

# **JET-300**

## **Operational Manual**

Windows version

**JET TECHNOLOGY CO.,LTD.**

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## **CHAPTER 1. PREFACE**

JET-300 is a high speed, high performance and economical In-Circuit-tester, it tests electronic components in a loaded PCB, such as resistors, capacitors, inductors, diodes, transistors and ICs..... It detects and locates most faults on a loaded board, like open/short circuit, missing parts, wrong parts, improper part insertion.....

JET-300 also provides many valuable reports (including daily reports, monthly reports and statistic histogram reports, .....), which are of great help to production process control and quality control.

## CHAPTER 2. TEST METHOD AND THEORY

### 2-1 Guarding

Guarding is a unique technique of in-circuit-tester, which is used to isolate the device under test from the circuitry, as shown below:

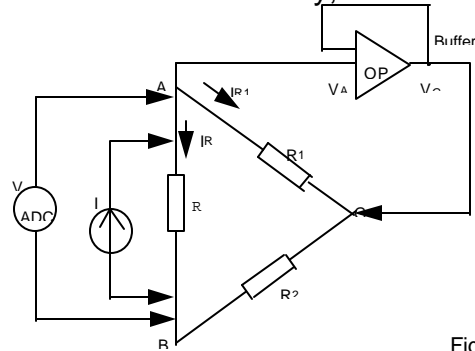


Fig.1

$$V_G = V_A \quad I_{R1} = 0 \quad I_R = I_i$$

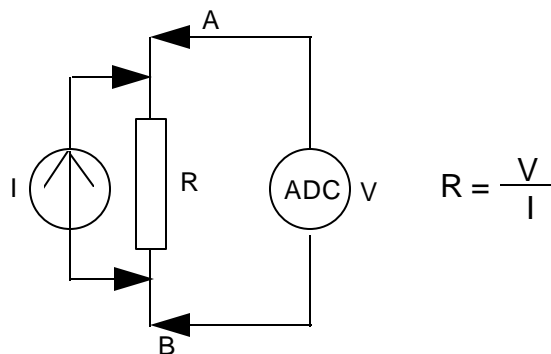
$$I_R = \frac{V}{R}$$

By guarding the point G, Resistor R can be measured correctly without the influence of R1 and R2.

JET-300 selects guard points automatically. Up to 10 guard points can be used for a test step.

### 2-2 Resistor test

#### 2-2-1 Constant current mode (MODE D1,D2)



Normally mode D1 is used to test resistor, system will choose proper constant current source automatically according to the value of the resistor under test.

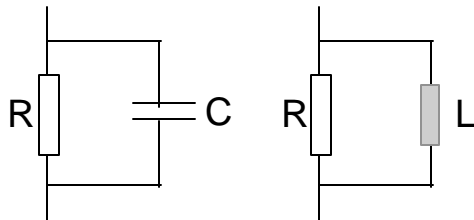
### 2-2-2 Constant Voltage mode (mode “CV”)

When a resistor under test is paralleled with a large capacitor, using constant current mode need a long time to charge the capacitor, constant voltage mode can be used to shorten the test time. The constant voltage in use is 100 mv.

### 2-2-3 Constant Voltage mode (mode “V5”)

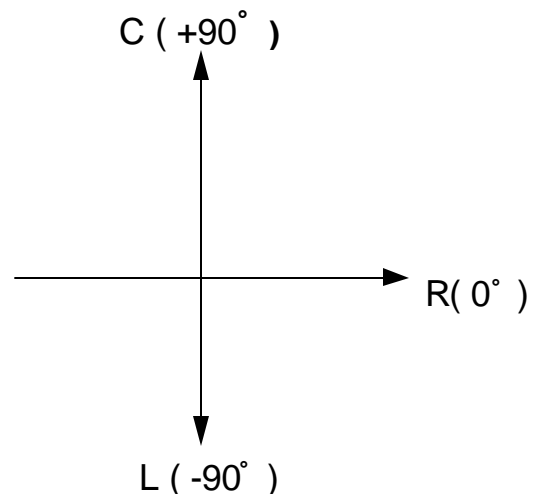
The same test as “C V” mode. But the constant voltage in use is 50 mv instead of 100 mv.

### 2-2-4 Phase measurement mode (MODE P1, P2, P3, P4, P5)



Sometimes when a resistor and capacitor or an inductor are paralleled, the resistor can not be measured correctly with constant current mode, but it can be measured with phase measurement mode, it uses an AC signal and measures phase angle between voltage wave form and current wave form on the paralleled circuit.

Following is the phase angle of current of R.C.L. (suppose the phase of voltage wave form is 0°)



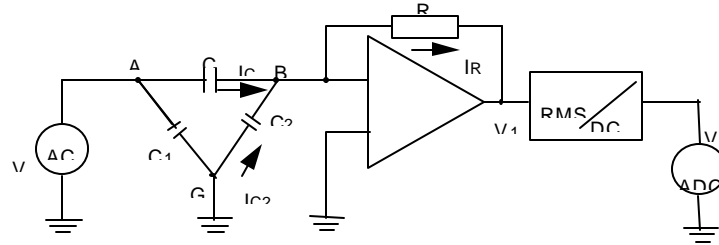
Phase measurement has five kinds of signal sources: 100KHz, 1KHz, 10KHz, 100KHz and 1MHz. AC signals for mode P1, P2, P3, P4 and P5

## 2-3 Capacitor test

### 2-3-1 AC constant voltage source (ACVS) (MODE A1,A2,A3,A4,A5)

Use AC constant voltage source to test capacitance of capacitor.

Following is guarding and measuring circuit for ACV mode test



$$i \hat{I}_{C2} = 0, \quad V_1 = V_0$$

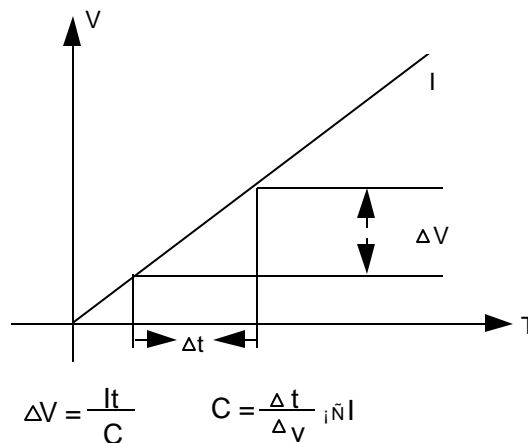
$$i \ddot{I}_C = I_R$$

$$i \ddot{X}_C = \frac{-V_v R}{V_0} \quad C = \frac{V_0}{V} \times \frac{1}{WR}$$

ACVS measurement has five kinds of AC signal : 100Hz, 1KHz,10KHz, 100KHz and 1MHz for five t4st modes A1,A2,A3,A4,A5.

### 2-3-2 DC constant current source measurement (MODE DC)

When capacitance is larger than 3uF. This test mode should be used. System sets constant current to 0.5mA or 5mA according to the capacitance of the capacitor under test. The constant current is used to charge the C.U.T. for a certain time(.t) and then measure the voltage drop on the C.U.T.(.V).





### 2-3-3 Phase measurement (MODE P1,P2,P3,P4,P5)

It is used to measure a capacitor in a RC parallel circuit, based on the same theory as phase measurement for resistor (refer to 2-2-2)

## 2-4 Inductor test

### 2-4-1 AC Constant Voltage Source (MODE A1, A2, A3, A4, A5)

Similar to capacitor ACVS test modes.

### 2-4-2 Phase measurement (MODE P1, P2, P3, P4, P5)

Same as phase measurement of capacitor.(refer to 2-3-3)

## 2-5 Diode test :

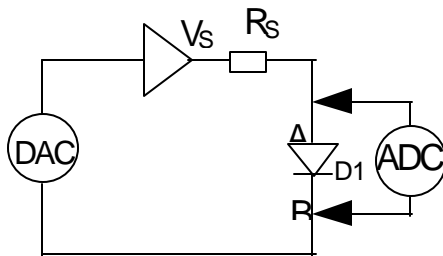


FIG.A

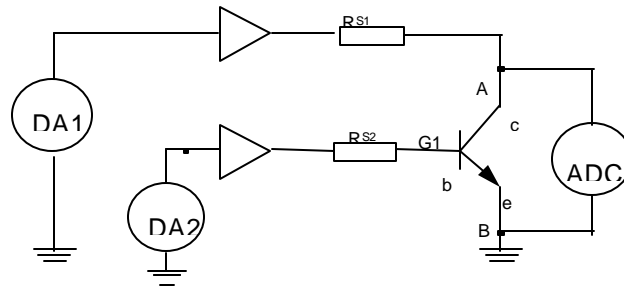
Fig A is the measurement circuit for forward bias of a diode.

Following is the test program for diode test.

STEP	DEVICE	LC	STDVAL	ACTUAL	+%	-%	MD	RG	DLY	A	B	G1	G2...
	D1		0	0.7V	20	20	DT	0	0	1	2		

When the unit of Actual value is "V". and standard value in STDVAL is "0", System will run diode test and use 2.2 volts voltage source (VS).

## 2-6 Transistor 3-terminal mode test ( mode “N”, ”P”)



Following is a sample test program.

(suppose Transistor is NPN type, and C.B.E. pin are 1,2,3)

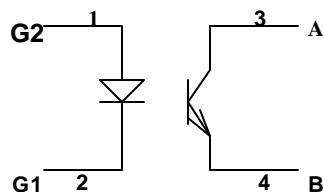
STEP	DEVICE	LC	STDVAL	ACTUAL	+%	-%	MD	RG	DLY	A	B	G1	G2...
15	Q1	C3	0.2V	1V	10	50	N	0	0	1	3	2	

Actual value is 1V, which is DAC output voltage. Standard value is 0.2V, Which is Vce value expected.

If the Transistor is PNP type then the program will become:

...	STDval	ACTval ..	MD ...	A	B	G1	G2.
	0.2V	4V P		1	3	2	

### 2-6-1 Photo transistor Test



Following is sample test program

STEP	DEVICE	LC	STDVAL	ACTUAL	+%	-%	MD	RG	DLY	A	B	G1	G2...
16	PT1	C4	0.5V	3V	30	30	N	0	0	3	4	2	1

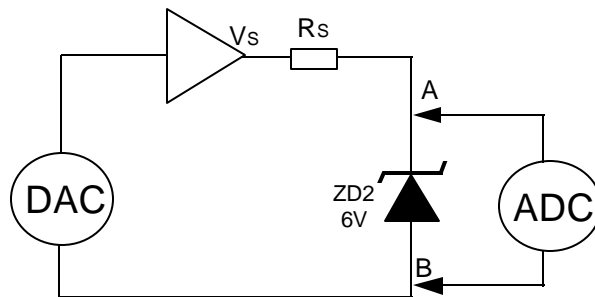
## 2-7 Voltage Test

### 2-7-1 Low voltage Test (Mode LV)

Low Voltage test is used to test diode, IC, or voltage measurement.

Following is a sample program for zener diode (suppose anode is pin 5, Cathode is pin 6)

STEP	DEVICE	LC	STDVAL	ACTUAL	+	-	MD	RG	DLY	A	B	G1	G2...
	ZD2	A1	6	9V	10	10	LV	0	0	6	5		



Note : When unit of ACTUAL is "V" and STDVAL is not "0", DAC will supply a voltage according to Actual value ( $V_s=9V$ ). Voltage measured from two end of the zener diode should be 6V.

### 2-7-2 High Voltage Test (MODE HV)

LV mode test is limited to use test voltage up to 10V only. If a test need to use test signal higher than 10 Volt DC, High Voltage test mode has to be taken. The HV mode test can use test voltage up to 50 Volt.

Following is a sample program.

STEP	DEVICE	LC	STDval	ACTval	+	-	MD	GR	DLY	A	B	G1	G2...
	ZD3	A1	24	27V	10	10	HV	0	7	9	4		

## 2-8 IC Clamping Diode Test

IC clamping diode test is to test between VCC pin or GND pin and all other pins to check clamping diode, or to test between every two IC pins to check diode junctions, IC clamping diode test program is generated by learning a good board.

Before IC program, "IC's pin" command should be used to key-in probe numbers of all pins of all Ics in an IC's pin table, and define the Vcc pin and GND pin (refer to 6-7-2).

The procedure of IC clamping diode Learning is as the following :

Select Edit component command and get the component Editor picture, then press .Alt+.I.keys, the screen will display :

( To go with IC SCAN learning?)

Yes or No

If Learning with IC SCAN only is wanted, press.Y..otherwise press.ENTER., the screen will display:

(Adjacent pin learn?)

Yes or No

If Adjacent pin Learning is not wanted press .N..otherwise press .ENTER..

If the new program generated to be appended to the last step of the current program is acceptable, press .ENTER., or key-in a new start step number you want , then press .ENTER., the screen will display :

(Actual Value?) 2.2V

← Accepts, Esc exits

If 2.2V for ACTual value is acceptable, press.ENTER., or key-in a new ACTual value, then press .ENTER.,system will now start the IC claming diode test program automatically, following is a sample program :

STEP	DEVICE	LC	STDval	ACTval	+%	-%	MD	RG	DLY	A	B	G1	G2...
	U1:14.16		0.7	2.2V	20	20	LV	0	0	15	20		

Assume the 14<sup>th</sup> pin of U1 is pin 15 and the 16<sup>th</sup> pin of VCC pin is pin 20.

## 2-9 Open/Short TEST

### 2-9-1 Learning Short Pin Group Table:

Open/Short Test data can be obtained by learning a good board under test system will measure the resistance between every two Test points then and generates a short pin group table as follows:

Short Group :

Short Group 1 : <15 20 17 85 >

Short Group 2 : <23 51 62 >

Short Group 3 : <36 41>

Short Group 4 : <38 92 >

The table above shows that pin 15,20,17,85 are short together and pin 23,51,62 are short together.....etc.20 ohm is the threshold value used to judge if two points are short.

### 2-9-2 Open/Short Test has two parts : Open Test and Short Test.

“Short Test” tests any of two points which do not belong to any Short Pin Group .

10 ohm is the threshold value used to judge, so if the value between the two points is less than 10 ohm then judge as “Short Fail”

“Open Test” tests any of two points which belong to a Short Pin Group. 80 ohm is the threshold value used to judge, so if the value between the two points is higher than 80 ohm then judge as “Open Fail”.

## 2-10 Jumper Test

Jumper Test uses the same test circuit as Open /Short Test. The output result shows only four value which are 1. 2 .3.4 the definition of the four values mentioned below :(unit :JP)

.JP .. 10 ohm  
.JP . . 10 ohm. . 20 ohm  
.JP . . 20 ohm. . 80 ohm  
.JP . . 80 ohm

## 2-11 HP TestJet Technology Option

Hp TestJet Technology is developed by Hewlett Packard company to detect the solder open defect of SMD IC, JET-300 is authorized to use this new technology. HP TestJet Technology does the test by placing a sensor plate on the top of IC under test, then measure the capacitance existing in between IC's pin frame and the copper foil of the sensor plate.

Refer to the drawing page. A 200mv 10KHz signal is fed to the pc board under test, passing through the IC's pin, C frame (capacitance between IC pin frame and sensor plate ) Amp / Buffer, MUX card, then be detected by TestJet card in the system. If the IC pin is not connected well to pc board, the 10KHz signal will not be detected, then judge as "Open Fail".

The TestJet test program is generated by learning a good board under test.

