

***BK PRECISION***<sup>®</sup>

MODEL 570 HANDHELD  
LINEAR IC TESTER

OPERATOR'S MANUAL

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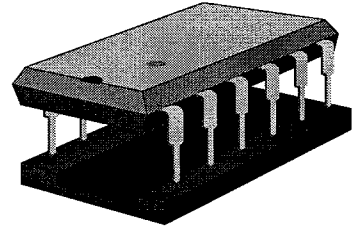
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## 1. Introduction

Thank you for purchasing the B&K Precision Model 570 Handheld Linear IC Tester.



The basic function of the Model 570 Handheld Linear IC Tester is to test linear ICs for correct operation as described in the IC data sheets. The Model 570

Handheld Linear IC Tester applies the necessary analogue signals to the inputs of the IC, measuring the output voltages at each stage and comparing them with the expected values. Any discrepancy results in a FAIL indication and the faulty pins are shown on the integral LCD display. Additional facilities are also provided, among them test loops that can be used for goods inwards inspection, detecting intermittent faults or simply providing a rapid method of exercising any IC for demonstration or educational purposes. Also provided is a SEARCH facility to identify unknown ICs. Since the Model 570 Handheld Linear IC Tester contains an extensive IC library, it is not necessary to program the unit yourself other than to key in the IC number.

## 2. DC input

The Model 570 Handheld Linear IC Tester is powered by two 9V batteries or by use of the battery eliminator input at the rear of the case. Nickel-Cadmium batteries may be used but they must be removed from the Model 570 Handheld Linear IC Tester before recharging. To insert the batteries, turn the unit upside down and remove the battery cover by removing the two cross head screws holding it in place. The batteries must be inserted in the correct orientation, as indicated by the polarised battery connector clips. Incorrect insertion of batteries may cause damage to the unit. Replace the battery cover and insert the screws. If the battery voltage is too low a low battery warning symbol will be displayed at the top left hand cell of the display in normal operating mode. A low battery warning will also be displayed during a result display. Test results may be inconsistent under these conditions.

### 3. Battery eliminator

An external battery eliminator is available for prolonged use of the Model 570 Handheld Linear IC Tester. Some ICs consume significant amounts of current when powered up, and battery life can be conserved by using the eliminator. There is no need to remove the batteries prior to inserting the battery eliminator. However, please note that during prolonged periods of non-use batteries are prone to leakage and should be removed. Note that to avoid damage to the unit we strongly advise that you only use the recommended battery eliminator that is available by contacting your distributor.

### 4. Switching on

To switch the unit on simply press the 'ON' key. To preserve battery life, the unit powers itself off after approximately three minutes of non-use. When the unit is switched on it first of all performs a self diagnosis test. Therefore, before switching on, check that the test socket is empty to prevent interference with the diagnostics. If the unit passes the self test the display will be as follows:-

```
NO:           :  
MODE:SINGLE  :RDY
```

When this initial display is obtained the Model 570 Handheld Linear IC Tester is ready for use. If, however, the message SELF TEST FAIL:- is displayed this indicates that a self test diagnostic fault has been detected, and a code will be displayed indicating the type of fault. Pressing TEST/EXEC will continue the self test and all faults found will be scrolled on to the display before reverting to the opening menu as above, but of course operation of the unit will then be suspect. Before contacting your distributor, check that the test socket is completely empty.

## 5. Operating modes

The Model 570 Handheld Linear IC Tester has a number of test modes that are selected using the MODE/CLEAR key from the initial screen. The test modes are as follows:-

- SINGLE - execute a single test on the IC in the socket.
- LOOP - execute a test repeatedly, regardless of the result.
- P LOOP - execute a test repeatedly, provided the result was PASS.
- F LOOP - execute a test repeatedly, provided the result was FAIL.
- SEARCH - identify an unknown or house coded IC.
- DIAGS - execute the diagnostic self test.

## 6. Entering test numbers

Press the MODE/CLEAR key until the desired test mode is displayed. Enter the number of the IC you wish to test. Pressing the MODE/CLEAR key will clear these digits from the display if a mistake is made.

