

THE ABI DIGITAL IC TESTER

OPERATORS MANUAL

A.B.I. Electronics Ltd., Unit 21, Aldham Industrial Estate, Wombwell,
Barnsley, S. Yorks., S73 8HA.

Telephone: Barnsley (0226) 751639 Telex: 547376 CEAG G (For A.B.I.)

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CONTENTS

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	Page
Introduction	1
Precautions	1
Switching On	2
Entry of Device Type	3
Testing the Device	4
Memory Testing	5
Testing Further Devices	6
Continuous Testing	7
Chip Search Mode	9
Further Features	10
Device Lists	11
Series 54/74 TTL Devices	12
Notes on TTL Devices	19
CMOS Devices	20
Memory Devices	23
Interface Devices	25

INTRODUCTION

The ABI Digital IC Tester is designed to be extremely simple to use, and because of this the operators manual is quite brief. Nevertheless you should read it carefully before switching on for the first time to ensure that you make full use of the facilities provided. In particular, the precautions outlined below should be noted to prevent damage to the instrument. Depending on the various software packages that your instrument is fitted with, some sections of this manual may not be applicable. At the present time there are four options available - TTL, CMOS, memory and interface device families. A complete list of the devices supported is included at the end of this manual.

The basic function of the instrument is to test the device for correct logical functioning as described in the device truth table and/or function table. The instrument applies the necessary signals to the inputs of the device, monitoring the outputs at each stage and comparing them with the expected states. Any discrepancy results in a failure indication and the faulty pin number is also displayed. 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 device for demonstration or educational purposes. Because the instrument contains all the necessary data to perform the tests, it is not necessary to program the instrument yourself other than to key in the device number, and indeed the instrument is capable of working out the number anyway using the "Chip Search" mode - this is a feature that many users will find extremely valuable.

Precautions:-

Operating ambient temperature range: 0C to 35C.

Operating ambient humidity range: 35% to 85%.

Do not move the instrument rapidly from a hot place to a cold place to prevent condensation forming on the inside.

Do not allow the instrument to be subjected to excessive vibration or shock.

If the instrument becomes dirty, clean using a barely damp cloth and mild soap solution. Do not use solvents or abrasives.

After switching off, do not switch on again for at least 5 seconds.

SWITCHING ON

The instrument is factory configured for 240 volts AC 50/60 Hz operation - contact the factory if you require the unit to operate from any other voltage before connecting to a mains supply. The wires in the mains lead are colour coded as follows:- Brown - Live, Blue - Neutral, Green/Yellow - Earth. This equipment should not be used without an adequate earth connection. The mains input is fused at 1A, and to ensure continued protection this fuse rating should not be changed. Before switching on, check that there are no devices inserted in any of the test sockets, as the presence of a device will interfere with the self-test diagnostic system which operates on switch on. If all is well, the display will momentarily show random characters (due to the diagnostic sequence testing the display) before showing the prompt "CHIP-". When this message is displayed the instrument is ready for use. If, however, the message "FAULT" is displayed, flashing along with a single digit number, this indicates that the instrument has detected a fault with itself. You will notice that in this condition the instrument will not respond to any keys to prevent it from being used in a faulty state. Before contacting the factory, check that there is no device inserted into any of the test sockets. Should you inadvertently switch the instrument on with a device inserted, simply remove the device, switch off, wait 5 seconds and switch on again.

ENTRY OF DEVICE TYPE

After switching on and the prompt "CHIP-" has appeared, the instrument is ready to be configured to test a device. To do this the device type number is entered using the numeric keys on the keypad. The NUMERIC information only is entered, leaving out the manufacturers prefixes and suffixes and device family information. As an example, all the following TTL devices should be entered as 7, 4, 0, 0 on the keypad:-

- DM74LS00J
- DM74LS00N
- N74LS00N
- N74S00N
- DM7400J
- N7400N
- 74ALS00N etc.

In addition, the TTL compatible CMOS devices (74C and 74HC families) should be entered exactly as their TTL counterparts. The instrument makes no distinction between the different device families (LS, S, ALS etc.) and so this information does not need to be entered. A very small number of devices have differing pinouts for different device families - in these cases the most popular pinout only is supported. Series 54 military specification devices are tested using exactly the same procedures, so there is no need to re-enter the device type number if a mixed batch of 54 and 74 series devices is being tested, provided the devices are otherwise identical. The CMOS 4000 series is also supported and the device numbers for this family should all begin with "4", so that with for example Motorola devices beginning MC14... the initial "1" should be omitted. The same principles apply also to memory devices, which are mostly four digit numbers. With interface devices of the 8T series the "T" should be omitted. A complete list of all devices supported by the instrument is contained at the end of this manual, together with notes on any special requirements for certain devices.

