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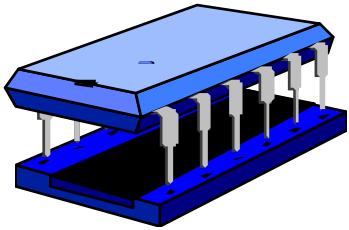
B&K PRECISION

MODEL 570A HANDHELD LINEAR IC TESTER

OPERATOR'S MANUAL

CONTENTS

1. introduction



Thank you for purchasing the B & K Precision Model 570A Hand Held Linear IC Tester.

The basic function of the B & K Model 570A Linear IC Tester is to test a linear IC for correct logical functioning as described in the manufacturer's IC data sheets. The B & K Model 570A applies the necessary analogue signals to the inputs of the IC, monitoring the outputs at each stage and comparing them with the expected voltages. Any discrepancy results in a FAIL indication and the faulty pins are shown on the integral display. Additional facilities are also provided, amongst 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. Since the B & K Model 570A contains an extensive IC library, it is not necessary to program the unit yourself other than to key in the IC number. It is also capable of identifying an unknown IC using the SEARCH mode - this is a feature that many users will find extremely valuable.

The B & K Model 570A is provided with an RS-232 interface enabling it to be connected to a companion software package called CompactLink running on a PC. CompactLink allows test programs for ICs not included in the internal library to be developed and downloaded into the B & K Model 570A memory to enhance the library according to your wishes.

2. DC input

The B & K Model 570A is powered by four AA batteries or by the use of the battery eliminator input at the rear of the case. To insert the batteries, turn the unit upside down and remove the battery

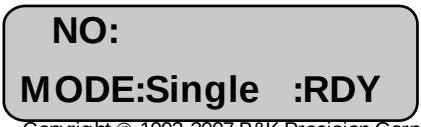
cover by removing the two cross head screws holding it in place. The batteries must be inserted in the correct orientation, as indicated by the drawing within the battery compartment. Incorrect insertion of batteries will not allow the unit to operate. Replace the battery cover and insert the screws. If the battery voltage falls 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 B & K Model 570A. Some ICs consume a significant amount 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. Note that using an incorrect battery eliminator voltage may damage the unit and invalidate the warranty.

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 or when “Sw Off” is selected from the main menu. When the unit is switched on, it first 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, a pass result will be displayed on the screen. Press a key to enter the main operating mode - the display will be as follows:



When this initial display is obtained the B & K Model 570A is ready for use. If, however, the message SELF-TEST FAIL: is displayed along with a fault message, this indicates that a self-test diagnostic fault has been detected. Any detected faults will be displayed one at a time. Pressing the TEST/EXEC key will then revert 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 B & K Model 570A 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 test repeatedly, regardless of the result.
P Loop	- execute test repeatedly, provided the result was PASS.
F Loop	- execute test repeatedly, provided the result was FAIL.
Search	- identify the number of the IC in the socket.
Diags	- execute the diagnostic self-test.
CmLink	- enter remote mode for CompactLink software.
Sw Off	- turn off the unit

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 the last digit from the display if a mistake is made.

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

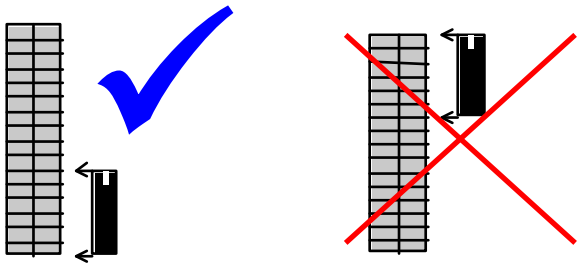
e.g. uA741CP, uA741M, uA741C etc

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 B & K Model 570A 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 - if this happens a warning message will be displayed. A complete list of all ICs supported by the B & K Model 570A is contained in the IC SUPPORT LIST at the end of this manual together with notes on any special requirements for certain ICs.

Note that if you have stored a user library using CompactLink, an IC in the user library with the same number as one in the internal library will take precedence. This allows a new test to be written for an existing IC. If you wish both tests to be available, use a different number for your user test.

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 the 24 pin Zero Insertion Force socket with pin 1 towards the display as shown below:



For 3 pin TO220 or TO92 packages, insert the IC in pins 6, 7 and 8 (lower left) of the socket with the metal tab or flat side facing to the right.