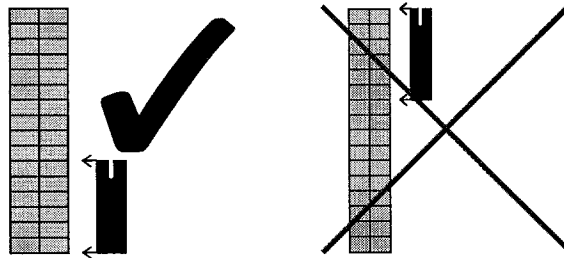
**Note:** The NUMERIC information only is entered, leaving out the manufacturers prefixes, suffixes, and IC family information. As an example, all the following linear ICs should be entered as 7, 4, 1 on the keypad:-

**uA741CP, uA741M, uA741C etc.**

Some ICs are available in different pin outs or package types, and also there may be several different types of IC with the same numerical part number. In these cases the Model 570 Handheld Linear IC Tester will automatically determine which test to perform. If however the IC is faulty the unit may not be able to determine the correct IC type or package - if this happens a warning message will be displayed and a menu will appear to allow you to select the correct part number. A complete list of all ICs supported by the Model 570 Handheld Linear IC Tester is contained in the IC SUPPORT LIST at the end of this manual together with notes on any special requirements for certain ICs.

## 7. Testing the IC

The test socket is a 24 pin shell with 16 active pins. Insert the IC to be tested in the front of this 16 pin Zero Insertion Force (ZIF) socket with pin 1 towards the display as shown below:-



Ensure that the operating lever on the socket is in the open (i.e. up) position before inserting the IC. Close the socket by lowering the lever, making sure that the IC is firmly seated in the socket and making good contact. Press the TEST/EXEC key to activate the test sequence for the IC. If an invalid IC type number was entered, or if the IC you have requested is not supported the message "Unknown" will be displayed. Simply entering another IC type number will automatically clear this error message. If a valid type number was entered, the IC test will begin and the message "BUSY" will be displayed while the test proceeds. Many of the tests, however, execute so quickly that this message is not noticeable.

## 8. Test result

A pre-determined sequence of signals is applied to the inputs of the IC under test and the output voltages are measured prior to comparing with the correct values. The exact nature of the test depends on the function of the IC, but as an example the operational amplifier tests include both open and closed loop testing over a range of input voltages and gain settings.

If all the outputs respond correctly the result PASS will be displayed at the top right of the display. A scrolling message will contain the IC

function and power pin information. If the IC under test takes an excessive amount of current when power is applied, a warning 'ICC!' will appear on the top right of the display. Press the TEST/EXEC key to continue with the test, or CLEAR to abandon it. Depending on the condition of the batteries there may also be a BAT! warning which indicates that the batteries are incapable of supplying the current required by the IC under test. You can continue with the test by pressing the TEST/EXEC key, but the unit may malfunction because of a drop in battery voltage. To avoid this, change the batteries or use a battery eliminator. Note that a faulty IC may demand more operating current and therefore will quickly drain the batteries.

Some ICs require external components to be fitted prior to the test - in these cases the message EXT will be displayed at the top right of the display. Please refer to the IC lists at the end of this manual for details of the component(s) required. After fitting the component the test can be carried out by a further press of the TEST key. If you wish you can abandon the test by pressing the CLEAR key.

In the case of a FAIL result the error conditions at all the non-functional pins of the IC will be scrolled on the display, and also the IC function will be shown. The various failure conditions that can be displayed are as follows:-

- VO- - the output shown was below the expected voltage.
- VO+ - the output shown was above the expected voltage.
- LOAD- - the input shown has an internal load to the negative supply.
- LOAD+ - the input shown has an internal load to the positive supply.
- RegL - the voltage regulator output voltage shown is too low.
- RegH - the voltage regulator output voltage shown is too high.

In some cases the message SEE NOTE will appear as part of the scrolling test result. Please refer to the IC lists at the end of this manual for details of any special requirements for testing this particular IC.



In addition the scrolling test results may include one or more WARNING indications. These warnings indicate conditions that may result in an incorrect test result, and are as follows:-

- D/F - Result may be invalid because last self test failed.
- Bat - Battery voltage too low during test
- ICC - Large current taken by IC under test

Some ICs are available in various packages, and there are some ICs in the library which have the same numerical part number even though the IC functions are different. In these cases the Model 570 Handheld Linear IC Tester will automatically determine the package and IC type prior to the test, provided that the IC is functional. If the IC is faulty, one of the following warnings will appear after the test:-

WARNING: All Part Types FAIL

WARNING: All Package Types FAIL

Both these messages indicate that the IC is faulty, but in the first case you can obtain more information about the nature of the fault by selecting the correct part type from a menu. Use EXEC to display the part type menu, then MODE/CLEAR to scroll through all available part types until the correct one is displayed. Pressing TEST will then cause the normal fault display for this IC to be displayed.