Followings are the procedures to generate TestJet test program :

1. Assign TestJet port number in IC's pin table (press "F10" key to turn p# field to become TestJet port number field ).
2. Select component Editor function, then press .Alt.+X..system will start TestJet learning and generate a TestJet program appending to the last step of current program. Following is a sample program :

STEP	DEVICE	LC	STDval	ACTval	+%	-%	MD	RG	DLY	A	B	G1	G2.
1123	U15:3	B1	0	3 mV50	50	TJ	0	0	31	4			

The above sample program tells that pin 3 of IC 15 is under test, the Probe number is 31 (defined in A field ), the TestJet port number is 4 (defined in B field), the signal detected is 3 mV.

. Note : If the detected signal level is less than 1 mV this step will be skipped.

## 2-12 IC SCAN

IC scan is a new technology developed by Jet Technology to detect poor solder or solder open problem of an IC pin. The new Technology uses three pins (The pin under test and a bias pin and GND pin) to do the test instead of two pins, thus can overcome the biggest problem of clamping diode test , clamping diode test can not detect the open defect of an IC pin which is connected to another. IC pin and if both IC pins are having a clamping diode. IC scan Test program is generated by learning a good board under test.

Followings are procedures of IC scan learning :

1. Enter the component Editor function, and press.Alt.+W..

screen display will be shown :

Learning Single Chip?      No
-------------------------------

If only one IC is to be learn press.Y..screen display will be shown :

(Device) :
------------

Key-in the IC number and.Enter..

System will start to do IC scan learning and generate test program automatically, following is a sample program :

STEP	DEVICE	LC	STDval	ACTval	+	-	MD	RG	DLY	A	B	G1.
1248	U19:12.91	B6	0	6.12mV	50	50	IS	0	0	87	140	0....

Above sample program shows that test pin 12 of IC U19 (Probe No. is 87)is under test and auxiliary test pin is pin 91of IC U19 (probe No. is 140) is under test, the test value be learn is 6.12 mA.

. If the test value learned is less than 1 mA , this step will be skipped.



. Benefits of IC scan Technology :

- 1.Lower cost, no need of overhead sensor.
- 2.In cases of IC is underneath another IC or IC with head sink are able to be tested .No space limitation.
- 3.BGA type, IC can be tested
- 4.Defects like bonding wire open or output stage burn out are detectable.
5. Poor soldering of an IC pin can be detected.

## CHAPTER 3. SPECIFICATION

### 3-1 System specification

Item	Type	Specification
AC power source	Voltage Frequency Power consumption	110V (+/-10%).120. 220. 240. 60Hz / 50Hz. 250VA MAX.
Environment	Temperature humidity	5.50.. 20.80%.
Weight		About 300 Kg (including press unit )
Dimension		1000mm(W)*700mm(D)*1600mm(H).
Number of pins	Standard maximum	320 pins 2048 pins 4096 pins option
Computer		Personal Computer. VGA Monitor.Hard Disk.

### 3-2 OPEN/SHORT specification

Item	Type	Specification
Threshold	Learn Test short Test open	20 ohm . 10 ohm . 80 ohm
Measure voltage		0.1 V
Measure current		5mA Constant current
Measure time		2 mS/pin average

### 3-3 Component test specification

Item	Type	specification
Resistance (MODE D1,D2)	Range  Guarding Measure current Measure time Delay time	1.0 ohm. 40M ohm ( 0.1 ohm resolution) 10 points maximum/step 0.1uA . 50mA 5mS . 15mS 5mS . 1900mS
Resistance (MODE V5)	Range  Guarding Measure voltage Measure time Delay time	30 ohm. 40M ohm (1.0 ohm resolution) 10 points maximum /step 50mV DC 10mS . 30mS 10mS . 1900mS
Resistance (MODE CV)	Range  Guarding Measure voltage Measure time Delay time	30 ohm. 40M ohm ( 1.0 ohm resolution) 10 points maximum/step 100mV DC 10mS . 30mS 10mS . 1900mS
Resistance (MODE P1,P2,P3,P4,P5)	Range Guarding Measure voltage  Measure time Delay time	1 ohm . 40M ohm 10 points maximum/step 100mV(rms.)/100Hz,1KHz,10KHz, 100KHz,1MHz 10mS . 30mS 10mS . 1900mS
Capacitance (MODE A1,A2,A3,A4,A5)	Range  Guarding Measure voltage  Measure time Delay time	1pF . 400uF (0.1pF resolution)  10 points maximum/step 100mV(rms.)/100Hz,1KHz,10KHz,1 00KHz,1MHz 10mS.30mS 10mS . 1900mS

Capacitance (MODE DC)	Range  Guarding Measure current Measure time Delay time	3uF . 40000Uf (0.001uF resolution) 10 points maximum/step 0.5mA~50mA 10mS . 100mS 10mS . 1900mS
Capacitance (MODE P1,P2,P3,P4,P5 )	Range  Guarding Measure voltage  Measure time Delay time	1pF . 400uF (0.1pF resolution) 10 points maximum/step 100mV(rms.)/100 Hz.1KHz. 10KHz.100KHz.1MHz 10mS . 30mS 10mS . 1900mS
Inductance (MODE AC)	Range  Guarding Measure voltage  Measure time Delay time	1uH . 40H (0.1uH resolution) 10 points maximum/step 100mV(rms.) /100Hz.1KHz. 10KHz.100KHz.1MHz 10mS . 30mS 10mS . 1900mS
Induction (MODE PHASE)	Range Guarding Measure voltage  Measure time Delay time	1uH . 40H(0.1uH resolution) 10 points maximum/step 100mA(rms.)/100Hz, 1KHz, 10KHz, 100KHz, 1MHz 10mS . 30mS 10mS . 1900mS
Diode	Range Grading Measure current Measure time Delay time	0.01V .50V (0.01V resolution) 10 points maximum/step 100mA approx. 10mS 10mS . 1900mS
Transistor	Range Bias voltage Measure time Delay time	0.01V . 5V (0.01 resolution) 0 . 5V 10mS 10mS . 1900mS
Function	Range Bias voltage Measure current Measure time Delay time	0.01V .100V (0.01V resolution) 0.01 .50V 50mA max 10ms .100ms 10ms .1900ms

IC	Learn Bias voltage Measure current Measure time	IC CLAMPING DIODE learning program clamping diode auto 1.0.10V(changeable) 100mA max 5ms
Jumper	Threshold Measure voltage Measure current Measure time	Can set up 0. 1V 5mA fixed current 1 ms

### 3-4 Press Down Unit specification

Item	Specification
Cylinder	125mmD*200mmL(Optional)
Solenoid valve	5/3-way with neutral position opened
Compressed air	5 . 8 Kg/cm <sup>2</sup>
Pressure	470 Kg
Fixture dimension	480mm*350mm Max
Dimension	600mmW*450mmD*950mmH
Weight	130 Kg approx.

## CHAPTER 4. FILING SYSTEM DESCRIPTION

JET300 ICT system software runs under Microsoft Windows operating system. All files of JET300 ICT are stored in JET directory of path : C:\Program Files\WinJet\JET300NW.

### 4-1. JET 300NW Installation

1. Insert the first disk of JET300NW ( Totally 5 ) and execute "Setup.exe"
2. Select the path of the installation, the configured one : C:\Program Files\WinJet\JET300nW
3. Select the clipper, the configured one : "Jet\JET300nW"
4. Make all the confirms done and start the installation. Switch the disk according to the reminder on the screen.
5. Press "Finish" to complete the installation process

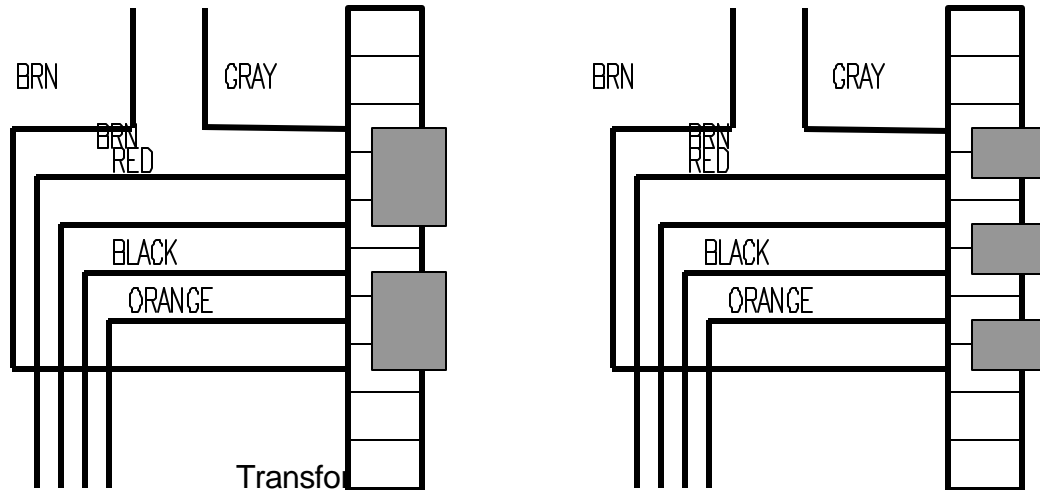
### 4-2. JET300nW Related Program Introduction

1. JET300N.EXE . System main program.
2. JET300N.CFG . Data file containing system parameters, including Status Table and Pass word.
3. JET300A.DAT . A self-check test program
4. \*\*.DAT . Every test type of PCB is tested with an UUT program file. It contains all information about the board. The format of file name should follow the regulation of MS-Windows; the extension is DAT.
5. \*\*.HIS . A Histogram Report File for every test board .
6. \*\*.RIS . A Retest Histogram Report File for every test board.
7. \*\*.RPT . A type of board under test has a Report file, containing Total Report and Histogram Report. This file is an ASCH II file.
8. \*\*.RPR . A Retest Report File for every test board.
9. \*\*.MSG . Fail message file. When printer in status table is set to "No", this file will be generated.
10. \*\*.TV . Test value file.
11. \*\*.Px . Monthly report file.x = 01, 02, 03,.. 12.x stands for month.
12. \*\*.Rx . Monthly report file for retest.
13. \*\*.PIN . This is a file which contains X, Y coordinators data of all component pins and node name, and nail number.
14. \*\*.NAL . X and Y coordination's data of all nails of a fixture.

- 15.\*\*\*.PCF . Monthly Test Yield Rate report file for test
- 16.\*\*\*.RCF . Monthly Test Yield Rate report file for retest.
- 17.\*\*\*.FOR . X, Y, coordination information for the outline of the board under test.

## **CHAPTER 5. SYSTEM INSTALLATION**





1. JET-300 supply 2 kinds of power, the 110V~120V (50/60Hz) or 220~240V(50/60Hz) as upper transformer drawings which is always attached on the left side of the cabinet.
2. Place the main unit on level floor. Adjust four feet of the main unit to raise the unit that four casters should leave the floor at least 1 cm.
3. Open the cover of computer, and check if a JET I/O card has been plugged in a slot of computer properly.
4. Place the computer in main unit, and place the keyboard in the keyboard drawer.(Fig 1)
5. Open the right back door of the main unit and check all the modules in the system card cage have been plugged in edge connectors of the mother board properly.
6. There will be a 50 pin cable connected to JET I/O board in computer, connect this cable to J1 of system control board (Fig.3) in card cage (see Fig.2)
7. Place the press unit on the table of main unit at the left side, and place the monitor and strip printer on the right side of the table (Fig.1)
8. Place test fixture on the pedestal of press unit then adjust and fasten four fixture mounting guide to fix fixture properly(Fig.4)
9. Connect monitor power cord and monitor link cable and keyboard link cable to Personal computer (Fig.2)
10. Connect press unit control cable, and power cord to main unit. Connect compressed air hose to air input of press unit.(Fig.2)
11. Connect strip printer power supply cable to main unit, connect printer link cable to compressed printer output port.(Fig.2)

12. Connect flat cables from relay boards to header connectors on the rear panel of the fixture. The first header (count from the right side with view to rear panel) connect to the upper connector of board #01 (Refer to Fig.2), the 2nd connector of the fixture connect to the lower connector of board #01, 3rd connector of the fixture connect to the upper connector of board #02 and so on .....

13. Turn on the main AC power switch. (check AC power voltage, before turn on the power.)

14. Remove the cover of up/down head assembly. Loosen two stopper rings by loosen two screws of each stopper ring. Insert one stick into the hole matrix plate at adequate position and push yellow and blue push button switch let the up/down head down to the level that the tip of stick is about 2 mm lower than the tips of test pin, then fasten both of stopper rings by driving two screws into each.

Note : Factory has made initial setting, users may not need to do this step of installation.

15. Take a PC board, place on the fixture, push the yellow and blue button, to get up/down head down to a position that sticks end leave PC board about 20 cm, then release both buttons to hold the head. insert sticks into holes of hole matrix plate (acrylic plate ) in the places above the blank area of PCB. The sticks should be distributed evenly over the PCB.

16. Push test button switch again to get down the head, sticks should not touch any component on the PCB, the PCB should be pressed by sticks evenly and the test pins should travel down about 2/3 of the stroke. Adjust the stopper rings again if necessary.

17. Following are instructions to operate the up/down head by pushing the yellow and blue push buttons.

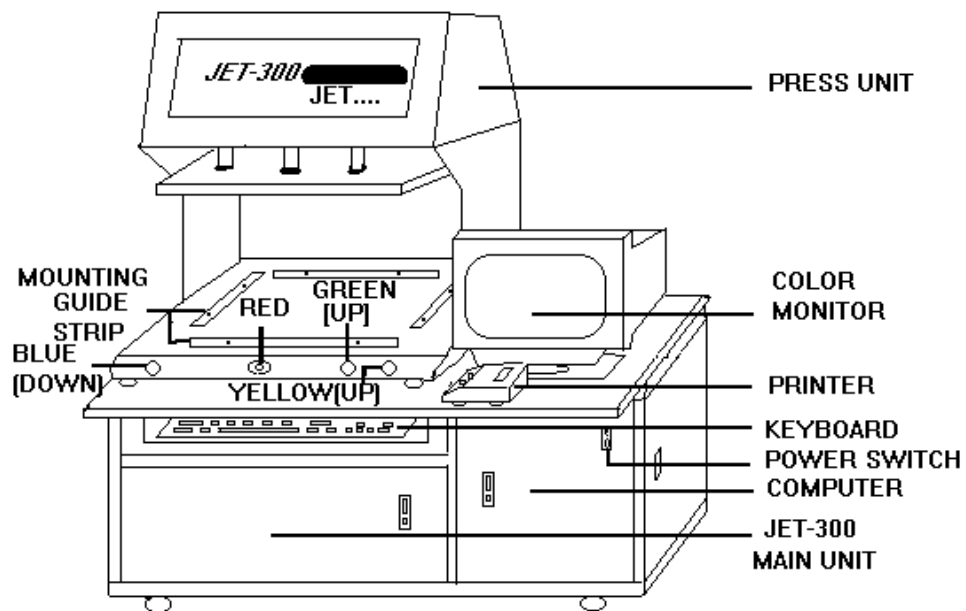
- a. Push yellow and blue buttons simultaneously move the head down.
- b. Push yellow button only move the head up.
- c. Push blue button only or push none of buttons, head keeps steady.

18. The red push button is an emergence stop switch press this button by palm, the up/down head will go up and test will be aborted; to reset the switch, just turn the red cap clockwise and let the button released to the up position.