If an error is made during the entry of the device type number, press the red STOP key and enter the complete number again. Do not press the green START key until the device has been inserted into the appropriate test socket.

TESTING THE DEVICE

Having entered the correct type number as described in the previous section, insert the device (with pin 1 nearest the display) into the appropriate Zero Insertion Force socket. Ensure that the operating lever on the socket is in the open (ie. up) position before inserting the device. Close the socket by lowering the lever, making sure that the device is firmly seated in the socket and making good contact.

When the device is inserted in the ZIF socket, press the green START key to activate the test sequence for the device. If an invalid device type number was entered, or if the device you have requested is not supported by the instrument, the message "Error" will be displayed in response to pressing the START key. Simply entering the correct device type number will automatically clear this error message. If a valid type number was entered, the instrument will now begin testing the device, displaying the message "busy" while the test proceeds. Many of the tests, however, execute so quickly that this message is not noticeable.

After the test the result "PASS" or "FAIL" will be displayed as appropriate, flashing along with the device type number. For non-functional TTL and CMOS devices, the pin number at which the instrument detected a faulty condition is displayed after the fail message. This information is useful in establishing the cause of failures, but it is important here to note several points concerning this feature. Firstly, as soon as the instrument detects a faulty condition testing stops, so that only the first faulty pin is displayed although there may be others. Secondly, with many devices it is impossible for the instrument to determine the exact location of a fault, and in these cases further investigations may be required to determine the nature of a fault. Finally, with devices that are inserted in unusual positions (eg. 8 pin devices etc., see notes at the end of this manual) the pin number given will be the number of the socket, not that of the device itself. Despite these limitations, however, this feature remains a useful facility provided the results are correctly interpreted.

When the test has completed and the result has been displayed, the device can now be removed, but before discarding a failed device check that the correct device type number was entered by observing the flashing display, and also check that the device pins are clean and making good contact with the test socket. Note that the instrument does not respond to key depressions made during a test until the test is completed. The effect of this is usually unnoticeable, but with for example memory devices which take a relatively long time to test confusion can arise as the instrument responds, at the end of a test, to a key which may have been depressed several seconds before. It also follows from the above that there is no way of stopping a test once it has commenced, but see the description of loop functions later in this manual.

MEMORY TESTING

If your instrument is fitted with the memory device software, you will realise that some of these devices are contained in 18 pin packages. These should be inserted in the lower section of the 20 pin ZIF socket (ie. pin 9 of the device in pin 10 of the socket), and a link added from pin 24 to pin 19 of the 24 pin ZIF socket to supply power to pin 18 of the device (pin 19 on both sockets are internally connected). This link can be fitted on a 24 pin header, which can be left in position in the 24 pin ZIF socket whilst testing a batch of 18 pin devices. Do not forget to remove the header before testing other devices.

The 4164 64k dynamic RAM device can be tested using the instrument, but due to the very critical timing requirements of this device some manufacturers parts will require an external 1000pF capacitor to be fitted to correct the RAS timing. This capacitor should be fitted as described in the note in the device lists at the end of this manual. It is very important to note that the 4164 64k dynamic RAM device is inserted "upside down" in the 16 pin ZIF socket because of the unusual power supply pins on this device (see note in the device lists). Be very careful to ensure that this device is inserted correctly as it will almost certainly be damaged if inserted in the same way as other 16 pin devices.

The algorithm used for testing memory devices results in every possible combination of bits being written into every location in the memory array, and because of this the test can take a considerable time to execute (eg. for a 6116 2k by 8 RAM the test time is 65 seconds). An abbreviated form of the memory test algorithm can be selected if desired to reduce the time, but in this case all possible combinations are not used. Since most device failures are gross functional failures or "mechanical" defects associated with internal connections, bond wires etc. this test will still find these devices. If in any doubt about the integrity of a device, the normal test should be used. A complete list of memory devices supported by the instrument, along with test times for both modes, is contained at the end of this manual.

The abbreviated test mode is selected by entering the digits 0,0,4 instead of the device type number. Pressing START then results in the letter A being displayed at the extreme right hand end of the display as a constant reminder that abbreviated mode is in operation. To reset the system back to normal test mode, enter 0,0,0 on the keypad and press START again. Note that entering 0,0,4 or 0,0,0 as described above automatically clears any previous device type number, so this must be re-entered when the test mode is changed. Having selected the test mode and entered the device type number, the device can now be tested as described in the previous section. Note that in the event of a failure there is no faulty pin number indication with memory devices.