Before discarding a failed IC check that the correct IC type number was entered and also check that the IC pins are clean and making good contact with the test socket.

## 9. Testing further ICs

After a test is completed the test result will be displayed. To test another IC of the same type, simply insert the next IC and press the TEST/EXEC key again. To test a different IC, enter the new IC type number in the usual way, noticing that pressing the first digit of the new number automatically clears the previous number from the display. Remember that the CLEAR key can be used if an error is made during the entry of the IC type number.

## 10. Continuous testing

It is possible to test the same IC repeatedly to detect intermittent or temperature related faults, or to rapidly test a batch of identical ICs. There are three types of test loop modes:-

LOOP - execute a test repeatedly, regardless of the result.

P LOOP - execute a test repeatedly, provided the result was PASS.

F LOOP - execute a test repeatedly, provided the result was FAIL.

The Model 570 Handheld Linear IC Tester is configured into one of the loop modes using the MODE/CLEAR key as described earlier. Insert the IC and press TEST/EXEC in the usual way to start the continuous test process. The result of each test is displayed as PASS or FAIL on the top right of the display. In LOOP mode this allows a large batch of identical ICs to be tested, without any action on the part of the operator other than inserting the IC. When the IC is inserted, sufficient time must be allowed for the test to take place before the result status is updated, so if in doubt the IC should be tested in single mode so that the approximate test time can be determined. It will be found that high throughput can be obtained using this mode.

To stop any of the test loops, press CLEAR, but note that the test in progress is completed before the command is obeyed. The effect of this is usually unnoticeable, but where the test takes a reasonable time to execute there will be a delay before the instrument responds to the CLEAR key.

**Note:** Testing ICs in loop mode will drain the batteries quickly, and it is recommended that a battery eliminator is used if you wish to perform loop tests. If the ICC! warning appears, the Compact will reconfigure itself to SINGLE mode to avoid draining the batteries.

## 11. Self test mode

This feature allows you to check the integrity of the unit, including the pin drivers and receivers, power supplies and other internal hardware. The test executes automatically at switch on, but you can if you wish

perform a self test at any time by selecting Self Test (Diags) mode using the MODE/CLEAR key and pressing TEST/EXEC.

If a fault is discovered an appropriate message will be scrolled on the display which will help our engineers to locate and rectify the fault. This message should be noted and quoted in any correspondence relating to a unit fault. Contact your distributor in the event of a self test fail, but first of all ensure that the socket was empty when the diagnostics were run.

**Note:- The self test run when "Diags" is selected includes a check of the internal program EPROM which is not done during the power up self test to save time.**

## 12. Search mode

This feature allows the type number of an unknown IC to be determined, provided the IC is actually contained in the Model 570 Handheld Linear IC Tester library, and it is a functional IC. This facility is useful when the IC type number is illegible or has been removed, or the IC is house coded.

Use the MODE/CLEAR key to choose SEARCH mode, insert the unknown IC into the socket and press the TEST/EXEC key. You will then be prompted to choose the number of pins of the IC you wish to identify - use the MODE/CLEAR key to select from 3 to 16 pins or 'QUIT' to abandon this mode. Press the TEST/EXEC key again to start the SEARCH or to quit as required.

During the identification process the display will now indicate the number of ICs identified (IDENT:) and will also show graphically how far through the library the SEARCH has progressed. At the end of the SEARCH a list of all the similar ICs will be scrolled onto the display. The list may be viewed again by pressing the TEST/EXEC key.

If the IC cannot be identified the message "Not in Library" will be displayed. This either means that the IC is not in the library or it is non-functional. Note that if the Model 570 Handheld Linear IC Tester detects excessive supply current (ICC! or BAT! warnings), the IC will not be identified, but can still be tested in SINGLE mode.