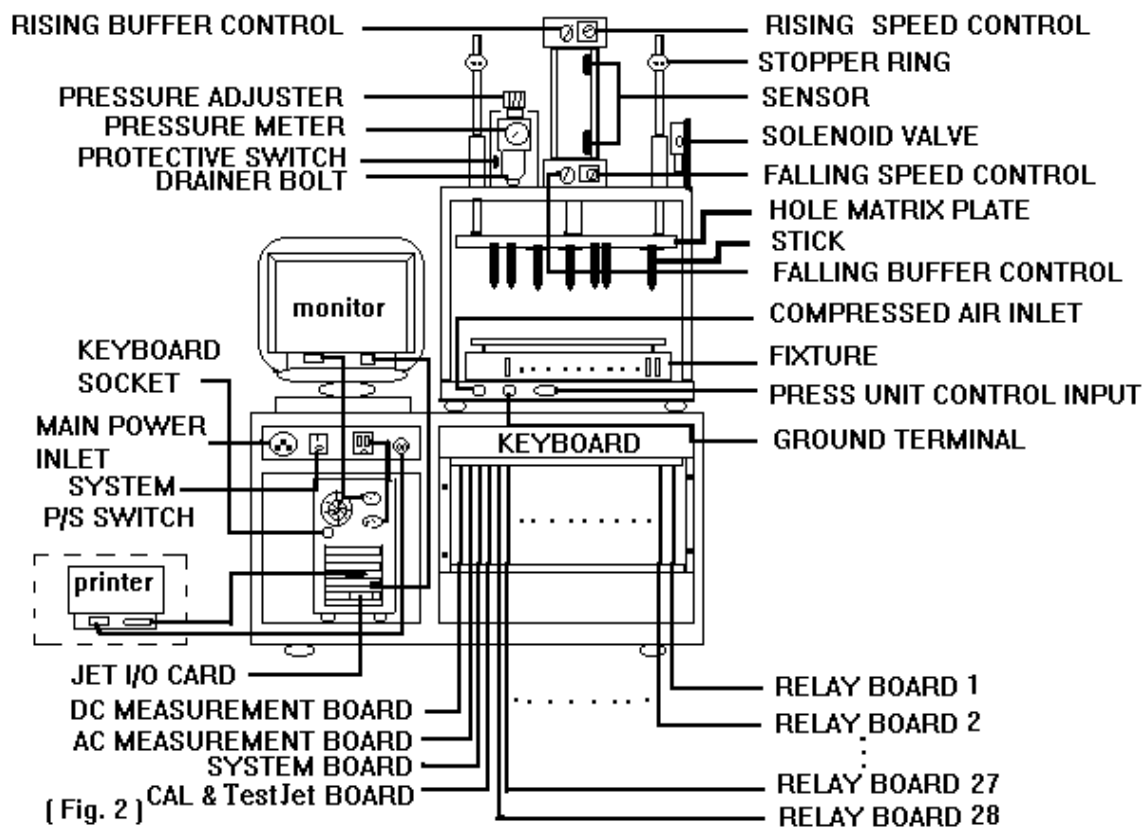
19. While operating the up/down head up and down, if the moving of the head is not smooth or the speed is not properly you can adjust two speed control valves and two buffer control values to make the head working smoothly and properly (Fig2).

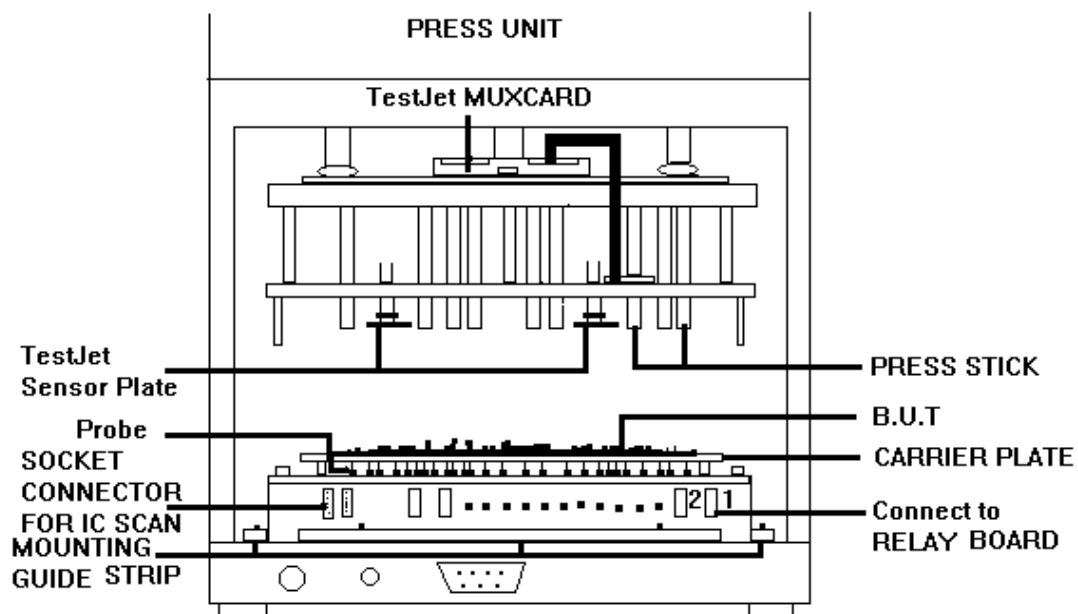
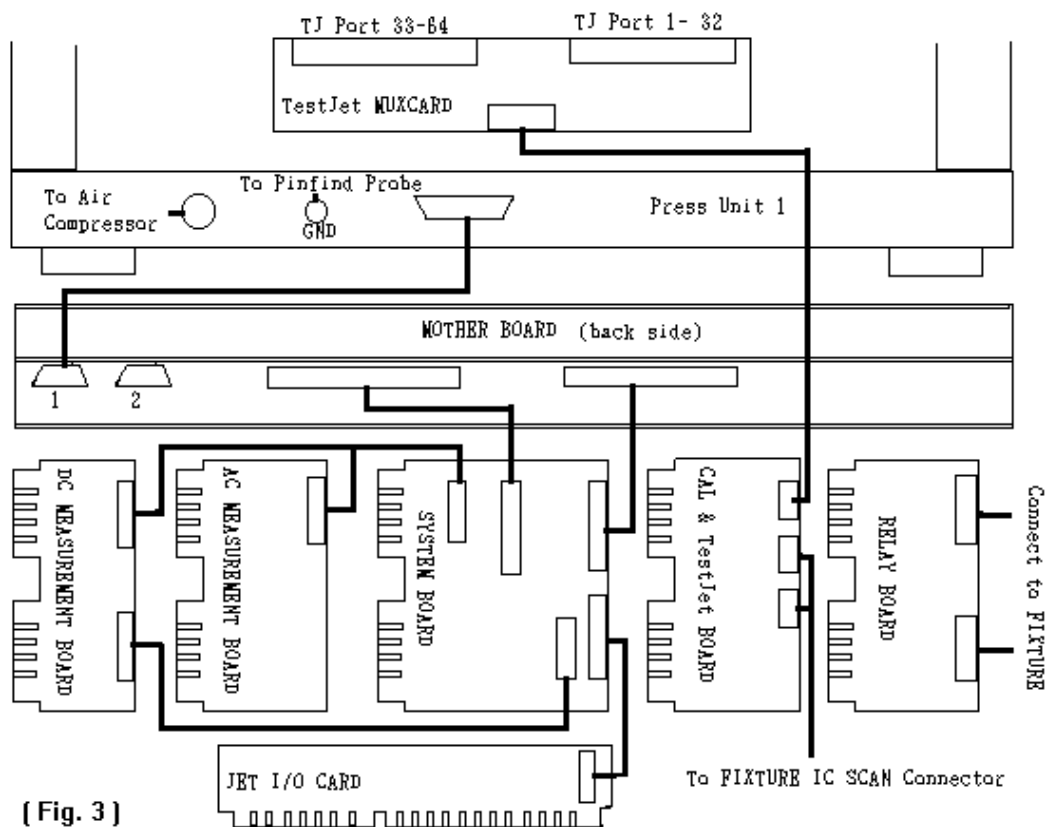
20. Turn the computer power on, system will execute system program and load the default product file automatically. Screen will display the main menu (Ref. To 4-2). Push yellow and blue switches to get up/down head down and start the test. If everything have been installed correctly and if the PCB under test is a good board you will see a "GOOD"

display on the left top area of the screen, after a few seconds. And it means to you that you have done a good job and installation is completed.



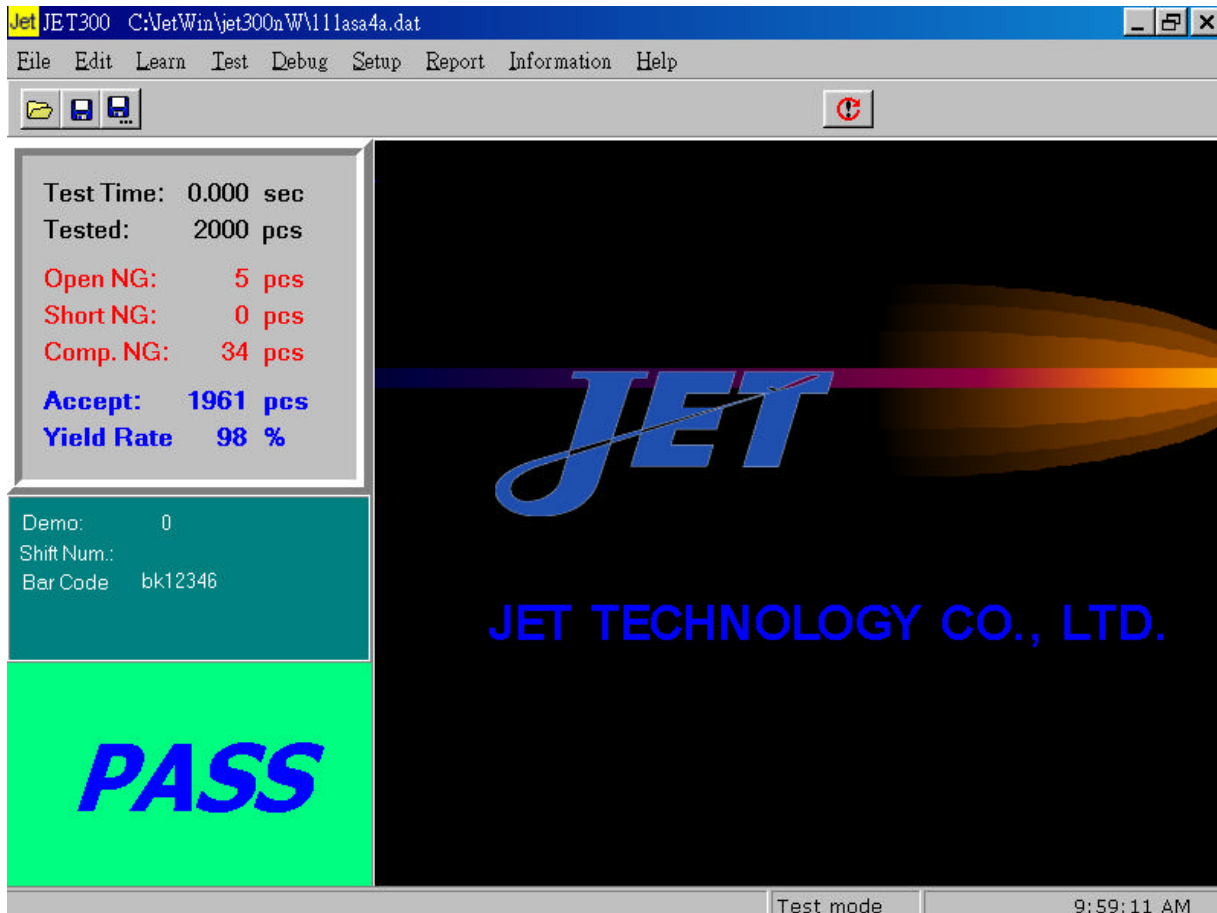
[ Fig. 1 ]





## CHAPTER 6. SYSTEM SOFTWARE FUNCTION

The system software structure of JET300 is a menu driven structure, the users can use Hot keys, mouse and preset keys to operate the programs. The main frame is as below:



There are 9 commands in the main menu. Below are the descriptions:

- 6-1 File command
- 6-2 Edit command
- 6-3 Learn command
- 6-4 Test command
- 6-5 Debug command
- 6-6 Setup command
- 6-7 Report command
- 6-8 Help command

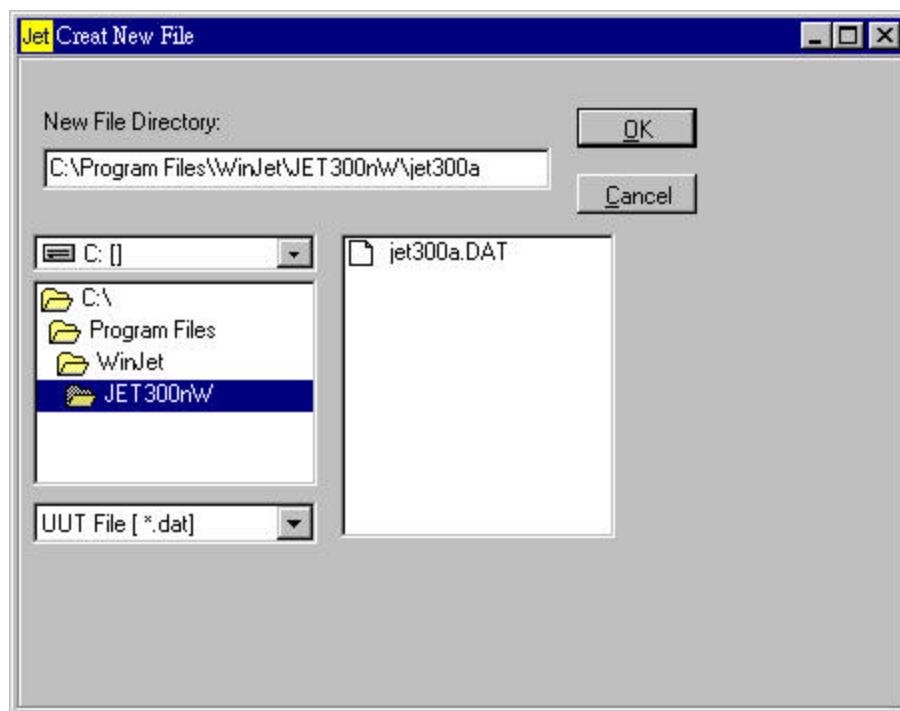
## 6-1 FILE COMMAND

When this command is called upon, a sub-menu will show as below.

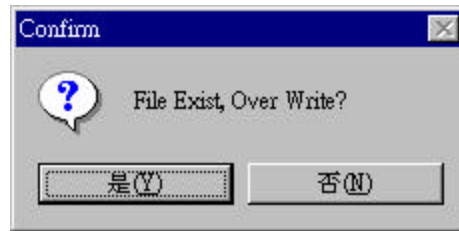


### 6-1-1 NEW COMMAND

This command is used to clean a test program and create a new file. When this command is called upon, there will be an input requiring your key-in new file name.