TESTING FURTHER DEVICES

Having tested the device, the instrument will continue to indicate the outcome of the test by displaying the device type number and PASS or FAIL alternately as a constant reminder. There are now two alternative procedures for testing another device. To test another device of the same type, simply insert the next device and press the START key again - there is no need to re-enter the device type number. In this way a batch of identical devices can be tested very quickly with only a single key depression per device. Another, even more rapid, method of testing a batch of identical devices is described later in the next section on continuous testing. To test a different device, enter the new device 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 STOP key can be used if an error is made during the entry of the device type number. As before, if the memory test mode is changed the device type number must be re-entered.

CONTINUOUS TESTING

It is possible to use the instrument to test the same device repeatedly to detect intermittent or temperature related faults, or to rapidly test a batch of identical devices in for example an inspection department. There are three types of test loops that can be set up, and each is identified by one of the letters L, P or F displayed at the extreme right hand end of the display. The three types of loop are as follows:-

- L - Unconditional Loop. Test is repeated indefinitely until STOP is pressed, irrespective of outcome of test. PASS/FAIL status is displayed as a single letter P or F on the display.
- P - Pass Loop. Test is repeated if result is PASS, otherwise testing is stopped and FAIL result is displayed. STOP can be used to stop the repetition of the test.
- F - Fail Loop. Test is repeated if result is FAIL, otherwise testing is stopped and PASS result is displayed. Again, STOP can be used to stop the repetition of the test.

The instrument is configured into one of the above loop modes by entering a three digit number from the following table in exactly the same manner as entry of a device type number. In addition, various other facilities are activated by entering one of the numbers in the table; these features are described elsewhere in this manual:-

Function	Number	Description
Clear	000	Clear loop function (power on default)
L	001	Unconditional Loop
P	002	Pass Loop
F	003	Fail Loop
A	004	Abbreviated memory test mode
C	005	Chip search mode
Version	006	Display version number
Diagnostics	007	Execute diagnostic test

Having entered the appropriate number from the table, press START and confirm that the correct letter appears on the right hand end of the display. The selected loop function can be cleared by entering 000 as shown in the table. Notice that entry of a loop function automatically clears a previously entered device type number, so this must be re-entered after the loop function. In addition, entering a loop function automatically clears the abbreviated memory test and chip search modes. It follows therefore that it is impossible to repeatedly execute the shortened form of the memory tests. During the entry of the device type number the loop function is displayed on the right as a constant reminder. During testing the "busy" message is displayed as before, and at this stage the display may show a slight "flicker" due to continuous updating taking place.

CONTINUOUS TESTING (CONTINUED)

In the Unconditional Loop (Function 001) mode, the result of each test is displayed at the third character position from the right in the form of a single letter P or F as appropriate. This allows a large batch of identical devices to be tested, without any action on the part of the operator other than inserting the device. When the device is inserted, sufficient time must be allowed for the test to take place before the result status is updated, so if in doubt the device should be tested in normal mode so that the approximate test time can be determined. It will be found that high throughput can be obtained using this mode, and at the same time wear on the instrument keys, particularly the START key, is minimised.

To stop any of the test loops, press STOP, but note that the test in progress is completed before the STOP 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 STOP key.

CHIP SEARCH MODE

This feature allows the type number of an unknown device to be determined, provided the device is actually supported by the instrument. This facility is useful when the device type number is illegible or has been removed. In addition, when testing a large batch of mixed devices it will be found that the time taken for the instrument to find the device type is typically less than the time taken to read and key in the number, so that the mixed batch can be tested with only one key depression (START) per device using Chip Search mode.

To activate this mode, enter the 3 digit number 0,0,5 as shown in the table in the previous section, whereupon the letter C (indicating Chip Search mode) will appear at the extreme right hand end of the display as for the loop functions. Insert the unknown device into the appropriate ZIF socket and press the START key again. The instrument will now ignore any type number present (whether entered manually or as the result of a previous search operation), and will begin to determine the type number of the device under test. The display will indicate "busy" during the search, and the result is indicated by the "PASS" display in conjunction with the type number in exactly the same way as a normal test result is displayed. If the device is not supported by the instrument, or if it is faulty, the "Error" message will be displayed.

It is important to note several points concerning the Chip Search feature:-

The device under test will have 5V, current limited at 0.5A, applied across its corner pins.

In some cases the type number display will be ambiguous due to logical equivalence of devices (eg. 7400, 7437, 74132 etc. will all be displayed as 7400 in Chip Search mode as they only differ in terms of output drive or threshold voltages).

A small number of CMOS devices are pin for pin equivalents of TTL devices. In these cases the TTL number will be indicated.

