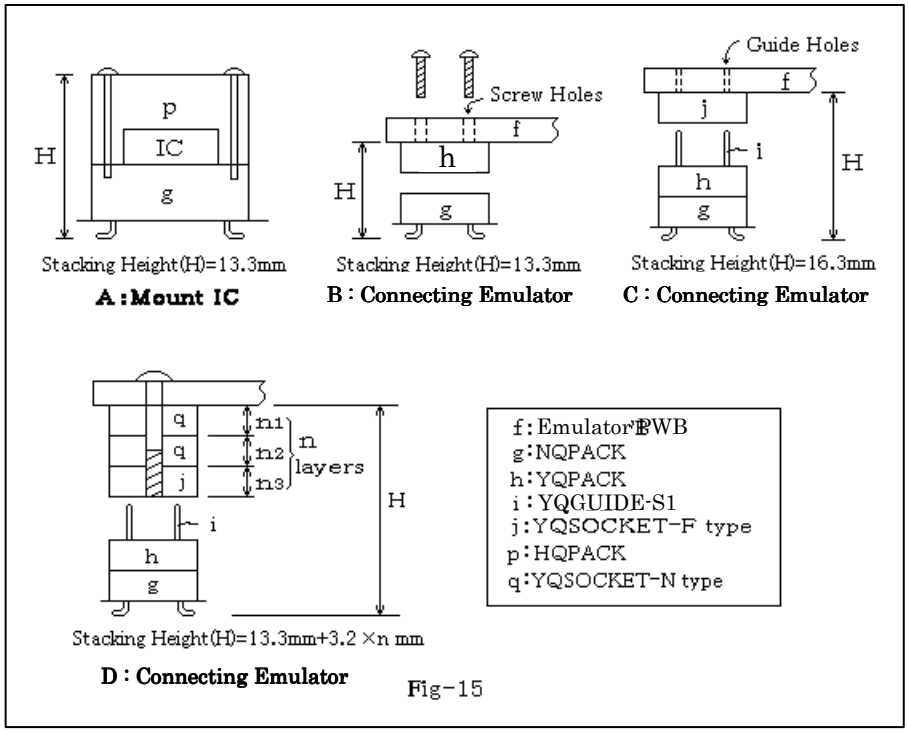


Fig-15

When higher space is required between Emulator and Target boards, the additional YQSOCKET will bridge the gap. The space of one YQSOCKET is 3.2mm in height.

YQSOCKET should be fixed to PWB with a screw as shown in **Fig-15 D:** YQSOCKET-F type should be used at the bottom. YQSOCKET-N type should be used in between PWB and YQSOCKET-F type.

Important Notes in Handling

NQPACK/HQPACK/YQPACK/YQSOCKET

1. Check the IC sizes whether NQPACK is fit for the IC package, for details refer to catalog.

2. When NQPACK/HQPACK/YQPACK are taken out of a packing box, press the product lightly by fingers and remove the packing material first. If the main body is removed first, the leads of the main body could make contact with the cushion material and be bent.

3. The YQSOCKET is packed in a polyethylene sheet. When removing it, be careful not to bend or break the pins.

4. Check mold burr around IC package by visual before place the package onto NQPACK. Please remove burr with a knife if you find it.

5. Do not mount an IC with bent leads, because it could negatively effect the NQPACK dividing walls or contact pins.
Check bent lead, and repair it if any before loading.

6. Tighten four screws on the corners equally with precision torque screw driver
(Phillips head tip #0 or 1).
The setting of torques screw driver is 0.054N·m（0.55kgf･cm）.
Over-tightening can cause a conduction fault, so be careful if using a large screwdriver.

7. YQPACK lead pins may be bent during YQPACK/YQSOCKET withdrawal. Use a slotted screwdriver to loosen little-by-little in the four locations.

8. 4 holes, 2.2mm in diameter, must be provided on PWB connected to YQPACK. Diameter of screw heads, 3.8mm or 4.3mm, should be runner restriction area.

9. HQPACK should be placed on NQPACK as a cover, which protects a flux splash during soldering process of NQPACK.

･ Soldering Temperature; Manual Soldering: 350 ◦C for 5 seconds or less (1 pin) Reflow Soldering: 260 ◦C for 10 seconds or less

* Mounting with flow soldering is not possible for the NQPACK.

10. Do not clean NQPACK, YQPACK, and YQSOCKET with steam. Do not immerse NQPACK, YQPACK, HQPACK, and YQSOCKET into flux, which are lead free products.