You can change the file name or use the old name by pressing “ Enter “. If the new file name existed, a dialog will jumped out as :

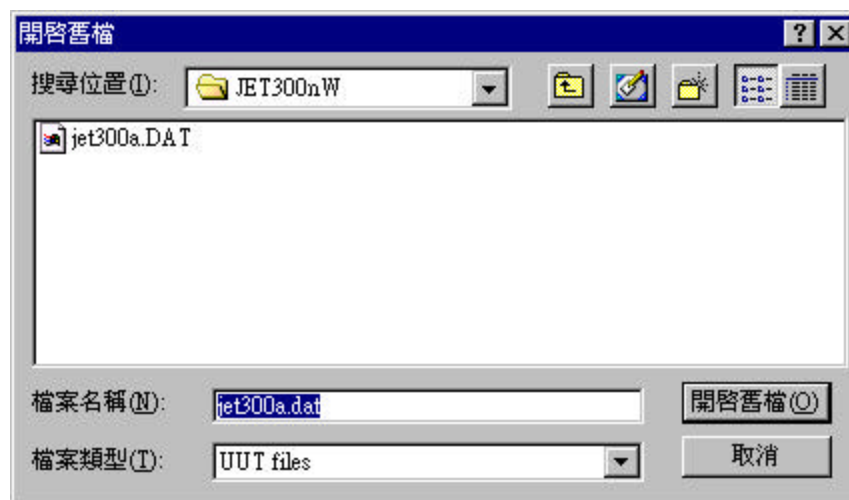


Press “N” to go back to the main frame, press “Y”, the dialog will show:



Press “Y”, the test program will be cleaned; press “N” to change old file name and reserved the old test program. Press “cancel” to go back to the main frame.

### 6-1-2 OPEN COMMAND



Select the old file you hope to open and press “Open”.

### 6-1-3 SAVE COMMAND (F3)

Save the test program promptly.



#### **6-1-4 SAVE AS COMMAND**

Select the path and name the new test program and press "Save".

#### **6-1-5 EXIT COMMAND (F12)**

Exit JET300nW program.

## 6-2 EDIT COMMAND

When the command is called, a sub-menu will show as below :

Component	Ctrl+E
IC's Pin	Ctrl+I
SKIP Pin	Ctrl+S
Short Pin Group	Ctrl+P

### 6-2-1 COMPONENT COMMAND

When components need editing and debugging, you should call this command and below is the example:

Step	DEVICE	LC	STDval	ACTval	+	-	MD	RG	TM	AVG	A	B	TestVal	Dev(%)	Cell	G-1	G-2	G-3	G-4
1	START	A1	0	0o	0	0	D1	0	0	0	1	1	0			0	0	0	0
2	R-100	A1	10.2	10o	5	5	D1	0	0	0	1	2	0			0	0	0	0
3	R-1000	A1	0	100o	5	5	D1	0	5	0	3	1	0			0	0	0	0
4	R-1K0&G	A1	0	0o	5	5	D1	0	5	0	1	4	0			1	0	0	0
5	R-10K0	A1	0	10Ko	5	5	D1	0	0	0	1	5	0			0	0	0	0
6	R-100K0	A1	0	100Ko	5	5	D1	0	0	0	1	6	0			0	0	0	0
7	R-1M0_T	A1	0	1Mo	10	10	D1	0	0	0	1	7	0			0	0	0	0
8	R-1000	A1	0	100o	5	5	D2	0	0	0	3	1	0			0	0	0	0
9	R-1K0&G	A1	0	1Ko	6	6	D2	0	5	0	1	4	0			1	0	0	0
10	R-10K0	A1	0	10Ko	5	5	D2	0	0	0	1	5	0			0	0	0	0
11	R-100K0	A1	0	100Ko	5	5	D2	0	0	0	1	6	0			0	0	0	0
12	R-1M0_T	A1	0	1Mo	10	10	D2	0	0	0	1	7	0			0	0	0	0
13	R-10M0	A1	0	10Mo	15	15	D1	0	0	0	1	8	0			0	0	0	0
14	R-1000	A1	0	100o	5	5	CV	0	0	0	3	1	0			0	0	0	0
15	R-1K0&G	A1	0	1Ko	5	5	CV	0	5	0	1	4	0			1	0	0	0
16	R-10K0	A1	0	10Ko	5	5	CV	0	0	0	1	5	0			0	0	0	0
17	R-100K0	A1	0	100Ko	5	5	CV	0	0	0	1	6	0			0	0	0	0
18	R-100K0	A1	0	100Ko	10	10	CV	0	0	0	1	6	0			0	0	0	0
19	R-100K0	A1	0	100Ko	5	5	CV	1	10	0	1	6	0			0	0	0	0

Above is the program for UUT. Every step stands for one component and its test program ( IC and those with numbers of pins should have more than one step.). Below are the definitions of every field.

- 1.STEP(step) : This field contains step number, which is test sequence number. Test is performed in the order of step number. If the color of this field is changed, this step will be skipped without test. (controlled by F2 key )
2. DEVICE (Device name) : The part name of the device under test (E.g.R13), this field can contain up to 12 alphanumeric characters, normally. test is performed from step 1 to the last step. The only exception is : When the device name in this field is “#ADJ,” test will stop at this step, awaiting a manual adjustment for variable resistor. When <Space>key is pressed, test will be continued. (For Function test option refer to Appendix 1)
3. LC (Location) : This field contains the physical location of the D.U.T on P.C board under test. P.C.B can be divided to 8\*8, sixty-four territory, coordinate x is from A to H and coordinate Y is from 1 to 8 Following is a 4 \* 4 MAP :
4. STD-value : Standard value is the reference value used to set test limits (LL and HL). Unit of STD-value is the same as that of ACT-value. If STD-value is “0,” the ACT-value will be taken as STD-value.
5. ACT-value : Actual value of the UUT on the BOM. It is a must that the operators input the unit of the device. System will classify the categories of devices by the unit of devices and decide the test methods. Following are the acceptable units.
- a) JP : Jumper test
  - b) O. KO. MO : Resistance test
  - c) pF. nF. uF. mF : Capacitance test
  - d) uH. mH. H : Inductance test
  - e) mV. V : LV test, HV test, HP TestJet, Diode test, Transistor test, Clamping diode test. IC Scan Test .
  - f) mA current test

Note : In LV test :

If STD-value is not “0” and ACT-value is “0,” system will not supply voltage and only take measurement on the D.U.T.

6. +% (Upper limit) : Upper limit in percentage is set from 1 to 999%.

7. -% (Lower limit) : Lower limit. is set from 1 to 99%.

8. MD : Jumper test :JP  
(Test Mode) Resistor test : D1, D2, CV, P1, P2, P3, P4, P5.  
Capacitor test :DC, A1, A2, A3, A4, A5, P1, P2, P3, P4, P5.  
Inductor test :DC, A1, A2, A3, A4, A5, P1, P2, P3, P4, P5.  
Function test : DT, LV, HV.  
Transistor test : N, P.  
TestJet test : TJ  
IC SCAN test : IS  
Voltage test : LV, N, P, HV, TJ, DT, CM, IS, PF  
Current test : PD

9. RG(Test range) : JET-300 has a auto-ranging system. Based on the STD-value of D.U.T, system will choose proper signal frequency, current and circuit gain automatically (refer to Appendix 2,3) but range can be changed manually by one step up (+1) or down (-1).

10. TM (Time delay):In an automatic test system, delay time is required for test condition to settle down before measurement can be taken, delay time is defined by an index number (0 to 30)(refer to Appendix 2), but , if the time base in status table is set to “0”, the delay time unit in this field is “ms”.

11.AVG : If test is not stable for any reason, more than one test can be  
(Average) performed and the average of readings is taken as test value.  
The number in this field is the times of test to be taken.

12.A (HIGH PIN) : One of two pins comes into contact with UUT test current flows to UUT through A pin.

13.B (LOW PIN) : One of two pins comes into contact with UUT test current flows/out from this pin.

14.G-1, G-2, G-3, G-4, G-5, G-6, G-7, G-8, G-9 AND G-10 :There are up to ten guard points (refer to chapter 2)can be used, normally five guard points are displayed, when .Alt+.B. key is pressed, last five guard points will be displayed automatically. Screen will also display all possible guard points as reference for manual guard points selection .

### **A. Edit keys:**

- a. .Tab. : To move cursor one field right. The lowest part of the screen has a description about the cursor field.
- b. .Enter. : To move cursor one field right.
- c. .0.-.9. : number keys.
- d. .A.-.Z : alphabet keys.
- e. .SPACE. : To select test mode or test range when cursor is in MD or RG field.
- f. .Up. : To move cursor up one line.
- g. .Down. : To move cursor down one line.
- h. .PgUp. : To move up a page.
- i. .PgDn. : To move down a page.
- j. .Home. :To jump to step 1.
- k. .End. :To jump to last step.
- l. .Shift..Tab. : To move cursor one field left.
- m. .Ctrl. + .Home. : To jump to Step 1.
- n. .Ctrl. + .End. : To jump to last Step.

### **B. Function keys :**

Page(Block) Meas.	Alt+F9
Measure	F9
Skip	F2
Reverse A,B	F5
Histogram	F6
Clear Guard	F4
Auto Guard	F10
DEL Line	Alt+F7
INS Line	Alt+F8

a. Page ( Block ) Meas ( .ALT+.F9.) :

Page test, test all steps in the current page, but if there is a marked block, this function becomes block test, that means :All steps in the marked block will be tested.

b. Measure ( .F9.) : Single step test key. When .F9.key is pressed, cursor step

will be tested and the reading of measurement will be displayed

in a window. If the cursor step is skipped, a message “this step is skipped” will be displayed on the screen . if the D.U.T. is paralleled with any component, a warning message “warning : parallel component” will be displayed. If A and B pins are short, a message warning : A & B short “ will be displayed.

c. Skip ( .F2.) : Press.F2.key, the step field of cursor step will change it's color. That means this step will be skipped during the automatic test. Press .F2.again, and color will change back and the step will be tested during automatic test.

d. Reverse A, B ( .F5.) : To switch A. B points.

e. Histogram ( .F6.) : To display histogram and bar chart on the lower half of the screen.

f. Clear guard ( .F4.) : To clean all guard points.

g. Auto guard ( .F10.) : Perform automatic guard point selection and display all possible guard points

h. Del lines ( .ALT+.F7.) : Delete one line and re-number step numbers.

i. Ins lines ( .ALT+.F8.) : Add one line and re-number step numbers.

## C. Special command :

Edit Offset Value	Alt+O
Edit Relay's Code	Alt+K
Copy Steps	Alt+C
Move Steps	Alt+M
Set Block	Alt+L
Clear Block	Alt+U
Clear Offset Value	Ctrl+O
Go To Reject Step	Alt+R
Copy Measure to STD_value	Alt+Z
Copy Average to STD_value	Ctrl+Z
Block Edit	Ctrl+F
Find	Alt+F
Sort	Alt+S

### 1. Edit command :

- a. Edit Offset Value (.Alt+.O.) : Edit offset value. Press .Alt.and.O.keys simultaneously, the fields at the right side(field G1 to G5)will clamp to offset value field, all test value measured will be offset by the value in this field.(default value is zero).
- b. Edit Relay's Code (.Alt. + .K.) : Edit relay code for function.
- c. Copy Steps (.Alt+.C.) : Copy lines. Use .Alt+.C .function to mark the lines you want to copy, then move cursor to the destination line. Key-in pin offset number and location offset, then press .Enter ., the marked area will be copied to the cursor position and all A, B pin numbers are offset and location numbers are offset.
- d. Move Steps (.Alt+.M.) : Move a line or lines of program to a new place. Mark the lines you want to move by using .Alt+.M .command then move cursor to the destination line and press .Alt.and.M.keys simultaneously, the marked lines will be moved to new position under the cursor line. The lines in old position will be deleted.

- e. Set Block (.Alt.+L.) : Set mark area. Move the cursor to the start line of the area you want to mark, and press.Alt.and.L.keys simultaneously, then move cursor to the last line of the area you want to mark and press.Alt.and .L.keys simultaneously, the area from the start line to the last line will change color. It becomes a marked area for used by (Alt + C), (Alt + M), (Alt + S), (Alt + Z) functions.
- f. Clear Block (.Alt.+U.) : Unmark the marked area.
- g. Clear Offset Value (.Ctrl.+O.) : Reset the OFFSET value to 0.
- h. Go To Reject Step (.Alt.+R.) : Replace A, B, G pin number.
- i. Copy Measure to STD\_value (.Alt.+Z) : If there is a marked area, press .Alt.and .Z simultaneously. All test value of marked lines will be written into "STD\_Value" field. If there is no marked area the test value of cursor step will be written into "STD\_Value" field.
- j. Copy Average to STD\_value (.Ctrl.+Z) : Similar to .Alt.+Z, but the test value to be written is average value which is calculated by taking the average test value of all tested boards.
- k. Block Edit (.Ctrl . + .F.) : Call this command to edit the block value.
- l. Find (.Alt.+F.) : Search function .Press.Alt.and.F.keys simultaneously, a window will be displayed to ask you to select a searching key (step number, Device name, pin no, actual value and TJ port), move cursor to select a key and press .Enter.. The step which meet the searching key will be found and cursor will locate on the step, press .Ctrl.+N.. The second step which meet the searching key will be found and so on'' .
- m. Sort (.Alt.+S.) : Program sorting. Mark program lines you want to sort by using .Alt.+L. function. Press .Alt.and.S.keys simultaneously, a window will be displayed to ask you



to select a sorting key (ACT\_val, LC, Device). Move the cursor to select a key and press .Enter., will be sorted program automatically based on the selected key.

## 2. Learning command :

IC Clamping Diode Function Generator	Alt+I
TEST JET Function Generator	Alt+X
IC SCAN Function Generator	Alt+W
Stray CAP Learning	Alt+Y
Edit default value(+%, -%)	Ctrl+D
Resistor Offset	

- a. IC Clamping.Alt+.I. :To generate IC clamping diode test program automatically. (refer to 2-8)
- b. Test Jet Function Generator .Alt+.X.:TestJet test program auto-generation. (refer to 2-11)
- c. IC Scan Function Generator .Alt+.W.:IC SCAN test program auto-generation.(refer to 2-12)
- d. Stray CAP Learning.Alt+.Y. :Offset capacitance learning. Press .Alt+.Y., if the unit in ACTUAL field of cursor step is “pF”, capacitance will be measured and be used to set offset value. Offset Value = Meas. Value – ACTUAL Value.
- e. Edit Default Value .Ctrl+.D.:Make adjustment to +%, -% default value in IC Clamping Diode, TestJet and IC SCAN program learning.

## 3. Information command.

Pin Information	Alt+H
No Connected Pin	
Pin Location	Alt+N
Device Location	Alt+E
Parallel Components Display	Alt+J

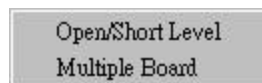
- a. Pin Information (.Alt+.H.) : Display all components which are connected to a test pin.  
This function is same as “Pin info” function under INFO command.  
(Ref to 6-10)
- b. No Connected Pin : Listing all the disconnected pins.
- c. Pin Location (.Alt+.N.) : This function is same as “Pin Location” function under INFO command.(Refer to 6-10-4)
- d. Device Location (.Alt+.E.) : This function is same as “Device Location” function under INFO command. (Refer to 6-10-5)
- e. Parallel Components Display (.Alt+.J.) .Display parallel components.