FURTHER FEATURES

There are two further facilities that are provided, although they are not directly concerned with the testing of devices. They allow the user to display the software version number, and also to run the instrument diagnostics without switching the instrument off.

To display the version number, key in 0,0,6, followed by START, in exactly the same way as the loop function described in the previous section. The version number will now be shown on the LED display. The first 3 characters are the software version number (eg 3-6 = version 3.6) of the software installed in your instrument, whilst the remaining characters show the options, if any, that the instrument is fitted with. Thus the number 3-6-12 indicates an instrument fitted with version 3-6 software with options 1 and 2. The options available at present are Memory (option 1) and Interface (option 2) device families.

To run the diagnostics, enter 0,0,7, followed by START. The instrument will then execute the internal diagnostics, displaying the "FAULT" message along with the fault number if a fault is detected, as described earlier. As before, the instrument will remain in an unusable condition if a fault is found during the diagnostic check. Note that after the successful completion of the diagnostic check, the device number, loop function and/or Chip search mode (if present) will be cleared and will need to be re-entered.

DEVICE LISTS

The remainder of the manual is a complete list of all the devices supported by your instrument, together with notes where applicable for those devices with unusual features or pin-outs. The devices numbers are listed on the left hand side, with columns representing the differing manufacturing technologies. A star (*) in a column indicates that this device is supported, and the lack of any note indicates that it can be tested without any special provisions for unusual pin-outs etc.. The lack of a star in a column indicates either that the device is not manufactured in that particular technology, or that the pin-out is different. Consult the manufacturers data to clarify this point. The lack of any stars in a row indicates that the device has been identified as being suitable for testing by the instrument, but the software has not yet been written. Contact the factory for further details of these devices. Note that the table has been set out in this way for reference only; the actual test performed on a device is the same irrespective of the device technology.

Always consult the table before testing a device which you have not tested before.

DEVICE LISTS (CONTINUED) VERSION NUMBER 5-9-12

SERIES 54/74 TTL DEVICES:-

NO.	STD	H	L	LS	S	ALS	AS	F	C	HC
7400	*	*	*	*	*	*	*	*	*	*
7401	*			*	*	*				
7402	*		*	*	*	*	*	*	*	*
7403	*		*	*	*	*				
7404	*	*	*	*	*	*		*	*	*
7405	*	*		*	*	*				
7406	*									
7407	*									
7408	*			*	*	*	*	*	*	*
7409	*			*	*	*				
7410	*	*	*	*	*	*	*	*	*	*
7411		*		*	*	*	*	*	*	*
7412	*			*		*				
7413	*			*				*		
7414	*			*				*	*	*
7415		*		*	*	*				
7416	*									
7417	*									
7418				*						
7419				*						
7420	*	*	*	*	*	*	*	*	*	*
7421		*		*		*	*			
7422	*	*		*	*	*				
7424				*						
7425	*									
7426	*			*						
7427	*			*		*	*			*
7428	*			*		*				
7430	*	*	*	*	*	*	*		*	*
7431				*						
7432	*			*	*	*	*	*	*	*
7433	*			*		*				
7437	*			*	*	*		*		
7438	*			*	*	*		*		
7439	*									
7440	*	*		*	*	*		*	*	
7442	*		*	*					*	*
7443	*		*							
7444	*		*							
7445	*									
7446	*		*							
7447	*		*	*						
7448	*			*					*	
7449				*						
7451	*			*						
7454			*	*						
7455				*						
7464					*			*		
7465					*					

NO.	STD	H	L	LS	S	ALS	AS	F	C	HC
7470	*									
7472	*	*	*							
7473	*	*		*		see note 2				
7474	*	*	*	*	*	*	*	*	*	*
7475	*				*	see note 1				
7476	*	*		*		see note 3				
7480										
7485	*			*	*			*	*	*
7486	*			*	*	*		*	*	*
7487		*								
7490	*				*	see note 1				
7492	*				*	see note 1				
7493	*				*	see note 1				
7495	*			*					*	
7497	*									
74104	*									
74105	*									
74107	*			*	*	*			*	*
74109	*			*		*	*	*		*
74110	*									
74111	*									
74112				*	*	*	*	*		*
74113				*	*	*	*	*		*
74114				*	*	*	*	*		
74116	*									
74118	*									
74119	*									
74120	*									
74121	*									
74122	*			*	see note 4					
74123				*	see note 5					*
74125	*			*						
74126	*			*						
74128	*									
74131						*				
74132	*			*	*			*		*
74133					*	*				*
74134					*					
74135					*					
74136	*			*						
74137				*						
74138				*	*	*		*		*
74139				*	*	*		*		*
74140				*						
74143	*									
74144	*									
74145	*			*						
74147	*									*
74148	*			*						
74150	*						*		*	
74151	*			*	*	*	*	*	*	*
74152	*			*						
74153	*		*	*	*	*	*	*		*