11. Cleaning material will contaminate inside of connector.

12. NQPACK, HQPACK, YQPACK, and YQSOCKET should be used for test application only. NQPACK, IC and YQPACK cannot be used in combination.

13. Stacking of NQPACK, IC package, and HQPACK and that of NQPACK and YQPACK are not being allowed for vibration and shock environments.

14. If the flat head screw in the center of the NQPACK is loosened or removed, the product warranty will no longer be valid.

15. NQPACK/YQPACK/HQPACK are developed for test application only. The connectors are not approved by safety rules or EMI regulations in any countries.

16. NQPACK, YQPACK, HQPACK and YQSOCKET are in compliance with RoHS.

VI Technical Data and Specifications of NQPACK series

* NQPACK/ YQPACK/ HQPACK/ YQSOCKET Specifications

1. Materials

1-1 Contact:

Table-3

		NQPACK	YQPACK		HQPACK
			0.4mm pitch	0.5mm pitch	
Metal		Copper Alloy	Copper Alloy	Copper Alloy	Copper Alloy
Under Coating	Base	Ni	Ni		Ni
Plating	Surface	Au	Au		Au

1-2 Molds :
Liquid Crystal Polymer (Filled glass fiber : UL94V-0)

1-3… YQSOCKET :
Outer sleeve : Copper Alloy , Au plating over Ni plating.
Inner contact : Copper Alloy , Au plating over Ni plating.
Insulator :FR-4(Filled glass fiber : UL94V-0)

- Soldering Temperature; Manual Soldering:
  350 °C for 5 seconds or less (1 pin)
  Flow Soldering:
  260 °C for 10 seconds or less

2. Characteristic

2-1 Contact Resistance :
NQPACK-IC (Mated with HQPACK) ; 70mΩ/pin or less
NQPACK-YQPACK ; 70 mΩ/pin or less
YQPACK-YQSOCKET ; 70 mΩ/pin or less

2-2 Withstand Voltage :
100V AC for one minute

2-3 Insulation Resistance :
500MΩ Min at 100V DC

2-4 Rating Current :
0.5 A /pin or less

2-5 Operating Temperature :
-25°C to +85°C

3. Insertion and Withdrawal Force

3-1 Withdrawal Force between YQPACK-YQSOCKET ; 60 g/pin or less
Insertion Force between YQPACK-YQSOCKET ; 10 g /pin or more

3-2 Contact Life :

NQPACK-IC (Mated with HQPACK)
NQPACK-YQPACK
YQPACK-YQSOCKET
} 100 times.

4. Soldering

4-1 Soldering Temperature:

Reflow: 260 °C for 10 seconds or less
Manual soldering: 350 °C for 5 seconds or less
* Mounting with flow soldering is not possible for the NQPACK.

* NQPACK Characteristics

1. NQPACK contacts and leads (reliability against heat and humidity)

Table-4 [Unit: mΩ]

	Temperature							
	150°C				60°C, 90 %Rh			
Test hours	$\bar{X}$	σ	X Max.	X Min.	$\bar{X}$	σ	X Max.	X Min.
Initial	16.36	3.46	21	11	16.79	3.45	22	11
240 Hours	16.74	3.29	21	13	16.83	3.47	22	11
360 Hours	16.98	3.30	20	13	16.86	3.48	21	11

Measurement Method: The contact resistance between the pins of NQPACK120SE-IClead-HQPACK120SE is measured under normal room temperature.

Test Points: n = 28(lines) x 3(connectors)

Measurement Equipment: HP 4338A milli-ohm meter

o:PWB
p:Test Pin
q:HQPACK120SE
r:HQPACK120SE Pin
s:NQPACK120SE
t:NQPACK120SE Contact Pin

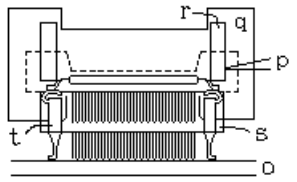


Fig-16

2. NQPACK –YQPACK Durability

Table-5 [Unit: mΩ]

	Test Data			
	Contact Resistance			
Life Test Cycle	$\bar{X}$	σ	X Max.	X Min.
Initial	18.69	3.35	23	13
5	22.30	2.31	25	18
10	23.86	2.38	27	19
50	25.09	2.54	29	21
100	26.12	3.10	30	21
150	27.09	3.35	32	21
200	27.93	2.29	32	23
300	29.63	2.56	34	25
400	31.83	2.75	38	24
500	33.18	3.52	42	27