#### 4.Debug command.



- a. Pin Find (.Alt+.P.).Pin find. This function is similar to pin find function (refer to 6-5), but this

#### 5. Setting command :



1. Set Open/Short Level
  - a. Short Level : 10 Û (1Û~40Û)
  - b. Learn Level : 20 Û (20Û~80Û)

c. Open Level : 80 Û (80Û~100Û)

## 2. Multiple Board

Generating multiple board program by copying from one board program. When this command is called upon, there will be a dialog asking you to fill in the numbers for multiple boards program. Next, input the first point No of the 2<sup>nd</sup> board. The system will name the file according to the previous file name but with the change of suffix.

## 6-2-2 IC'S PIN COMMAND

IC test programs (IC clamping diode test, IC scan test, TestJet test) are generated by learning a good board. The generated IC program will follow the last step of component test program. Before learning test pin number of all IC pins shall be described by a pin number table. IC's pin command is an editor for the table as follows.

Jet JET300 C:\www\HG330ad00.dat

File Edit Test Debug Information Help

Step	IC Name	LC	TJ	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	U1	H5	15	1094	1092	539	1091	583	1090	562	1089	589	5	188	539	191	583	189	562
2	U1	H5	15	190	589	1095	17	0	0	0	0	0	0	0	0	0	0	0	0
3	U2	H3	13	0	0	1181	0	0	0	0	0	0	1161	1163	310	2	5	18	1114
4	U2	H3	13	1179	1155	1162	1154	1122	1156	1160	309	307	686	1014	1177	1165	327	1175	1166
5	U2	H3	13	1167	1172	1164	1178	1174	1176	1015	1180	308	605	2	1173	2	5	2	2
6	U5	G1	11	975	960	961	963	962	967	965	966	964	925	5	933	273	935	272	934
7	U5	G1	11	932	0	936	2	0	0	0	0	0	0	0	0	0	0	0	0
8	U6	C1	3	15	96	95	92	87	86	85	84	83	82	81	80	29	28	26	5
9	U6	C1	3	24	22	20	19	14	311	90	70	91	89	88	93	94	97	278	2
10	U7	F1	9	5	930	927	521	25	928	5	976	0	5	922	15	15	926	931	1179
11	U7	F1	9	307	309	310	308	0	0	0	0	0	0	0	0	0	0	0	0
12	U8	F3	10	5	146	1261	106	129	1262	548	546	575	549	570	898	899	5	878	879
13	U8	F3	10	894	902	911	885	908	890	986	992	1007	5	10	872	145	128	141	604
14	U8	F3	10	553	568	547	569	552	874	919	896	900	915	914	893	912	909	887	906
15	U8	F3	10	989	999	983	1001	108	591	126	107	5	105	1258	551	5	574	550	571
16	U8	F3	10	920	877	916	901	913	5	903	904	888	5	985	984	1008	993	149	148
17	U8	F3	10	109	127	142	312	288	1257	554	1260	572	921	875	918	895	880	881	883
18	U8	F3	10	910	886	907	889	1006	982	1010	1009	462	463	5	125	143	140	291	260
19	U8	F3	10	873	284	573	5	897	917	5	871	882	884	892	891	905	1005	981	5

Test mode N/ None T/ None 8:51:42 AM

The definition of every fields are as the following:

- 1.Step.Line number.
- 2.IC\_Name.Part number of IC under test, if the first character is “.”, this IC will be skipped while doing IC scan and IC clamping diode learning, if the first character is “X”, the IC will be skipped during all kind of IC program learning.
- 3.LC.Location of IC under test.
- 4.P#.This field has two definitions and “F10” key is used to switch definitions.
  - a. In normal state, the number in this field (1-17-33....241) represent the IC’s pin number corresponding to the test pin number which is contained in the field “1”.
  - b. Press “F10” key, this field will become TestJet port number (probe number). If the IC is not tested with HP TestJet, then the number in this field will be “0”.
- 5.1,2...16.Test pin number of IC’s pins.

## A. Edit key :

- a..Enter. : While cursor is in “IC-name” field or “P#” field, press .enter.to move cursor to next line. While cursor is in any other field, press .enter.to move cursor right one field.
- b..o. : While cursor is in “P#” field, press .o.key to reset “P#” field to zero.
- c..Space. : While cursor is in “P#” field, press .Space .key, and number in “P#” filed will change in he order of 1-17-33-49-65-81-.....if the number in “P#” field is 1, it means the test pin number in field “1” of the line is connected to IC pin 1. If the number in “P#” field is n, it means the test pin number in field “1” of the line is connected to IC pin n.
- d..Tab. : Press .Tab., to move cursor one field right.

## B.Function keys :

- a. .F2.: Pin find, use ground probe to touch any test pin on fixture, and pin number will be displayed in a window. If .Enter.is pressed while touching test pin, the pin number will be put into the cursor field.
- b. .F3.: Save the table.
- c. .F4.: Declare VCC pin and GND pin. Press .F4. will change color of a pin number, red is VCC pin and white is ground pin.
- d. .F5.: Define VCC/GND pin. Press .F5.key. System will ask you which pin you want to define?

PIN NO =	12
----------	----

Key in a pin number (12 for example), screen display will change to :

Pin type :		
VCC	GND	None
{..}change, ( ) accepts,(Esc) exits.		

If the pin 12 is a VCC pin, move cursor to select VCC and press “enter”, All pin 12 in the IC’s table will be turn to white color and to be defined to VCC pin. Use same method to defined GND pin.

- e..Alt...F7..Delete one line.

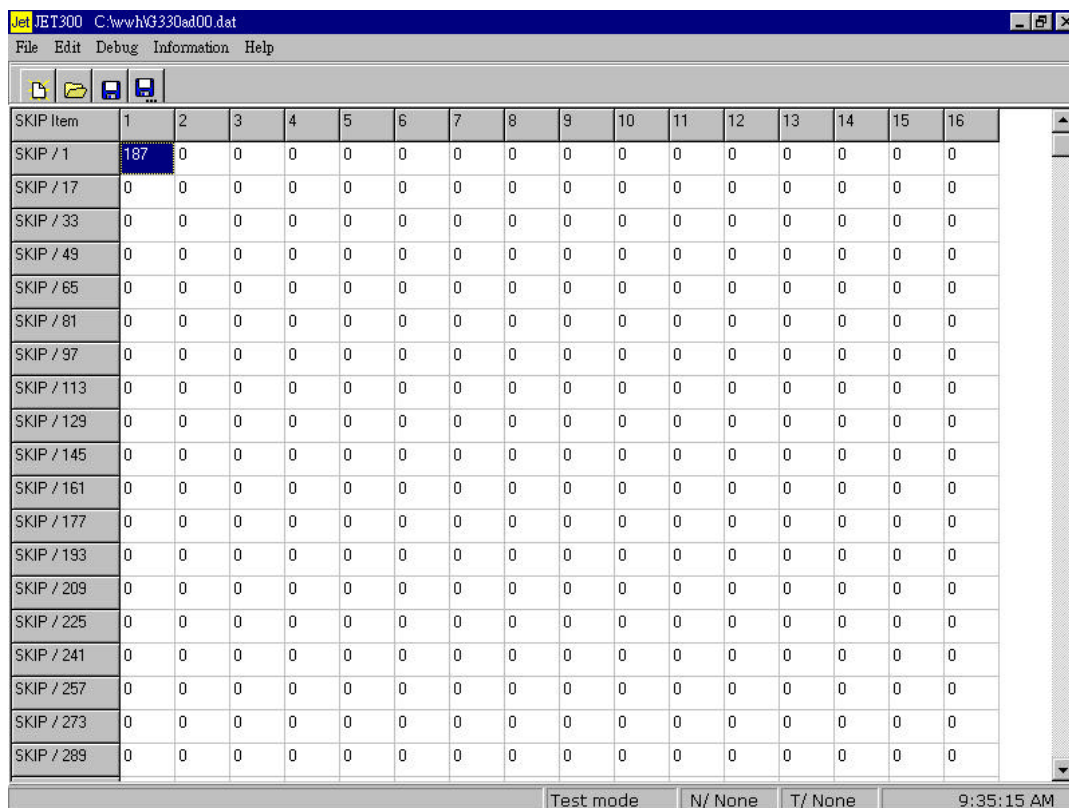
f. .Alt...F8..Insert one line.

g. .Alt...E..The same as device location function at 6-10 info command.

h. .Alt...N..The same as device location function at 6-10 info command.

### 6-2-3 SKIP PIN COMMAND

Open/Short test sometimes generates false reject, which may be caused by layout change or inaccurate fixturing or uncertain switch position. To avoid false reject, some pins may be skipped (ignored ) by putting them in this table as follows :



SKIP Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SKIP / 1	187	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 161	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 193	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 209	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 225	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 241	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 257	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 273	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKIP / 289	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

The table above shows that test pin #187 are ignored in open/short test, but they are not ignored in component test.

#### A. Edit key :

- a..0.-.9. : number keys.
- b..Up. : To move cursor up one line.
- c..Down. : To move cursor down one line.

## B. Function keys :

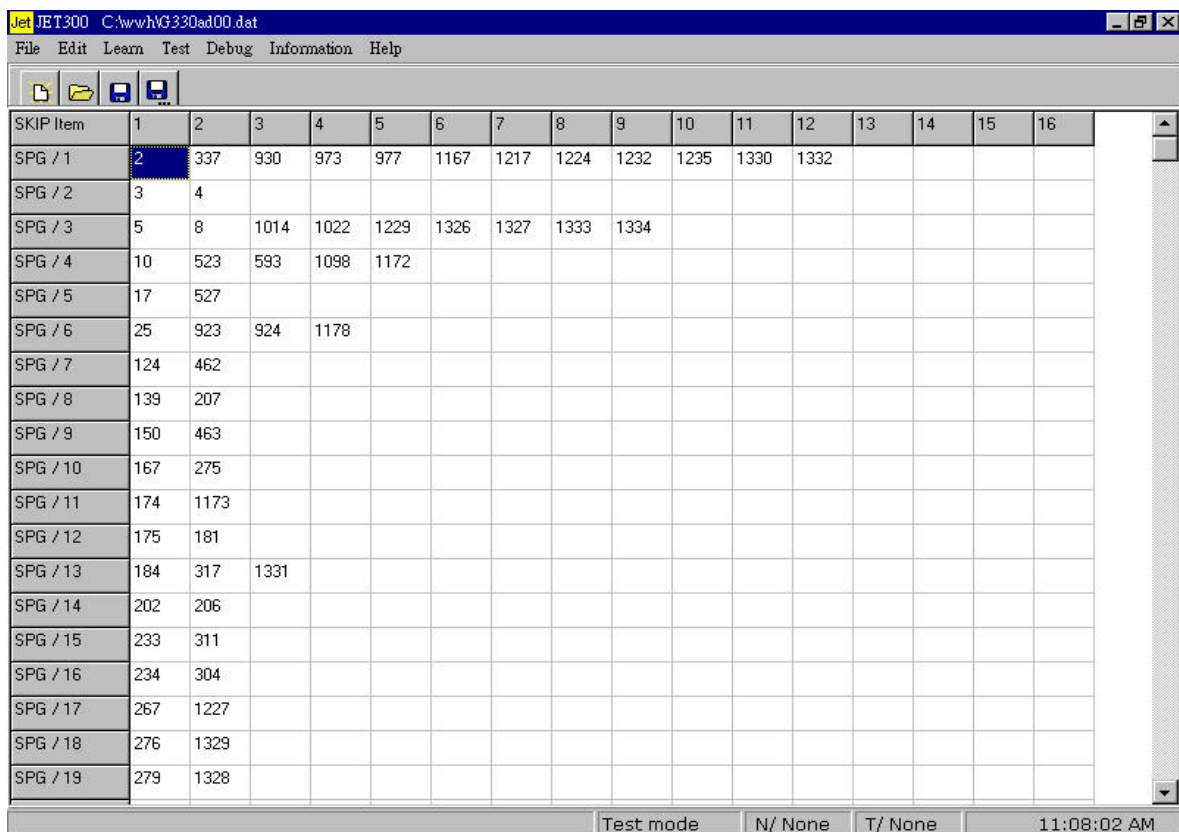
.F1.: Exit

.F2.: Pin find, use ground probe to touch any test pin on fixture, and pin number will be displayed in a window. If .Enter..is pressed while touching test pin, the pin number will be put into the cursor field.

.F3.: Save the table.

### 6-2-4 SHORT PIN GROUP COMMAND

After open/short learning (refer to 6-6), a short pin group table will be generated. Select view short pin function, a short pin group table will be displayed as follows.



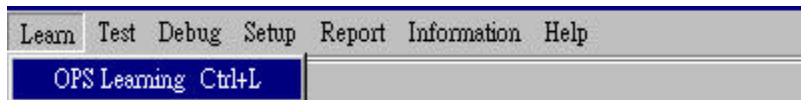
SKIP Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SPG / 1	2	337	930	973	977	1167	1217	1224	1232	1235	1330	1332				
SPG / 2	3	4														
SPG / 3	5	8	1014	1022	1229	1326	1327	1333	1334							
SPG / 4	10	523	593	1098	1172											
SPG / 5	17	527														
SPG / 6	25	923	924	1178												
SPG / 7	124	462														
SPG / 8	139	207														
SPG / 9	150	463														
SPG / 10	167	275														
SPG / 11	174	1173														
SPG / 12	175	181														
SPG / 13	184	317	1331													
SPG / 14	202	206														
SPG / 15	233	311														
SPG / 16	234	304														
SPG / 17	267	1227														
SPG / 18	276	1329														
SPG / 19	279	1328														

There are four command under Test menu:

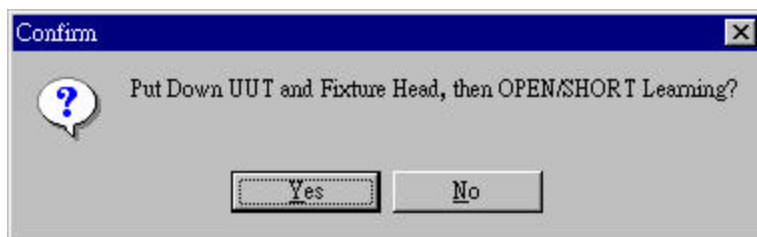
DEL SPG	Alt+F7
INS SPG	Alt+F8
DEL Pin	F7
INS Pin	F8

1. Del SPG (Alt + F7) : Delete Short pin group.
2. Ins SPG (Alt + F8) : Insert Short pin group.
3. Del Pin (F7) : Delete pin.
4. Ins Pin (F8) : Insert pin.

### 6-3 LEARN OPS COMMAND



The test data for open/short test is generated by learning a good board. 20ohm is taken as threshold value. If resistance measured from any two points is less than 20ohm, these two points will be included in a short group. Before the O/S learning, you should put a known good board in fixture and put down the press head. When this function is selected, a window display will be shown as follows.



Press "Y" to start O/S learning. During the learning process, a window will display short pin groups as follows:

EX :

```
SPG / 1 = 1 2 3
SPG / 2 = 25 37
SPG / 3 = 45 65
```

.



•  
•

When learning is completed, system will ask you to confirm if you want to store the learning data. Key-in “Y” to store the data or key in “N” to escape.

## 6-4 TEST COMMAND

Test	Space
Change Mode (Retest)	F7

1. Test : When Test command is selected, system starts to test. Test status will be displayed on the screen. If test is passed, a big “GO” will be displayed. If it fails, a failure message will be display. During the test, a status window as the following will be displayed at the lower of the screen.
2. Change Mode : It provide the switch function between Test and Retest.