### 13. Specification

SPECIFICATION	
Batteries:	2 x 9V size
DC input:	12V, 300mA max, Regulated.
Power consumption:	Power off      2 $\mu$ A
	Standby        30mA
Test thresholds:	Variable (DAC controlled)
Dimensions:	200mm X 100mm X 55mm approx.
Library ICs:	Op-amps, comparators, regulators, opto-isolators, references, analog switches/multiplexers, transistor arrays, audio, virtual grounds

### 14. IC Support List

Software Version No. <b>1.31</b>
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#### 14.1. Introduction

This section is a complete list of the ICs supported by the Model 570 Handheld Linear IC Tester. The full alphanumeric part number is given followed by the numeric only part which is the number keyed in to the Model 570 Handheld Linear IC Tester to perform the test. If there are any special requirements necessary for a particular IC, there will be a number in brackets referring to the notes at the end of this manual. Always consult this list before testing an IC you have not tested before, particularly when there is a note to refer to.

#### 14.1.2 OPERATIONAL AMPLIFIERS

AD546	546	CA3080	3080	ICL7621	7621
AD548	548	CA3130	3130	ICL7641	7641
AD645	645	CA3140	3140	ICL7642	7642
AD648	648	CA3160	3160	LF147	147
AD711	711	CA3240	3240	LF155	155
AD712	712	CA3260	3260	LF255	255
AD713	713	CA5130	5130	LF347	347
AMP03	03	CA5160	5160	LF351	351
CA1458	1458	CA5260	5260	LF353	353
		HA3-2840-5	328405	LF355	355
		ICL7611	7611	LF411	411
		ICL7612	7612	LF412	412

## Model 570 Handheld Linear IC Tester

LM11	11	OP200	200	LM211	211
LM101	101	OP290	290	LM219	219
LM107	107	OP482	482	LM239	239
LM108	108	OP490	490	LM293	293
LM118 (1)	118	OPA121	121	LM311	311
LM124	124	OPA606	606	LM319	319
LM148	148	RC4558	4558	LM339	339
LM158	158	TL061	061	LM393	393
LM201	201	TL062	062	LM2901	2901
LM207	207	TL064	064	LM2903	2903
LM208	208	TL071	071	LM3302	3302
LM218 (1)	218	TL072	072	LP111	111
LM224	224	TL074	074	LP211	211
LM248	248	TL081	081	LP311	311
LM258	258	TL082	082	LP239	239
LM301	301	TL084	084	LP265	265
LM307	307	TLC271	271	LP339	339
LM308	308	TLC272	272	LP365	365
LM318 (1)	318	TLC274	274	LP2901	2901
LM324	324	TLC277	277	LT1016	1016
LM348	348	TLC279	279	TLC339	339
LM358	358	TLC1079	1079	TLC372	372
LM2900	2900	TLC2272	2272	TLC393	393
LM2902	2902	TLC2872	2872	TLC3702	3702
LM2904	2904	TLE2061	2061	TLC3704	3704
LM3900	3900	TLE2062	2062		
LMC660	660	TLE2064	2064	<u>14.1.4 OPERATIONAL</u>	
LMC6032	6032	TLE2071	2071	<u>AMPLIFIERS/</u>	
LMC6042	6042	TLE2072	2072	<u>COMPARATORS</u>	
LP124	124	TLE2074	2074	LM392	392
LP324	324	TLE2081	2081	LM2924	2924
LT1013	1013	TLE2082	2082	<u>14.1.5 VOLTAGE</u>	
LT1014	1014	TLE2084	2084	<u>REGULATORS</u>	
MAX407	407	TLE2161	2161	uA7805 (2)	7805
MAX427	427	uA709	709	uA7905 (2,3)	7905
MC3303	3303	(8 pin)		LM2930-5 (3)	29305
MC3403	3403	uA709	709	LM2931-5 (3)	29315
MC33171	33171	(14 pin)		LM340T5 (2)	3405
MC33172	33172	uA741	741	MAX667	667
MC33174	33174	uA747	747	<u>14.1.6 VOLTAGE</u>	
NE531	531	uA748	748	<u>REFERENCES</u>	
NE5532	5532			REF02	02
NE5534	5534			REF03	03
OP07	07	<u>14.1.3</u>		REF05	05
OP27	27	<u>COMPARATORS</u>		REF43	43
OP37	37	CMP04	04	MAX872	872
OP42	42	LM111	111		
OP77	77	LM119	119		
OP90	90	LM139	139		
OP97	97	LM193	193		

**14.1.6 ANALOG SWITCHES /MULTIPLEXERS**

4016	4016
4051	4051
4052	4052
4066	4066
4529	4529
DG201	201
DG211	211
DG212	212
DG308	308
DG309	309
DG411	411
DG412	412
DG413	413
DG417	417
DG418	418
DG419	419
DG508	508
LF13201	13201
LF13202	13202
LF13508	13508