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 results

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 a short circuit between the power pins of the IC is detected, a warning ‘SHT!' will appear on the top right of the display and, since no valid test is then possible, the result will FAIL. If the IC under test takes an excessive amount of current when power is applied, a warning 'ICC!' will appear. Press the TEST/EXEC key to continue with the test, or MODE/CLEAR to abandon. 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 or CAP 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 the IC function will be shown. The various failure conditions that can be displayed are as follows:

V<<	- the voltage on the pin was lower than expected.
V>>	- the voltage on the pin was higher than expected.
D<<	- the diode drop voltage was lower than expected.
D>>	- the diode drop voltage was higher than expected.
LOAD	- the input cannot be driven.

In some cases, 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 also 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 B & K Model 570A will automatically determine the IC type prior to the test, provided that the IC is functional. If the IC is faulty, the following warning will appear after the test:

WARNING: All Part Types FAIL

This indicates that the IC is faulty, but the pin information cannot be displayed since the exact part type cannot be identified.

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. Note that there is no way of

stopping a test once it has commenced, but see the description of loop functions later in this manual.

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 MODE/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 is PASS.
F Loop - execute a test repeatedly, provided the result was FAIL.

The B & K Model 570A 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 MODE/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 MODE/CLEAR key.

Note: Testing high current 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.

11. search mode

This feature allows the type number of an unknown IC to be determined, provided the IC is actually contained in the B & K Model 570A library, and it is a correctly functioning IC. This facility is useful when the IC type number is illegible or has been removed.

Use the MODE/CLEAR key to choose SEARCH mode, insert the unknown IC into the socket and press the TEST/EXEC key. You will 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 indicate the number of ICs identified (IDENT:) and will 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 scrolled again by pressing the TEST/EXEC key.

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

If you have a user library present the search will extend to user ICs in that library also. However, CompactLink contains a facility for excluding ICs from the search if required.

12. 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 a brief description will be displayed 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.

13. CompactLink mode

The B & K Model 570A is provided with an RS-232 interface to connect to a PC with a serial COM port or using a USB to RS-232 converter. A companion software package CompactLink is available which provides library management, test development and debugging and user library update facilities. You can also use CompactLink to update the software of your B & K Model 570A without replacing the internal memory or opening the case.

To enter CompactLink mode, user the MODE/CLEAR key to enter CMLINK mode, then press TEST/EXEC. Press TEST/EXEC again to confirm that you wish to enter CompactLink mode, and the display will show “Not Connected”. Run the CompactLink software on your PC, connect the serial cable and follow the CompactLink manual instructions to connect to the B & K Model 570A.

For comprehensive instructions on using CompactLink please refer to the manual and built-in help supplied with the software.

Note that in CompactLink mode, including waiting for a connection, the normal power down timeout is disabled and the unit will remain

on for ever. We recommend using a battery eliminator when using CompactLink mode to develop test programs.

14. specifications

SPECIFICATIONS		
Batteries:	4 X AA size	
DC input:	6V, 850mA max, center positive, regulated.	
Power consumption:	Power off	10µA max
	Standby	30mA max
	Testing	IC dependent
Test parameters:	Supply voltage	2V to 10V IC dependant
	Op amp gains	open loop, 1,2,11,46
	Stimulus	0 - 10V, 8 bits, 330R source
	Sense	0 to 10.5V, 12 bit, >1M load
RS-232 settings	38400 baud, 8 data bits, 1 stop bit, no parity	
Dimensions:	200mm X 100mm X 55mm approx.	
Library ICs:	Op amps, comparators, optos, regulators, references, switches, miscellaneous	

Software Version No.
BK570A 2.03

15. IC support list

15.1. introduction

This section is a complete list of the ICs supported by the B & K Model 570A. If there are any special requirements necessary for a particular IC, this will be indicated in the comments column in the table. Always consult this list before testing an IC you have not tested before, particularly when there is a comment present.

15.2. operational amplifiers

IC	Number	Comments
AD546	546	
AD548	548	
AD645	645	
AD648	648	
AD711	711	
AD712	712	
AD713	713	
AMP03	03	
CA1458	1458	
CA3080	3080	
CA3130	3130	
CA3140	3140	
CA3160	3160	
CA3240	3240	
CA3260	3260	
CA5130	5130	
CA5160	5160	
CA5260	5260	
HA3-2840-5	328405	
ICL7611	7611	
ICL7612	7612	
ICL7621	7621	
ICL7641	7641	
ICL7642	7642	
L272	1272	
LF147	147	
LF155	155	
LF156	156	