## 6-5 DEBUG COMMAND

When debug command is selected, a sub-menu will be shown as follows :

Pins Check	
Single Board Check	
Boards Check	
Probe Short Check	
Measure	
Pin Find	Alt+P

### 6-5-1 PINS CHECK COMMAND

JET300 pin check function is a self –check function for scanning relay board. When this command is selected, a window will be shown at the lower-left corner and ask you to input the number of pins you want to check



Input the maximum pin number of current UUT file. Change the pin number or keep the number and press <enter> key. System will start the relay board test from pin#1 to the last pin you just enter. If test is passed, a message “TEST ALL PASS”, will be displayed in the window. If test is failed, error message will be displayed. Following are some examples :

Open on A5 (B1.P5)	A switch of pin #5 is open. The pin is in pin 5 of relay board 1.
Short on B124 (B2.P60)	B switch of pin #124 is short. The pin is in pin60 of relay board 2.
Open on G231 (B3.P39)	G switch of pin #231 is open. The pin is in pin 39 of relay board 3.

Replace the bad relay board according to the error message, but if the error Point is A1, B1, or G1, the problem board may not be the first relay board. The following procedure should be taken to find the bad board :

1. Turn off the power supply , and unplug all relay board.
2. Plug in a relay board into the first slot and turn on the power supply to perform self-test. If the test is passed, turn off the power supply and plug in a relay board into slot #2 and turn on the power again and perform selftest again, and so on.....until a bad relay board is found. If one good relay board is plugged in slot and self-test fails, then the problem may be in D.C. measure board or system control board.

## 6-5-2 SINGLE BOARD CHECK COMMAND

Similar function as pin check function, but it check one board at a time according to the number of relay board designated.

### 6-5-3 BOARDS CHECK COMMAND

Similar function as 6-4-2, but system will check all relay boards, their board number are less than the designated number instead of checking only one board.

### 6-5-4 PROBE SHORT CHECK COMMAND

This function is used to check any short between all test probes or pins of flat cable connectors.

Before performing this function. Fixture should be connected to relay board correctly. Don't place the board under test on the fixture.

When probe short check is completed, short pin numbers will be displayed in the window if there are probes shorted together. Otherwise an .OK. will be shown in the window.

### 6-5-5 MEASURE COMMAND

This function is same as 6-7-1 component command.

### 6-5-6 PIN FIND COMMAND

When this command is selected. A question will be displayed as follows :

Select open/short level

X<5 Ohm

X<20 Ohm

X<80 Ohm

51

Move cursor to select a threshold level (usually select 20 Ohm). A window at the lower-left corner of the screen will display a .none.letter. Use the ground probe to contact any probe on the fixture. Number of the probe will be displayed in the window. If there is a board under test in the fixture and if more than one probe are shorted through the board under test, number of all probes will be displayed.

## 6-6 SETUP COMMAND



### 6-6-1 STATUS COMMAND

When status command is selected, a status table will be shown as the follows. It contains 28 system parameters. To change parameter setting, move the cursor to the item you want, and change parameter setting by key-in a number or press Space bar (following the instruction shown at the lower part of the status table)

The screenshot shows a 'Jet Status' dialog box with two main sections: 'SYSTEM' and 'TEST'. The 'SYSTEM' section contains settings for maximum pin count, last step, failure quantity, device selection, auto-save, map, printer, failure units print, fix type, demo cycle, shift number, begin of day, yield rate limit, and component failure limit. The 'TEST' section contains settings for time base, fix up delay, OPS delay, repeat, auto retry, fix auto, open abort, short abort, open test, short test, component test, function test, and temperature level. At the bottom are 'OK' and 'Cancel' buttons.

SYSTEM		TEST	
Max Pin :	1342	Time Base :	50
Last Step :	7027	Fix up Delay :	50
Max Fail QTY :	10	OPS Delay :	100
O/S Pin's Device :	1	Repeat :	1
Auto Save :	1	Auto Retry :	3
MAP :	ON	Fix AUTO :	ON
Printer :	LPT1	Open Abort :	ON
Fail Units(LC ) Print :	ON	Short Abort :	ON
Fix Type :	AIR	Open Test :	ON
DEMO cycle :	0	Short Test :	ON
Shift Num :	3	Component Test :	ON
Begin of Day :	7	Function Test :	OFF
Yield Rate limit :	0	Temp.Level(°C) :	34
comp. Fail limit :	0		

Buttons: OK, Cancel

## System

### a. Max\_Pin :

When a UUT file is loaded, system will set maximum-pin according to the test

Program in the UUT file. Max. pin can be changed by key-in a number (1 to 4096)

### b. Last\_Step :

When a UUT file is loaded, system will set Last-step automatically according to the Test

program in the UUT file. Last-step can be changed by key-in a number (1 to 20,000).

c. Max\_Fail Qty

The limit of number of failed items to be printed out. Default is set 20.

d. O/S Pin's name

When O/S test fails, printer can print out not only problem points, but also name of the components that are connected to the problem points. The maximum number of components that can be printed is decided by the number set here.

e. Auto Save

System can save statistical data automatically into hard disk after certain test cycles, to avoid losing data from power interruption. If the parameter is set to "n", the data will be saved every n times of test.

f. Map (Location map)

When map setting is on, Location map will be displayed first, followed by fail message list when the test fails. if map setting is "off," fail message will be displayed first, followed by location map.

g. Printer (printer control)

If printer is set off, printer will not operate for a failed test. But press <p> key. can force printer to print failure message .

h. Fail Units(LC) print :

The failed items to be printed out with the detail map and location.

i. Fixture type

Two types of fixtures can be used with JET-300 I.C.T. if press unit is used, set fix type to air. If vacuum type fixture is used, set fix type to vacuum.

j. Demo cycle (test recycle)

At normal operation, the demo cycle is set to "0," if it is set to a number other than 0 (1 to 99), test will be repeated after a test is completed, and the number will be subtracted by 1. If the number is not "0," test will be repeated again, till number is "0"

k. Shift Num.

If the shift Num. Is set "0", means no shift class now. The number can be set 1 to 9, press .Alt.plus .S.key then you can change the shift class you want to see.

l. Begin of Day

To match with shift Num., it must set up the beginning time of first shift everyday (The number is 0 to 23)

m. Yield Rate Limit

It is no function when you set "0", the number you can set from 1 to 99. For example if set "95", means when Yield Rate less then 95%, the warning message

Warning : Yield Rate <95%

be displayed on the screen.

n. Comp. Fail Limit

Setting "0" is no function, the number you can set from 1 to 99. For example if set "5", means when one component has been measured failure up to five times, the warning message

Component Fail Num.>=5

ll be displayed on the screen.

## TEST

### a. Time\_base

Time base is the basic unit of test delay time (default value is 50). The greater number of time base, the longer delay time will be. Range: from 0 to 9999

Refer: Appendix 2 Delay Time Table

### b. Fix up Delay

When test is completed, press head will move up automatically default setting :50 Fix-delay is the traveling time of the press head to move up.(from 0 to 9999)

### c. OPS Delay ( delay time for open/short test)

In order to overcome the capacitance effect, a delay time between each O/S measurement is needed. Setting range is from 1 to 500, default value is 100.

### d. Repeat

If test fails, failed items will be retest if "Repeat" is not set at "0", the number set here is the maximum test times can be taken.

### e. Auto\_Retry

If Auto\_Retry is not set at "0", and if a step fails during test, the step will be performed again and again until the step is passed.

The times of retest will not exceed the number set here. (1-9)

### f. Fix Auto

Press both yellow and blue push-buttons to lower the press head to the end. Test will start automatically if Fix Auto is set "on." Test will not start, if Fix Auto is set off. (default setting is on)

### g. Open Abort (default setting is on)



If setting "on" means the test will be interrupted as long as system find open test failure, in case of "off", test will be continued.

h. Short Abort(default setting is on)

If setting "on" means the test will be interrupted as long as system find failure of short test, in case of "off", test will be continued.

i. Open Test

Open test shall be performed or not : on : yes : off : no

j. Short Test

Short test shall be performed or not : on : yes : off : no

k. Comp. Test

Component test shall be performed or not : on : yes : off : on

l. Function test

Function test is an option function of JET-300, A function board with 16 general purpose relays are offered to implement function test, if this flag is "on". Function test will be performed, if the flag is "off". Function test will not be performed.

m. Temp. Level ( $^{\circ}\text{C}$ )

Default setting : 34. If set  $34^{\circ}\text{C}$  means the temperature of machine is higher than  $34.5^{\circ}\text{C}$  then the fan will be turn on the fan will stop as long as the temperature is less than  $33.5^{\circ}\text{C}$ .

When all setting in status table is satisfied, press <F3> key to save the setting.

## 6-6-2 OPEN/SHORT LEVEL COMMAND



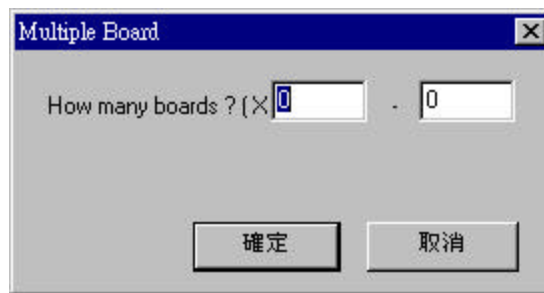
1. Learn Level : When you set learn level as 20 ( default value ) from a golden board, system will judge the measured value short when it is under 20ohm, and open when the value is higher than 20ohm.

2. Short Level and Open Level :

When this command is executed testing, the system will define it short when the measured value is under 10ohm ; system will define it open when the value is over 80ohm. For Learn level,

## 6-6-3 MULTIPLE BOARD COMMAND

This command is used to generate a multiple board (clustered boards ) test program from a single board program. When the command is selected, the screen will show :



Enter the number of boards in X axis and Y axis, ex. like right figure."4-3" should be key-in.

. Note : Making the fixture, the wiring sequence has to follow like right figure.

1	4	7	10
2	5	8	11
3	6	9	12

Enter first pin number of the second board,



Then system will ask you again :



Enter the file name of the multiple board. System will generate a multiple board.

Note : When wiring fixture of multiple boards, the pin number assignment for every single board should be in the same order.

#### 6-6-4 SET NETWORK COMMAND

Jet Set Network

Test Fail Report

Test Fail disk : C: OFF

Real Time Yield Report

NET disk : D: OFF

SFCS Disk: E:

Prepare\_NO: No.

Line\_NO:

Product\_NO: Type

Qty\_R: 0

Factory: 1

Department

☒ SMT ☐ DIP

ICT\_NO:

Test Fail Network : None Refresh

Real Time Network : None Close

SFCS Network : Label15

Network can be divided into 2 parts, the default value is no connecting. To connect the network, please set the “OFF” within the Test Fail Report section and NET disk into “ON” and press the “Refresh” button to complete the connection. “Success” will be displayed if

connecting successfully. “Error!” for failing the connection. If you prefer not to connect the network, choose “None” back to the main frame.

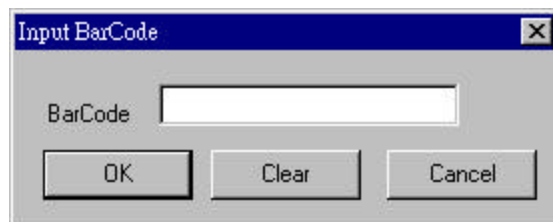
#### **6-6-5 PASSWORD SET COMMAND**



Set the password here to prevent the programs of UUT from destroying. Once if the password is forgotten, you can delete Jet300n.cfg and reset the password.

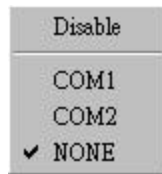
You are required to use the password to enter the edit, delete file, status and learn etc.

#### **6-6-6 BAR CODE COMMAND**



You can input the bar code in the dialog box or the entrance in the main frame.

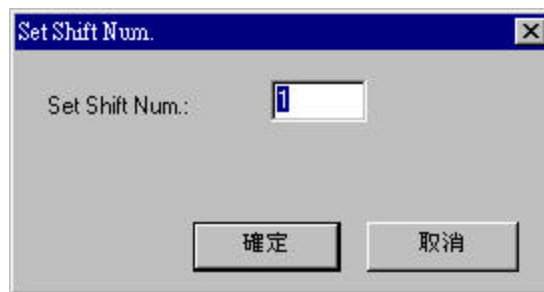
#### **6-6-7 BARCODE SETUP COMMAND**



Set bar code or cancel on the Disable command. The default is NONE

#### 6-6-8 SET SHIFT NUM COMMAND

For inputting the Shift number. You can input this information in the main frame.



#### 6-7 REPORT COMMAND

When REPORT Command is selected, a sub-menu will be shown as follows :



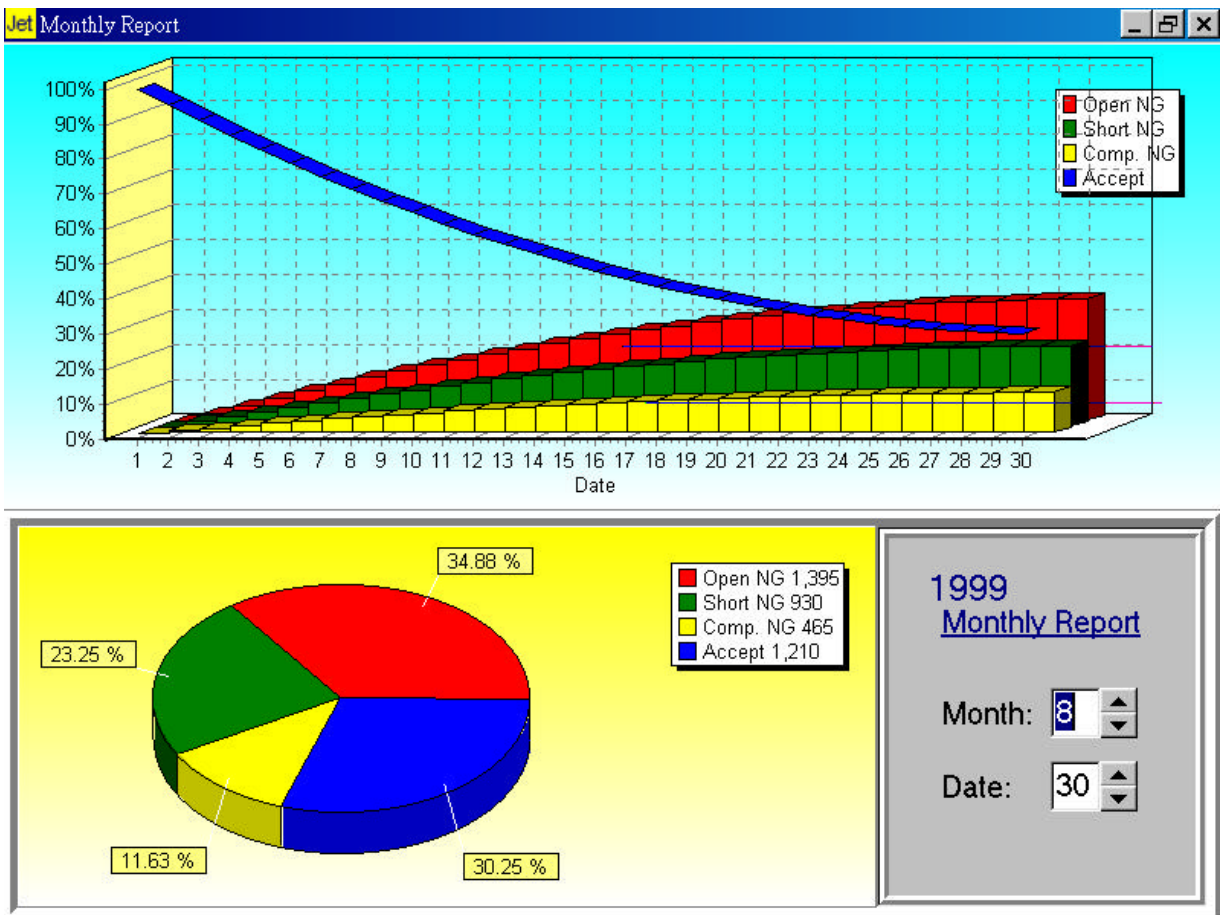
Move cursor to select a sub-command.