NO.	STD	H	L	LS	S	ALS	AS	F	C	HC
74241				*	*	*	*	*		*
74242				*		*	*	*		*
74243				*		*	*	*		*
74244				*		*	*	*	*	*
74245				*		*		*		*
74246	*									
74247	*			*						
74248	*			*						
74249	*			*						
74251	*			*	*	*	*	*		*
74253				*		*	*	*		*
74257				*	*	*		*		*
74258				*	*	*		*		*
74259	*			*		*		*		*
74260				*	*					
74261										
74265	*									
74266				*						*
74273	*			*		*		*		*
74274										
74275										
74276	*									
74278	*									
74279	*			*						
74280				*	*		*	*		*
74281				*						
74283	*			*	*			*		
74289				*	*					
74290	*			*						
74292										
74293	*			*						
74294										
74295				*						
74297										
74298	*			*				*		
74299				*	*	*		*		*
74300				*	*					
74301				*	*					
74322				*						
74323				*		*		*		
74340					*					
74341					*					
74344					*					
74347				*						
74348				*						
74351	*									
74352				*		*	*	*		
74353				*		*	*	*		
74354				*						
74355				*						
74356				*						
74357				*						
74365	*			*						*

see memory table

see memory table

see memory table

NO.	STD	H	L	LS	S	ALS	AS	F	C	HC
74366	*			*						*
74367	*			*						*
74368	*			*	*	*	*	*	*	*
74373				*	*	*	*	*	*	*
74374				*						*
74375				*						*
74376	*			*				*		*
74377				*						*
74378				*				*		*
74379				*	*					*
74381				*						*
74382				*						*
74384				*						*
74385				*						*
74386				*						*
74390	*			*						*
74393	*			*				*		*
74395				*			*	*		*
74396				*				*		*
74398				*				*		*
74399				*				*		*
74422				*						*
74423				*	see note 5					*
74425	*			*						*
74426	*			*						*
74436				*	*					*
74437				*	*					*
74440				*						*
74441				*						*
74442				*						*
74443				*						*
74444				*						*
74445				*						*
74446				*						*
74447				*						*
74448				*						*
74449				*						*
74465				*		*				*
74466				*		*				*
74467				*		*				*
74468				*		*				*
74490	*			*						*
74518				*						*
74519				*						*
74520				*						*
74521				*						*
74522				*						*
74533				*	*	*	*	*	*	*
74534				*	*	*	*	*	*	*
74538				*						*
74539				*						*
74540				*	*	*	*	*	*	*
74541				*	*	*	*	*	*	*

NO. STD H L LS S ALS AS F C HC

74560											
74561				*		*					*
74563				*		*					*
74564				*		*					*
74568											
74569				*		*	*				*
74573				*		*	*				*
74574				*		*	*				*
74576						*	*				
74580											
74590				*							
74591				*							
74592				*							
74593				*							
74594				*							
74595				*							
74596				*							
74597				*							
74598				*							
74599				*							
74620				*		*	*				
74621				*		*					
74622				*		*					
74623				*		*	*				
74638				*		*					
74639				*		*					
74640				*		*	*				*
74641				*		*					
74642				*		*					
74643				*		*	*				*
74644				*		*					
74645				*		*	*				
74668				*							
74669				*							
74670				*							*
74671				*							
74672				*							
74673											
74674											
74681											
74682				*							
74683				*							
74684				*							
74685				*							
74688				*		*					
74689				*		*					
74690				*							
74691				*							
74692				*							
74693				*							
74696				*							
74697				*							
74698				*							

NO.	STD	H	L	LS	S	ALS	AS	F	C	HC
74699				*						
74800										
74802										
74804										
74805										
74808										
74830										
74832										
74836										
74886										
74905									*	
74906									*	
741000						*	*			
741002						*				
741003						*				
741004						*	*			
741005						*				
741008						*	*			
741010						*				
741011						*				
741020						*				
741032						*	*			
741034						*				
741035						*	*			
741240						*				
741241						*				
741242						*				
741243						*				
741244						*				
741245						*				
741620						*				
741621						*				
741622						*				
741623						*				
741638						*				
741639						*				
741640						*				
741641						*				
741642						*				
741643						*				
741644						*				
741645						*				

NOTES ON TTL DEVICES:-

Note 1: For these devices with non-standard power pins, insert a 24 pin header with links from pin 12 to pin 15, and from pin 24 to pin 6. Insert the device in the 20 pin ZIF socket with pin 1 of the device in pin 2 of the socket.