LF157	157	
LF255	255	
LF256	256	
LF257	257	
LF347	347	
LF351	351	
LF353	353	
LF355	355	
LF356	356	
LF357	357	
LF411	411	
LF412	412	
LM101	101	
LM107	107	
LM108	108	
LM11	11	
LM118	118	Add 47nF capacitor between IC pins 1 and 6
LM124	124	
LM148	148	
LM158	158	
LM201	201	
LM207	207	
LM208	208	
LM218	218	Add 47nF capacitor between IC pins 1 and 6
LM224	224	
LM248	248	
LM258	258	
LM2900	2900	
LM2902	2902	
LM2904	2904	
LM2924	2924	
LM301	301	
LM307	307	
LM308	308	
LM318	318	Add 47nF capacitor between IC pins 1 and 6
LM324	324	
LM348	348	
LM358	358	
LM3900	3900	
LM392	392	
LMC6032	6032	
LMC6042	6042	
LMC660	660	

LT1013	1013
LT1014	1014
MAX407	407
MAX427	427
MC3303	3303
MC33171	33171
MC33172	33172
MC33174	33174
MC3403	3403
NE531	531
NE5532	5532
NE5534	5534
OP-07	07
OP200	200
OP-27	27
OP-282	282
OP290	290
OP-37	37
OP-42	42
OP482	482
OP490	490
OP-77	77
OP-90	90
OP-97	97
OPA121	121
OPA606	606
OPA620	620
RC4458	4458
TL061	061
TL062	062
TL064	064
TL071	071
TL072	072
TL074	074
TL081	081
TL082	082
TL084	084
TLC1079	1079
TLC2272	2272
TLC271	271
TLC272	272
TLC274	274
TLC277	277

TLC279	279
TLC2872	2872
TLE2061	2061
TLE2062	2062
TLE2064	2064
TLE2071	2071
TLE2072	2072
TLE2074	2074
TLE2081	2081
TLE2082	2082
TLE2084	2084
TLE2161	2161
UA709-14	709
UA709-8	709
UA741-14	741
UA741-8	741
UA747	747
UA748	748

15.3. comparators

IC	Number	Comments
CMP04	04	
LM111	111	
LM119	119	
LM139	139	
LM193	193	
LM211	211	
LM219	219	
LM239	239	
LM2901	2901	
LM2903	2903	
LM293	293	
LM311	311	
LM319	319	
LM3302	3302	
LM339	339	
LM393	393	
LP111	111	
LP211	211	
LP239	239	
LP265	265	
LP2901	2901	
LP311	311	

LP339	339
LP365	365
LT1016	1016
TLC339	339
TLC3702	3702
TLC3704	3704
TLC372	372
TLC393	393

15.4. switches and multiplexers

IC	Number	Comments
4016	4016	
4051	4051	
4052	4052	
4066	4066	
4529	4529	
DG201	201	
DG202	202	
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	

15.5. regulators, references and virtual grounds

IC	Number	Comment
LM2930-5	29305	Add 100uF between IC pins 2 (-) and 3 (+)
LM2931-5	29315	Add 100uF between IC pins 2 (-) and 3 (+)
LM340T5	3405	
LM7805	7805	
LM7806	7806	
LM7808	7808	

LM7905	7905	May need 10uF between IC pins 2 (-) and 3 (+)
MAX667	667	May need 10uF between IC pins 4 (-) and 2 (+)
MAX872	872	
MAX874	874	
REF02	02	
REF03	03	
REF05	05	
REF43	43	
TLE2425	2425	
TLE2426	2426	

15.6. opto couplers and isolators

IC	Number	Comments
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	
H11A1	111	
H11A2	112	
H11A3	113	
H11A4	114	
H11A5	115	
HCPL2503	2502	
HCPL2530	2530	
HCPL2531	2531	
HCPL4502	4502	
HCPL4503	4503	
ILCT6	6	
ILD74	74	
ISD74	74	
LD428	428	
MCT2	2	
MCT210	210	

MCT2200	2200
MCT2201	2201
MCT2202	2202
MCT271	271
MOC8030	8030
MOC8050	8050
TIL197	197
TIL198	198
TIL199	199
TLP250	250
TLP521	521
TLP521-2	5212
TLP521-4	5214
TLP559	559
TLP621	621
TLP621-2	6212
TLP621-4	6214

15.7. miscellaneous

IC	Number	Comment
AD7524	7524	
DAC08	08	
NE555	555	
NE556	556	
ULN2001	2001	
ULN2002	2002	
ULN2003	2003	
ULN2004	2004	
ULN2064	2064	
ULN2065	2065	
ULN2066	2066	
ULN2067	2067	
ULN2068	2068	
ULN2069	2069	
ULN2070	2070	
ULN2071	2071	
ULN2074	2074	
ULN2075	2075	
ULN2076	2076	
ULN2077	2077	