The bottom of the screen will show the information that the 40 columns or 80 columns printer should be applied. If it shows “Off” on the printer command in the status command, the reports will be saved in the files. These files can be identified by the extension.

1. \*\*.bak : Generated by the time that test program printed
2. \*\*.tot : Generated by the time that test quantity printed.
3. \*\*.rot : Generated by the time that test quantity printed under the retest condition.
4. \*\*.rpt : Generated by the time that statistics data printed.
5. \*\*.rpr : Generated by the time that statistics data printed under retest condition.
6. \*\*.tv : Generated by the time that the test value printed.
7. \*\*.ost : Generated by the time that the most Open/Short printed.
8. \*\*.top : Generated by the time that the top 10 failed points printed.
9. \*\*.skp : Generated by the time that the skip items and testability printed.
10. \*\*.pcf : Generated by the time that the P type drawing printed.
11. \*\*.rcf : Generated by the time that the P type drawing printed under the retest mode.
12. \*\*.top : Generated by the time that the most failed data produced and printed..

## 6-7-1 MONTHLY REPORT COMMAND

Monthly report display contains two parts : The upper half of display is a curve diagram showing the test yield, open fail percentage, short fail percentage and component fail percentage of every day in current month. The lower half of picture is a pie chart showing test yield information of the current day. You can use ... key to show the previous daily record, and ...key for previous monthly record.



### 6-7-2 STATISTICS PRINT COMMAND

Print statistics report from 40 column printer, which contains total number of board tested, open test reject percentage, short test reject percentage, component reject percentage, component reject percentage and test yield.

### 6-7-3 REPORT PRINT COMMAND

Print report from a 80 column printer, which contains total report and histogram report.



File Name: CALN.DAT

Date : 11/20/98 Time : 02:39:01

Tested : 11 100.0%  
O/S NG : 1 9.1%  
Comp.NG: 10 90.9%

Total Unit in Histogram : 10

STEP	DEVICE	F%	VL	L2	L1	-4	-3	-2	-1	0	+1	+2	+3	+4	H1	H2	VH	Limits
===== < Cell width is (UL-LL)/9 > =====																		
1	R1E0	0			:							%			:			90 110O
2	R1E1	0			:		30	70							:			10.17 11.24O
3	RSTB	0			:			20	80						:			88.2 92.7O
4	R1E2	0			:			20	50	30					:			98.49 102.6O
:																		
:																		
:																		

Histogram is an analysis of test value. Data is collected from test of all boards. The left vertical dotted line stands for lower limit, right dotted line stands for upper limit. Between upper limit and lower limit, there are 9 cells. Each cell stands for a region of value. Each cell width is (UL-LL)/9. The center cell is cell "0" ., four cells on left are cells "-1", "-2", "-3", "-4". outside the dotted lines are reject area. Three cells on left side (L1, L2, VL), and three cells on right side (H1, H2, VH). Cell width of L1, L2, H1, H2 is the same as the cell width inside the dotted lines. VL and VH cells represent regions lower than L2 and higher than H2. The number in every cell is the number of boards in which has test value percentage located at the cell. In the example above, step 1, 100% (10 pcs, mark "%" stand for 100%) of R10 are located at cell +2 region, in step2, 30% of R11 are located at cell -3, and 70% of R11 are located at cell -2.

#### 6-7-4 TOP-TEN FAILED PRINT COMMAND

Select this command, 40 column printer will print top ten steps that failed most times.

#### 6-7-5 CLEAR UUP REPORT COMMAND

Clear the test result for collecting the new information.

#### **6-7-6 CLEAR MONTHLY REPORT COMMAND**

Clear monthly report.

#### **6-7-7 CLEAR HISTOGRAM REPORT COMMAND**

Clear the histogram

### **6-8 INFORMATION COMMAND**

Pin Information	Alt+H
Repeat OK	
No Connected Pin	
Pin Location	Alt+N
Device Location	Alt+E
Test Information	F5

#### **6-8-1 PIN INFORMATION COMMAND**

Select pin info function, screen shows:

Test pin :

Key in the pin number you are inquiring, all components connected to this pin will be displayed as the following :

IC-Name	LC	IC-Pin			
IC1	B2	pin 12			
Step	Device_Nam	LC	A	B	
57	R4	H1	7	34	SKIP
191	C8	H1	10	34	

The above sample represent that components R4, C8 and IC-12 are connected to pin 34

## 6-8-2 REPEAT\_OK COMMAND

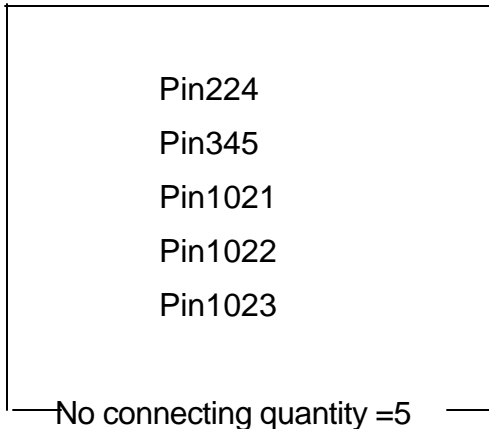
Select this function, the screen will shows.

1. The number pins which failed at open test and pass at repeat test also the number of failing times. You can judge if the probe need to be replaced referring this information .
- 2.Components which failed at component test and pass at repeat test also ,the number of failing time.

REPEAT TEST OK INFORMATION					
OPEN	----REPEAT TEST OK PINS:				
PIN	NUMBER				
125	5				
249	5				
COMPONENT	---REPEAT TEST OK STEPS:				
STEP	DEVICE_NAME	A	B	NUMBER	
284	R101	125	2	5	
396	C201	5	101	2	

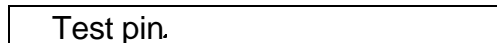
### 6-8-3 NO CONNECT PIN COMMAND

To select this function, system will display the probes which do not connect any components.



### 6-8-4 PIN LOCATION COMMAND

Select this function, screen shows :



Key in the pin number you are inquiring, a graphic of bed of nails will be displayed, the inquired pin will be highlighted by a circle.

This function can also do the pin find function, press .P.key, the graphic display will shows both solder points and nail points, use ground probe to touch any probe (or if a B, U, T is placed on the fixture, touch the component lead), the nail point touched will be highlighted in the graphic by a blue cross, the inquired pin is highlighted by a green cross. If the ground probe find the inquired pin, two crosses overlap and a long sound will be heard.

### 6-8-5 DEVICE LOCATION COMMAND

To display the location of a component on graphic display.

Select “Device Location” function and key in the device name, a graphic of solder points will be shown on the screen, the device inquired will be highlighted by a rectangle.

### 6-8-6 TEST INFORMATION COMMAND

Back to the previous test information.

## 6-9 HELP

This command provide operator s with the technical support information.



## CHAPTER 7. FIXTURE FABRICATION

### 1. Material preparation

- a. PCB with component tested good x 2
- b. PCB W/O component x 2
- c. Circuit schematic x 1
- d. Part list x 1
- e. CAD file or Gerber file x 1

### 2. Fixture dimension specification

A SIZE : 380W \* 310D \* 100H (mm) P10M3  
380W \* 310D \* 95H (mm) P15M3.P15M7  
380W \* 310D \* 108H (mm) S25K-6.7G.SM0TL-3.8G

B SIZE : 450W \* 330D \* 100H (mm) P10M3  
450W \* 330D \* 95H (mm) P15M3.P15M7  
450W \* 330D \* 108H (mm) S25K-6.7G.SM0TL-3.8G

C SIZE : 480W \* 330D \* 100H (mm) P10M3-16  
480W \* 330D \* 95H (mm) P15M3.P15M7-23  
480W \* 330D \* 108H (mm) S25K-6.7G.SM0TL-3.8G

- NOTE : To ease model change, the height of fixture should be different while using different type of test pin. P10M3, P15M3, P15M7, S25K-6.7G and SM0TL-3.8G are model names of test pin.

### 3. Fixture making procedure.

- a. Take a blank PCB, choose one pad as a test point from each copper track, and marked by marker pen, Choose bigger copper and as possible. The distance between any two test point should not be too close.
- NOTE : For ground copper track more than one test points can be selected for better contact. But in the fixture all these points have to be connected together and treated as one test pin number.
- b. When all test point has been selected and marked. Then number every test point in a sequence from TOP to bottom and from right to left.
- c. Find two bigger hole as guide holes.
- d. Use digitizer to find X. Y. coordinate of each test point and guide holes. Select

proper type of test pin and guide pin, then drill holes for all test pins and guide pins by CNC drill machine (according to the diameter of the pins )on a 10mm thick acrylic plate. Then use the plate to build fixture.

- e. Plant a test pin into every drilled hole of the fixture. Wire all pins to flat cable headers mounted on the rear panel of the fixture. Each header has 34 pins, but headers for a 320 pin fixture. The test pin NO.1 should be wired to pin 1 of the first header (Count from right to left, view to rear panel), test pin NO.33 should be wired to pin 1 of second header and so on.

## CAPTER 8. MAINTENANCE AND TROUBLE SHOOTING

### 1.Maintenance.

- a. Kept the machine clear and away from humidity.
- b. Read/write head of floppy disk driver has to be cleaned by head cleaning diskette periodically.
- c. Water in air filter should be pour out if water is too much.

### 2.Trouble shooting

When machine have trouble. Check machine according to its symptom as following.

- a. No power, no CRT display : check is power cord has been plugged properly ? Is main power switch turn on? Is power breaker break off ? Is computer power on?
- b. Up/down head does not go up and down.  
Check is the control cable of up/down head loosen? Has the AC power cord of up/down head unit been plugged properly? Then remove the cover of up/down head unit. Check the operation of relay and solenoid valve. If it still does not work check more detail according to circuit diagram.
- c. When operator push the “down” and “up/down” button and the Up/down head had Come down but system does not start test : Check if “fix auto“ flag in status table is off, if it is, Change it to on status, if it is not, then check the micro-switch in the up/down head unit to see is it loosen or broken?
- d. Test unstable or false reject :
  - 1. If false reject occurs on certain test steps repeatedly. Check relative pin for poor contact, replace the pin if necessary.
  - 2. Check relay boards by “pin check “ function under the “debug” function.(Refer to chapter 5. section 5-5).



## APPENDIX 1

### 1.Function Test

JET-300 offer a function board as a option to support various of function test.

There are 16 pieces of 1C type relays on the function board".Alt.+K."function under the component Editor is used to program the on/off of 16 relays.

When .Alt.+K.are pressed, the right portion of test program (G1~G5 fields )becomes Relay code field, 16 bit is used to control 16 relays, for each bit,"0"stand for "off", "1", stand for "on". Last bit (bit 17)is an enable bit, if this bit is "1", all relay will be actuated according to the relay code, if this bit is "0", relays keep it are of f.

In the first step of function test, the first character of device name should be "@", when program is running to step which device has a "@" character, system will check, if all test steps before the function test pass the test? If not, test will be aborted, if yes, test will be continued and function test will be performed.

### 2. Counter Card

Counter card is an option, it is used to measure frequency of a signal in a function test.

The following is a sample program for a counter test.

Step	Device	LC	STDVAL	ACTval	+%	-%		1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	e
	@FUNC							0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1
	#COUNT	A2	0	1.4MHz	0.1	0.1		0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1
	@END							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

The device name should be # COUNT, put standard frequency value in "ACTUAL" field.

### 3.ID CODE

JET-300 has a error message query system.

- Direct query : On the main menu screen, press.Alt.+D. , at the upper left corner will display an ID code 1dXX. This is the ID code for rejected board. The system now is ready in a error message query system. Every rejected board will be numbered in

sequence like 1dXX, 2dXX, 3dXX.....,XX is the date. If you want to read the error message of a board, press .Alt+.D., then key in the ID number, the error message will be displayed.

- b. Network query : If troubleshooter station and ICT have been linked by a network the T/S station can query the error message from ICT or from a server through network
- You need to copy the server's test program (\*.DAT) and related file to client for easy Network query.

## Appendix 2

RESISTOR TEST			
RNG	TEST RANGE	CURRENT	DELAY
1	0.1 - 30	50 mA	2 mS
2	30 - 300	5 mA	2 mS
3	300 - 3K	500 uA	2 mS
4	3K - 30K	50 uA	2 mS
5	30K - 300K	5 uA	2 mS *
6	300K - 3M	0.5 uA	5 mS
7	3M - 40M	0.1 uA	6 mS

CAPACITOR TEST			
RNG	TEST RANGE	SIGNAL	DELAY
1	3 m - 30 mF	DC 50 mA	15 mS
2	300 u - 3 mF	DC 5 mA	15 mS
3	30 u - 300 uF	DC 0.5 mA	15 mS
4	3 u - 30 uF	AC 1KHz	10 mS
5	300 n - 3 uF	AC 1KHz	10 mS
6	30 n - 300 nF	AC 1KHz	10 mS
7	3 n - 30 nF	AC 10KHz	10 mS
8	300 p - 3 nF	AC 100KHz	20 mS
9	1 p - 300 pF	AC 1MHz	20 mS

INDUCTOR TEST			
RNG	TEST RANGE	TEST SIGNAL	DELAY
1	3 – 30H	AC 100Hz	60 mS
2	300m – 3H	AC 100Hz	60 mS
3	30m – 300mH	AC 100Hz	60 mS
4	3m – 30mH	AC 1KHz	10 mS

DELAY TIME	
RN	DELAY
<b>G</b>	
0	DEFAULT
1	0.5 mS
2	1 mS
3	2 mS
4	3 mS
5	4 mS
6	8 mS
7	12 mS
8	16 mS
9	20 mS
10	28 mS
11	39 mS
12	61.5 mS
13	84 mS
14	124 mS
15	164 mS
16	204 mS
17	244 mS
18	284 mS
19	324 mS
20	364 mS
21	404 mS
22	444 mS
23	484 mS
24	524 mS
25	564 mS

5	300u – 3mH	AC 10KHz	10 mS
6	30u – 300uH	AC 10KHz	10 mS
7	1u – 30uH	AC 100KHz	20 mS

\* Time Base :

50

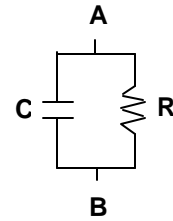
26	604 mS
27	644 mS
28	684 mS
29	724 mS
30	764 mS

## Appendix 3 SOME INSTRUCTIONS FOR PROGRAM DEBUGGING

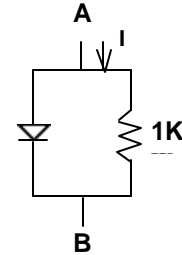
### 1. About Resistor test

- a. In case resistor is parallel with a capacitor and can not be measured accurately, the following methods may be tried.