**14.1.7 TRANSISTOR ARRAYS**

ULN2001	2001
ULN2003	2003
ULN2004	2004
ULN2005	2005
ULN2064	2064

ULN2065	2065
ULN2068	2068
ULN2069	2069
ULN2074	2074
ULN2075	2075

**14.1.8 OPTOISOLATORS/OPTOCOUPERS**

4N25	425
4N26	426
4N27	427
4N28	428
4N29	429
4N30	430
4N31	431
4N32	432
4N33	433
4N35	435
4N36	436
4N37	437
6N135	6135
6N136	6136
HCPL2530	2530
HCPL2531	2531
HCPL4502	4502
HCPL4503	4503
ILD74	74
ISD74	74
ILCT6	6
LD428	428
MCT2	2
MOC8030	8030

TIL197	197
TIL198	198
TIL199	199
TLP250	250
TLP559	559
TLP621	621

**14.1.9 DACS/ADCS**

AD7524	7524
DAC08	08
DAC0800	0800
TLC7524	7524

**14.1.10 SPECIAL FUNCTIONS**

NE555 (4)	555
NE556	556
TLC555	555
TLC556	556

**14.1.11 VIRTUAL GROUNDS**

TLE2425 (2)	2425
TLE2426 (2)	2426

**14.1.12 AUDIO**

L272	272
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**14.2. Notes on testing some ICs**

**Note 1:** The LM118, LM218 & LM318 require a 47nF compensation capacitor connecting between pins 1 and 6 to stabilise the device during the test.

**Note 2:** These voltage regulators can be tested by inserting them directly in the ZIF socket. They should be inserted as follows:-

PACKAGE TYPE	ORIENTATION
TO-220 (eg uA7805)	Insert in pins 1, 2 and 3 with metal tab facing right
TO-226 (eg 78L05)	Insert in pins 1, 2 and 3 with flat side facing right
DIL	Insert in normal position at front end of socket

**Note 3:** These voltage regulators require external capacitors to be fitted to stabilise the device during the test. Insert the capacitors as follows:-

IC	COMPONENTS
LM2930-5	100 $\mu$ F between pins 2 and 3, -ve lead to pin 2
LM2931-5	10 $\mu$ F between pins 2 and 3, -ve lead to pin 2
$\mu$ A7905	1 $\mu$ F between pins 2 and 3, -ve lead to pin 2
$\mu$ A7905 (DIL)	1 $\mu$ F between pins 6 and 1, -ve lead to pin 6

**Note 4:** This IC requires a 0.33 $\mu$ F capacitor connected between pins 1 and 8 to prevent the supply from dropping.

## 15. Service Information

Contact B&K Precision to receive a repair Return Authorization tracking number. This number must be clearly written on the exterior of the shipping carton and will assist us with the processing of your return. Return all merchandise to B&K Precision Corp. with pre-paid shipping. The flat-rate repair charge includes return shipping to locations in North America. For overnight shipments and non-North America shipping fees contact B&K Precision Corp.

**Warranty Service:** Please return the product in the original packaging with proof of purchase to the below address. Clearly state in writing the performance problem and return any leads, connectors and accessories that you are using with the device.

**Non-Warranty Service:** Return the product in the original packaging to the below address. Clearly state in writing the performance problem and return any leads, connectors and accessories that you are using with the device. Customers not on open account must include payment in the form of a money order or credit card. For the most current repair charges contact the factory before shipping the product.

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Include with the instrument your complete return shipping address, contact name, phone number and description of problem.

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# **BK PRECISION®**

## **Limited One-Year Warranty**

B&K Precision Corp. warrants to the original purchaser that its product and the component parts thereof, will be free from defects in workmanship and materials for a period of one year from the date of purchase. B&K Precision Corp. will, without charge, repair or replace, at its' option, defective product or component parts. Returned product must be accompanied by proof of the purchase date in the form a sales receipt.

To obtain warranty coverage in the U.S.A., this product must be registered by completing and mailing the enclosed warranty card to: B&K Precision Corp., 22820 Savi Ranch Parkway, Yorba Linda, CA 92887-4604 within fifteen (15) days from proof of purchase.

Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. It is void if the serial number is altered, defaced or removed.

B&K Precision Corp. shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific rights and you may have other rights, which vary from state-to-state.

**Model Number:** \_\_\_\_\_

**Date Purchased:** \_\_\_\_\_

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