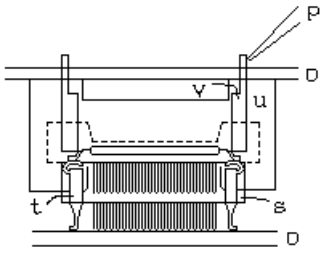


Fig-17

o:PWB
p:Test Pin
s:NQPACK120SE
t:NQPACK120SE Contact Pin
u:YQPACK120SE
v:YQPACK120SE Contact Pin

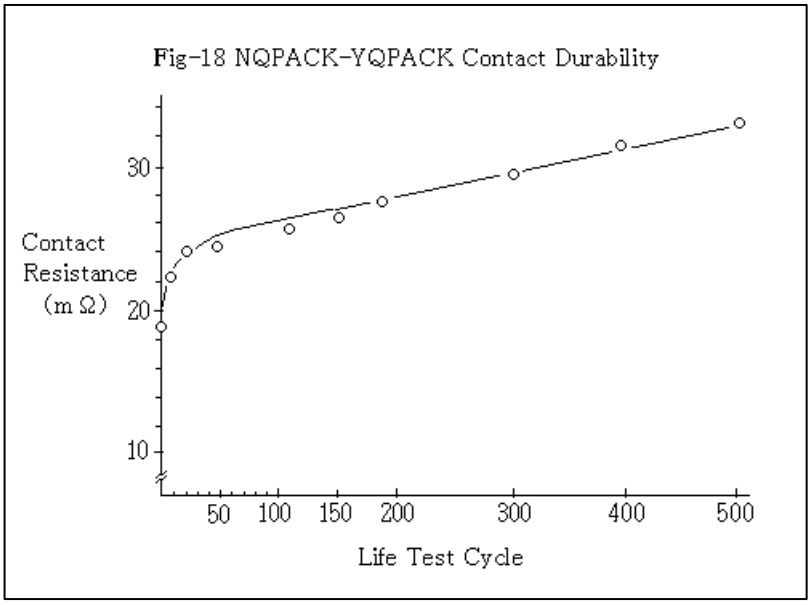
Measurement Condition: Test was made under normal room temperature.

Contact resistance(X) is calculated by formula shown under ;

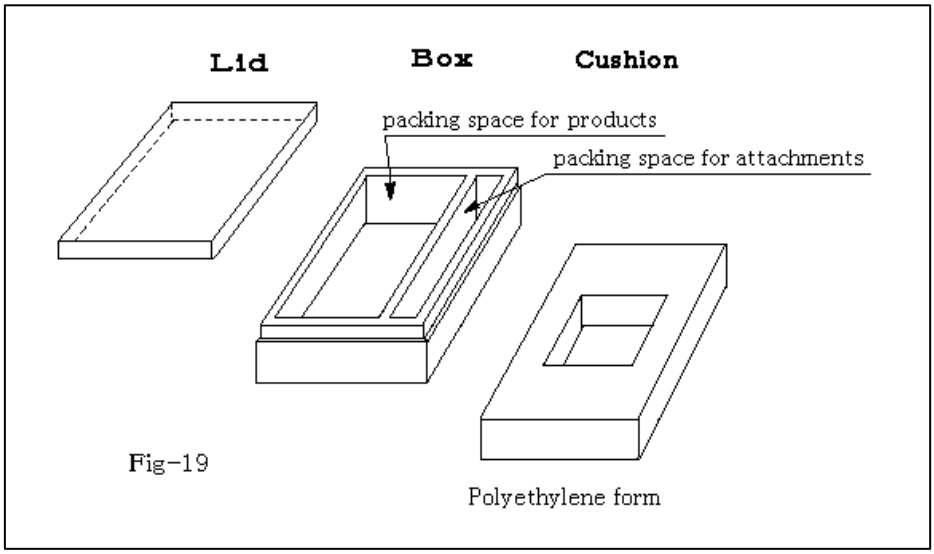
X= (Resistance between PWB-NQPACK120SE-YQPACK120SE) – (YQPACK Pin Resistance, 43.6 mΩ)

Measurement Location: n = 32(lines) x 3(connectors)

Measurement Equipment: HP 4338A milli-ohm meter



VII NQPACK/HQPACK/YQPACK Individual Packing Box



Note : The case is made from environmentally-friendly biodegradable resin. As the case may deform if exposed to temperatures of 50°C or higher, please store in a location that will remain below 40°C and is not exposed to direct sunlight.