- ① Add delay time
- ② Try HS mode
- ③ Try CV mode

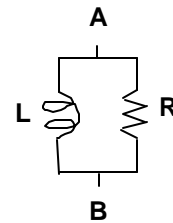


- b. In case, a resistor is parallel with a diode (or diode in IC), use D1 mode to test the resistor (right Figure) will build a 0.5V DC between two end of the resistor, this voltage is reaching the turn on point of a diode, thus, may affect the test result of the resistor, D2 mode is recommended for this measurement.



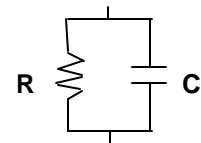
D1 Mode  
I=0.5mA  
VAB=0.5V  
D2 Mode  
I=0.05mA  
VAB=0.05V

- c. When a resistor is parallel with an inductor, phase mode measurement should be used. The smaller inductance, the higher frequency should be used.
- d. In a R/C parallel circuit, if RC time constant is too big, the resistor may become untestable.
- e. In a R/C parallel circuit, if the inductance is too small compare to the Resistance, the resistor may be untestable.



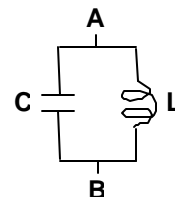
### 2. About Capacitor test

- a. In case a capacitor is parallel with a resistor, and can not be tested correctly with AC modes test, phase measurement can be taken, the smaller capacitance the high frequency should be chosen.



- b. For a small capacitor (in PF unit), offset value can be used adjust the test value..Alt.+Y.function can be used to generate offset value of capacitance automatically

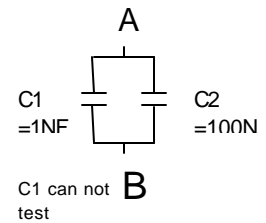
- c. For small capacitor, if test value is not stable, lengthen the delay time may help (delay 2 to 4).



- d. When a capacitor is parallel with an inductor, phase mode measurement should not be taken, high frequency of measurement is "coverage", set "RNG" field to "+1", and try again.
- e. In case a capacitor has a stable test in signal step mode test but unstable in page test or normal test, "move" function under component Editor command

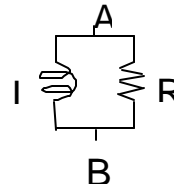
can be used to move the step to the beginning area of the test program, and try again.

- f. If a small capacitor is parallel with a big capacitor or is parallel with several capacitors. This small capacitor will becomes in testable.

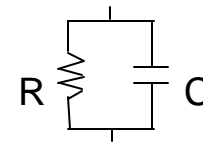


### 3. About Inductor test

- a. When inductor is parallel with a resistor, phase mode test should be taken, the larger inductance the lower signal frequency should be used.



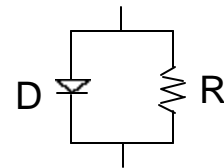
- b. When a inductor is parallel with a capacitor, low frequency ACVS mode (A1~A3) should be used to test the inductor.



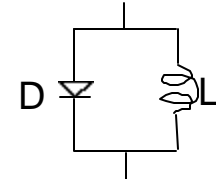
- c. If the spec. of the inductor under test is unknown, set ACTual to "10UH", then test by press .F9., if test reading is too big, change ACTual value to be large and try again. If the reading is still too large, change ACTual value again... until a stable measurement is obtained.

### 4. About Diode test

- a. DT mode is used to test forward bias of a diode, if test is not a table, lengthen the delay time may help.



- b. If a diode is parallel with a small resistor (less than 12 ohm), the diode will becomes untestable.

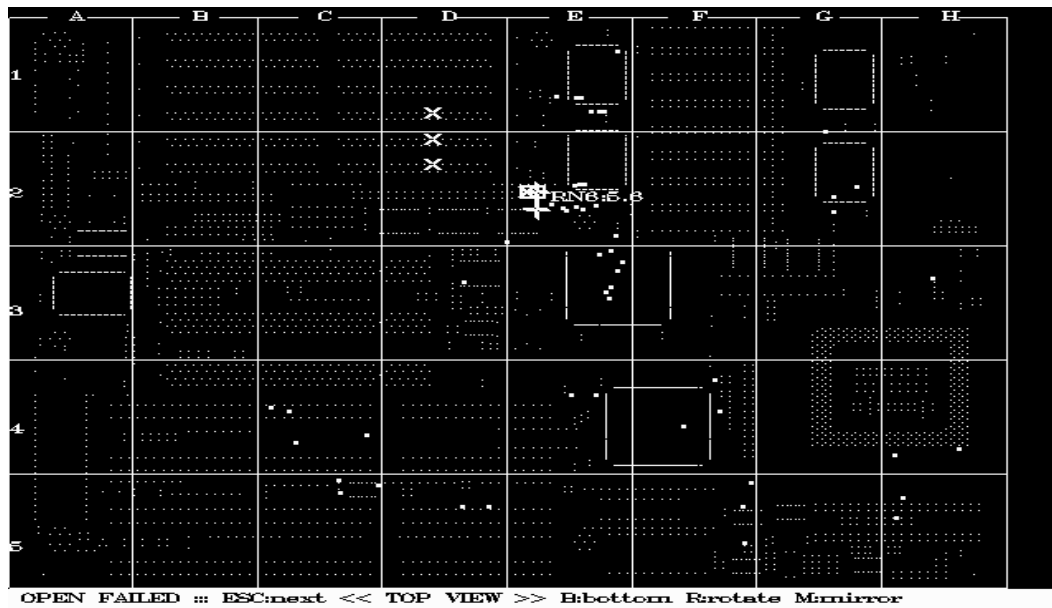


- c. If a diode is parallel with a inductor, the diode can not be tested.

### 5. About transistor, photo transistor and IC test Please refer to chapter 2.

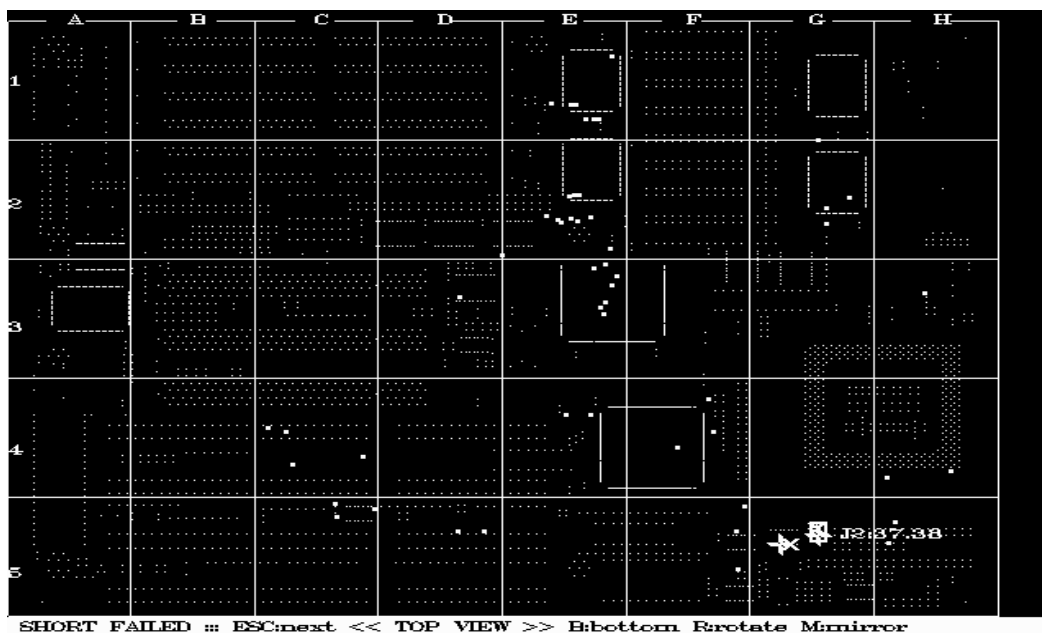
## Appendix 4

### 1. Open Failed :



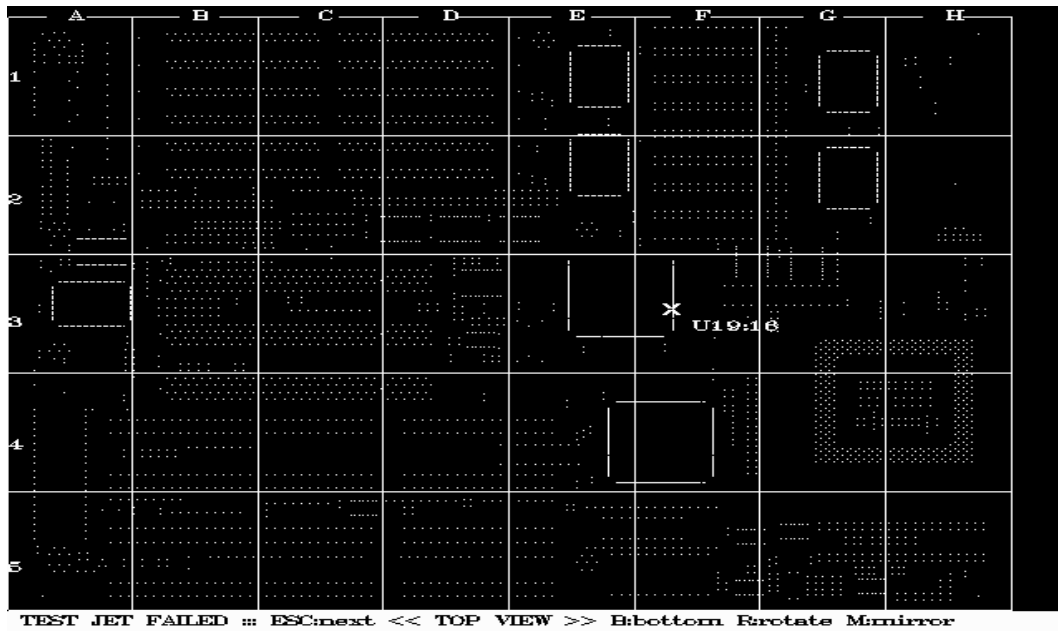
“X” represent first open point, ”+” represent the other open points, the nearest “X” and “+” will be highlighted by drawing a “.” around two points above figure shows RN6 pin 5 and pin 6 are two most possible open points.

### 2. Short Failed :



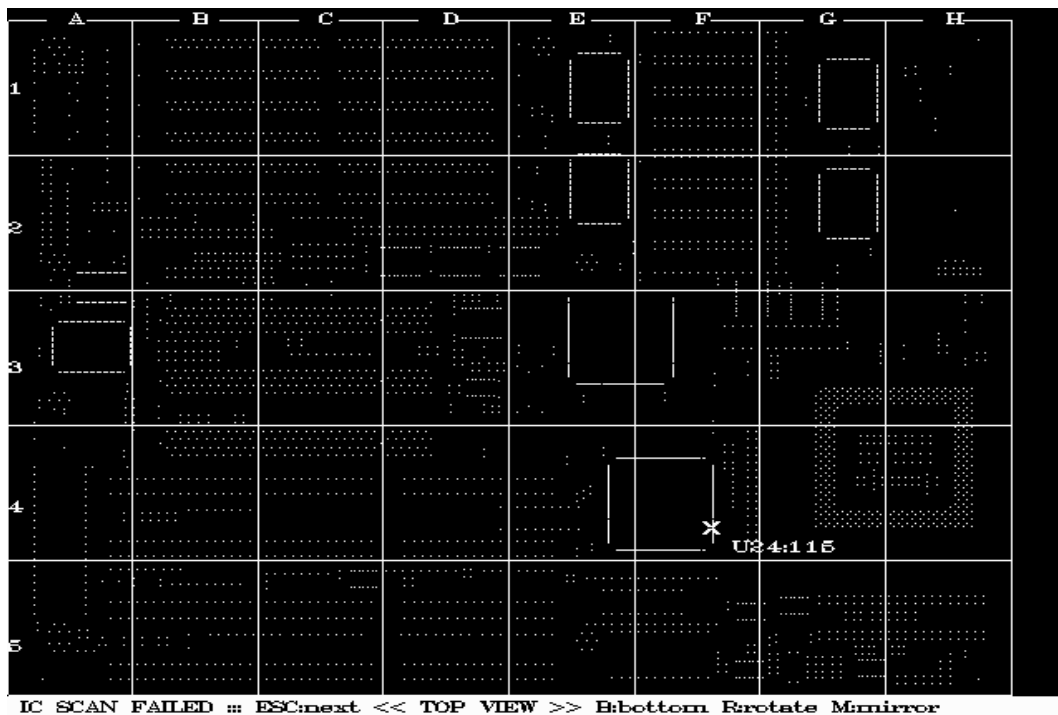
“X” represent first short group ”+” represent second short group, the nearest “X” and “+” will be circumscribed with a rectangular and the device name will be displayed if two point are connected to one component above Figure shows that pin 37 and pin 38 of J2 are two possible short points.

### 3. TestJet Fail :



“X” indicate the TestJet fail pin.

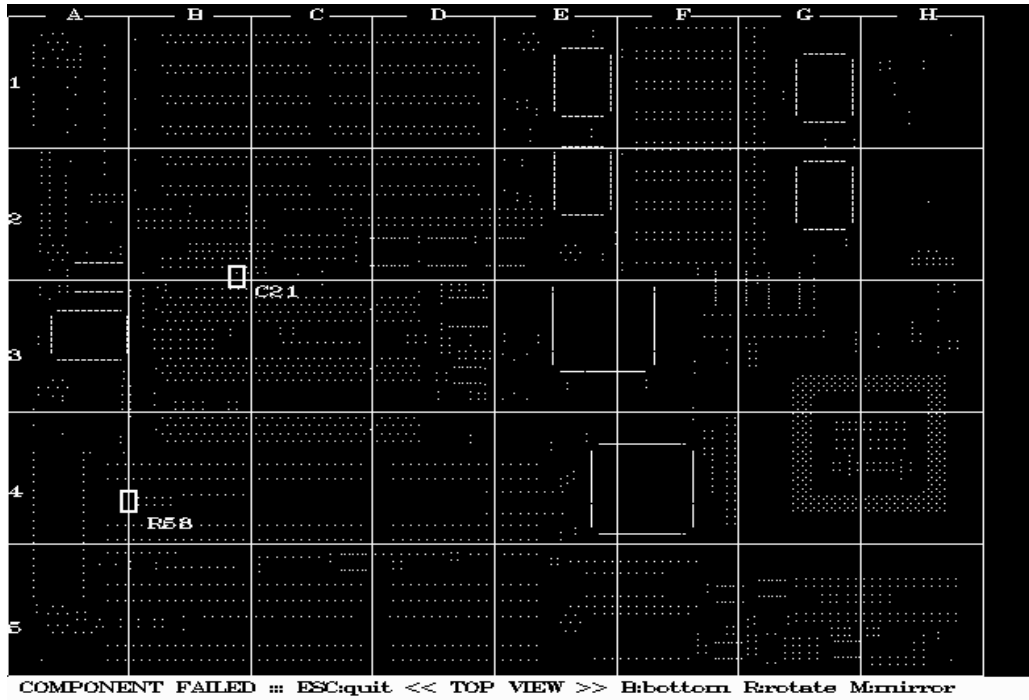
### 4. IC SCAN Failed :



“X” indicate the IC SCAN fail pin.



## 5. Component Failed :



Rejected component is circumscribed by a rectangular above figure shows that C21 and R58 are rejected.