Note 2: For the 7473 device, use the same header as described in note 1 above, but insert the device in the 20 pin ZIF socket with pin 1 of the device in pin 3 of the socket.

Note 3: For the 7476 device, insert a 24 pin header with links from pin 12 to pin 16, and from pin 24 to pin 6. Insert the device in the 20 pin ZIF socket with pin 1 of the device in pin 2 of the socket.

Note 4: For 74LS122 monostable devices, insert a 24 pin header with a 0.1uF capacitor connected between pins 10 & 13 before testing the device. With some devices, noise pickup at the Cext pin may affect device operation and cause it to fail the test - to avoid this, connect a 470pF capacitor between pins 13 & 12 on the above header. 74122 devices do not need the 0.1uF capacitor, but may still need the 470pF capacitor.

Note 5: For '123, '221 and '423 Monostable devices, insert a 24 pin header with 2.2uF capacitors between pins 6 & 7 and 14 & 15 (-ve lead to pins 6 & 14), and 3K3 resistors between pins 7 & 24 and 15 & 24, before testing the device. With some devices, noise pickup at the Cext pins may affect device operation and cause it to fail the test - to avoid this, connect 470pF capacitors between pins 6 & 12 and 14 & 12 on the above header.

CMOS DEVICES:-

Note: 74C and 74HC devices are listed in the TTL section

<u>NO.</u>	<u>STD</u>	<u>HC</u>
4000	*	
4001	*	
4002	*	*
4006	*	
4007	*	
4008	*	
4011	*	
4012	*	
4013	*	
4014	*	
4015	*	*
4016	*	*
4017	*	*
4018	*	
4019	*	
4020	*	*
4021	*	
4022	*	
4023	*	
4024	*	*
4025	*	
4026	*	
4027	*	
4028	*	
4029	*	
4030	*	
4031	*	
4033	*	
4034	*	
4035	*	
4040	*	*
4041	*	
4042	*	
4043	*	
4044	*	
4046	* see note 6a	
4047	*	
4048	*	
4049	*	*
4050	*	*
4051	*	*
4052	*	*
4053	*	*
4059	*	
4060	*	*
4066	*	*
4067	*	*
4068	*	
4069	*	

<u>NO.</u>	<u>STD</u>	<u>HC</u>
4070	*	
4071	*	
4072	*	
4073	*	
4075	*	*
4076	*	
4077	*	
4078	*	*
4081	*	
4082	*	
4085	*	
4086	*	
4093	*	
4094	*	
4098	*	see note 6
4099	*	
4502	*	
4507	*	
4508	*	
4510	*	
4511	*	*
4512	*	
4513	*	see note 8 (memory section)
4514	*	*
4515	*	*
4516	*	
4517	*	
4518	*	*
4519	*	
4520	*	*
4521	*	
4522	*	
4526	*	
4527	*	
4528	*	see note 6
4529	*	
4530	*	
4531	*	
4532	*	
4534	*	
4538	*	see note 6
4539	*	
4541	*	
4543	*	*
4553	*	
4555	*	
4556	*	
4557	*	
4562	*	
4572	*	
4580	*	
4583	*	

<u>NO.</u>	<u>STD</u>	<u>HC</u>
4585	*	
4599	*	see note 8 (memory section)
4724	*	
4731	*	
40097	*	
40098	*	
40101	*	
40102	*	
40103	*	
40104	*	
40105	*	
40106	*	
40108	*	
40160	*	
40161	*	
40162	*	
40163	*	
40174	*	
40175	*	
40181	*	
40182	*	
40192	*	
40193	*	
40194	*	
40195	*	
40240	*	
40244	*	
40245	*	
40373	*	
40374	*	

NOTES ON CMOS DEVICES:-

Note 6: For 4098, 4528 and 4538 monostable devices, insert a 24 pin header with 0.1uF capacitors between pins 1 & 2 and between pins 14 & 15.

Note 6a: For the 4046 phase locked loop device, insert a 24 pin header with 0.22uF non-polarised capacitor between pins 6 and 7, and a 10k resistor between pins 7 and 24.

MEMORY DEVICES:-

DEVICE	ORG.	NORMAL TIME	ABBREVIATED TIME	PINS
2102	1k * 1	0.5		
2112	256 * 4	0.7	0.2	
2114	1k * 4	3.0	0.3	16 see note 7
2115	1k * 1	1.0	0.5	16
2125	1k * 1	1.0	0.5	18 see note 8
2141	4k * 1	3.0	0.5	16
2142	1k * 4	3.0	1.5	16
2147	4k * 1	3.0	0.4	18 see note 8
2148	1k * 4	3.0	1.5	20
2149	1k * 4	3.0	0.4	18 see note 8
2167	16k * 1	12.0	0.4	18 see note 8
2168	4k * 4	12.0	5.0	18 see note 8
4016(6116)	2k * 8	86.0	5.0	20
4044(2141)	4k * 1	3.0	2.0	20
4045(2114)	1k * 4	3.0	1.5	24 see note 9
4104	4k * 1	3.0	0.5	18 see note 8
4116	16k * 1	6.0	1.5	18 see note 8
4118	1k * 8	42.0	6.0	18 see note 8
4164	64k * 1	25.0	1.0	16 see note 11
4315	4k * 1	3.0	25.0	24
4801	1k * 8	42.0	1.5	16 see note 10
4802	2k * 8	86.0	1.0	18 see note 8
5104	4k * 1	3.0	2.0	24
5257	4k * 1	3.0	1.5	24
5504	4k * 1	3.0	1.5	18 see note 8
5508	1k * 1	1.0	1.5	18 see note 8
5514	1k * 4	3.0	0.5	18 see note 8
5516	2k * 8	86.0	0.5	16
6116	2k * 8	86.0	2.0	18 see note 8
6147	4k * 1	3.0	2.0	24
6148	1k * 4	3.0	1.5	24
6167	16k * 1	12.0	0.5	18 see note 8
6168	4k * 4	12.0	5.0	18 see note 8
6504	4k * 1	3.0	5.0	20
6508	1k * 1	1.0	1.5	20
6514	1k * 4	3.0	0.5	18 see note 8
6516	2k * 8	86.0	0.5	16
6518	1k * 1	1.0	2.0	18 see note 8
7114	1k * 4	3.0	0.5	24
7141	4k * 1	3.0	0.5	18 see note 8
8114	1k * 4	3.0	1.5	18 see note 8
9114	1k * 4	3.0	0.5	18 see note 8
9147	4k * 1	3.0	0.5	18 see note 8
74189	16 * 4	1.5	1.5	18 see note 8
74200	256 * 1	2.0	1.5	18 see note 8
74201	256 * 1	2.0	2.0	16
74289	16 * 4	1.5	2.0	16
74300	256 * 1	2.0	1.5	16
74301	256 * 1	2.0	2.0	16
74C929	1k * 1	1.0	2.0	16
74C930	1k * 1	1.0	0.5	16
			0.5	18 see note 8

NOTES ON MEMORY DEVICES

Note 7: For this device, insert a 24 pin header with links between pins 11 & 12 and 13 & 24 of the 24 pin ZIF socket. Insert the device in the centre of the 20 pin ZIF socket (ie. pin 1 of the device in pin 2 of the socket).

Note 8: For these 18 pin devices, insert a 24 pin header with a link from pin 24 to 19. The device should be inserted in the lower section of the 20 pin ZIF socket (ie. pin 1 of the device in pin 2 of socket).

Note 9: These devices have the same type number as CMOS devices. To test these devices, use the type number shown in brackets, as these devices are functionally equivalent.

Note 10: This device MUST be inserted "upside down" because of its unusual power supply pins, ie. pin 1 of the device in pin 9 of the 16 pin ZIF socket. THIS IS VERY IMPORTANT - TESTING THIS DEVICE THE OTHER WAY ROUND WILL ALMOST CERTAINLY RESULT IN DESTRUCTION OF THE DEVICE. As discussed earlier in this manual, some manufacturers devices have critical RAS timing requirements that require a 1000 pF capacitor to be fitted to the instrument before testing the device. The capacitor should be fitted to a 24 pin header between pins 11 and 12 (ie. between RAS and OV), and the header should be used when testing 4164 dynamic RAM devices.

Note 11: This device can be tested using a special adaptor, available by contacting the sales office, which automatically generates the extra power supply voltages required by the device. Instructions for use are supplied with the adaptor. Do not attempt to test this device without using the adaptor as damage may result to the device.

INTERFACE DEVICES

ULN2... SERIES:-

2001 * see note 12
2003 * see note 12
2004 * see note 12
2005 * see note 12
2064 * see note 13
2065 * see note 13
2066 * see note 13
2067 * see note 13
2068 * see note 13
2069 * see note 13
2074 * see note 13
2075 * see note 13
2801 * see note 12
2803 * see note 12

25LS.. , 26S.. AND 26LS.. SERIES:-

2518 *
2519 *
2602 *
2631 *
2632 *

MC34.. SERIES:-

3446 *
3481 *
3486 *
3487 *

DS8.. SERIES:-

8303 *
8304 *
8640 * see note 20
8641 *
8820 *
8830 *
8831 *
8832 *
8837 *

8T.. SERIES (OMIT "T" WHEN ENTERING TYPE NUMBER):-

8T13 *
8T14 *
8T23 *
8T24 *
8T26 *
8T28 *

INTERFACE DEVICES (CONTINUED)

75 SERIES:-

75064 * see note 13
75065 * see note 13
75066 * see note 13
75067 * see note 13
75068 * see note 13
75069 * see note 13
75074 * see note 13
75075 * see note 13
75113 *
75114 *
75115 *
75116 *
75117 * see note 14
75118 *
75119 * see note 14
75121 *
75122 *
75123 *
75124 *
75126 *
75127 *
75128 *
75129 *
75130 *
75136 *
75138 *
75142 *
75143 *
75151 *
75153 *
75157 *
75158 * see note 14
75159 *
75160 *
75161 *
75163 *
75172 *
75173 *
75174 *
75175 *
75182 *
75183 *
75189 *
75270 *
75401 *
75402 *
75403 *
75404 *
75411 *
75412 *
75413 *

INTERFACE DEVICES (CONTINUED)

75414 *
 75416 *
 75417 *
 75418 *
 75419 *
 75430 *
 75431 * see note 14
 75432 * see note 14
 75433 * see note 14
 75434 * see note 14
 75450 *
 75451 * see note 14
 75452 * see note 14
 75453 * see note 14
 75454 * see note 14
 75460 *
 75461 * see note 14
 75462 * see note 14
 75463 * see note 14
 75464 * see note 14
 75465 * see note 12
 75466 * see note 12
 75468 * see note 12
 75469 * see note 12
 75470 *
 75471 * see note 14
 75472 * see note 14
 75473 * see note 14
 75474 * see note 14
 75491
 75492
 75496

MISCELLANEOUS:-

555	* see note 15	Timer
556	*	Dual timer
ILQ74	* see note 16	Quad opto isolator
HCPL2530	* see note 17	Dual opto isolator
HCPL2531	* see note 17	Dual opto isolator
8273	*	Signetics 8000 series shift register
LM311	* see note 22	Comparator
LM339	* see note 18	Quad comparator
LM324	* see note 19	Quad operational amplifier
SP380A	* see note 20	Quad unified bus receiver
TIL111	* see note 21	Opto-isolator
8212	*	Multi mode latch
8243	*	I/O expander

NOTES ON INTERFACE DEVICES

Note 12: Insert device in lower section of 20 pin ZIF socket, ie. pin 1 of the device in pin 3 of the socket for 16 pin devices, or in pin 2 of socket for 18 pin devices.

Note 13: Insert device in centre of 20 pin ZIF socket, ie. pin 1 of the device in pin 2 of the socket.

Note 14: Insert a 24 pin header with a link from pin 24 to pin 10. Insert the device in the lower section of the 14 pin ZIF socket, ie. pin 1 of the device in pin 4 of the socket.

Note 15: Insert this device in the top section of the 14 pin ZIF socket, ie. pin 1 of device in pin 1 of socket.

Note 16: Insert this device in the centre of the 20 pin ZIF socket, ie. pin 1 or device in pin 2 of socket. Enter the type number as 1,4,7,4. Note that IL74 devices can be tested in pairs by inserting them both in the centre of the 20 pin socket one below the other, using the same type number (1474).

Note 17: Insert this device in the 14 pin socket with pin 1 of the device in pin 1 of the socket. Omit the letters when entering the type number.

Note 18: Insert this device in the 20 pin socket with pin 1 of the device in pin 2 of the socket. Omit the letters when entering the type number. Note that this device is tested as if it were a digital device using standard logic level inputs, and thus some of the parameters associated with this linear device are not tested.

Note 19: Insert this device as for the LM339 as described above. The same notes regarding the method of testing apply to this device also.

Note 20: Insert a 24 pin header with links between pins 2 and 12, and between pins 13 and 24. Insert the device in the 20 pin socket with pin 1 of the device in pin 2 of the socket.

Note 21: This device can only be tested by carefully bending out pin 6 (ie. the transistor base lead) so that it does not enter the test socket. Insert the device in the 14 pin socket with pin 1 of the device in pin 2 of the socket. We recommend that if large quantities of these devices are to be tested then an adaptor is constructed using a second 8 pin Z.I.F. socket to accept the devices.

Note 22: Only the 8 pin DIL version of this device is supported. Insert a 24 pin header with a 220R resistor between pins 24 and 11. Insert the device in the top section of the 14 pin Z.I.F. socket ie. pin 1 of the device in pin 1 of socket. Refer to note 18 for notes regarding the method of testing this linear device.