ALL-03 Hardware I/O Configuration

This document describes the I/O configuration of the ALL-03 device programmer. This information would be of use in the development of special purpose software for the ALL-03 (and possibly also for the Expro-60/80).

1. I/O Control Concept:

Some basic concepts need to be explained.

The main control unit is on the adapter card (SAC-201).

There are two 8-bit I/O registers on the SAC-201 that are able to control all I/O devices on the ALL-03 main module.

Register name	I/O address
IDPORT	base address+0
DATAPORT	base address+2

The base address is the I/O address of the SAC-201 as defined by DIP switches 1 and 2. These switches allow a choice of 16 possible base addresses from 200h to 2f0h (default is 2e0).

Every device on the ALL-03 main module can be controlled by writing its ID byte to the IDPORT and then reading from or writing to the DATAPORT (the ID bytes of the various devices will be shown below).

TABLE 2

Available control pins on test-socket:

1. VOPENID: 1, 5, 7, 9 to 32.

2. VHHENID: 9 to 32.

3. VCCENID: 40, 36, 34, 32, to 26, 9, 7, 5, 1.

4. VHHENCID: 32 to 28.

5. TTLID: all 40 pins can be defined as inputs or outputs.

Note: Devices that cannot use the previous pin definitions will require a special purpose external adapter.

Example: We wish to write the value 7fh to #1 D/A device (ID = e5h).

Assembly Language

```
idport      equ     2e0h
dataport    equ     2e2h

            mov     ax,0e5h          ;id number setting
            mov     dx,idport
            out     dx,al
            jmp     $+2              ;device recovery time

            mov     ax,7fh           ;data writing
            mov     dx,dataport
            out     dx,al
            jmp     $+2              ;device recovery time
```

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C Language

```
#define       idport 0x02e0
#define       dataport 0x02e2

Outp (idport, 0xe5)         ;/* ID number setting */
Outp (dataport, 0x7f)       ;/* data writing */
```

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2. ALL-03 Device ID Mapping and Definition:

The following describes each 8-bit device and its associated ID bytes:

Power Source D/A Voltage Level Setting Device:

e5h : #1 D/A named VOPID, full scale is 25.5 volt (400 ma), resolution is 0.1 volt, minimum voltage setting is 10.2 volt

Example: Writing 255 to device e5h will set the #1 D/A to

25.5 volt, writing 102 to e5h will set the D/A to 10.2 volt.

e6h #2 D/A named VHHID, full scale is 15.3 volt (400 ma) resolution is 0.06 volt, minimum voltage setting is 5.1 volt

Example: Writing 255 to device e6h will set the #2 D/A to 15.3 volt, writing 85 to e6h will set the D/A to 5.1 volt.

e7h #3 D/A named VCCID, full scale is 10.2 volt (1A) resolution is 0.04 volt, minimum voltage setting is 0 volt

Example: Writing 255 to device e7h will set the #2 D/A to 10.2 volt, writing 0 to e7h will set the D/A to 0 volt.

The levels of each power source can be set by the above three D/A devi ces. However, additional devices are required to apply these voltages to the specified test-socket pins.

TTL Level I/O Device:
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e0h	TTLID+0
e1h	TTLID+1
e2h	TTLID+2
e3h	TTLID+3
e4h	TTLID+4

Total 40 bits assigned to 40 pins on test-socket.
LSB of e0h is assigned to pin 1, and MSB of e4h is assigned to pin 40. Each pin can be a TTL level input or output. Before inputting from th e desired pin, the user must output a high to that pin.

Example: After writing an ID byte (TTLID+i) to the IDPORT, one can then output 8 bits to the DATAPORT or input 8 bits from the DATAPORT.

VOP Level Output Control Device:
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e8h	VOPENID+0
e9h	VOPENID+1
eah	VOPENID+2

ebh	VOPENID+3
ech	VOPENID+4

Total 40 bits assigned to 40 pins on test-socket.
LSB of e8h is assigned to pin 1, and MSB of ech is assigned to pin 40.

Writing a high to a particular bit will apply the VOP source to the re levant test-socket pin. Writing a low will disable the VOP source outp ut to that pin.

Example: After writing ID byte VOPENID+1 to the IDPORT, and then outputting 8 bit data to the DATAPORT, VOP will be applied to the relevant test-socket pins 9 through 16 via a 22 ohm current limiting resistor.

Note: 1. Test-socket pins 2,3,4,6,8 and pins 33 to 40 have no VOP control circuit, so VOP cannot be output to these pins even though the relevant bit may have been set to high.

2. VOP must not be applied to any pin for more than one hour.

VHH Level Output Control Device:
---

foh	VHHENID+0
f1h	VHHENID+1
f2h	VHHENID+2
f3h	VHHENID+3
f4h	VHHENID+4

Total 40 bits assigned to 40 pins on test-socket.
LSB of f0h is assigned to pin 1, and MSB of f4h is assigned to pin 40.

Writing a high to a particular bit will apply the VHH source to the re levant test-socket pin. Writing a low will disable the VHH source outp ut to that pin.

Example: After writing ID byte VHHENID+1 to the IDPORT, and then outputting 8 bit data to the DATAPORT, VHH will be applied to the relevant test-socket pins 9 through 16 via a 22 ohm current limiting resistor.

Note: 1. Test-socket pins 1 to 8 and pins 33 to 40 have no VHH control circuit, so VHH cannot be output to these pins even though the relevant bit may have been set to high.

2. VHH must not be applied to any pin for more than one hour.

VCC Level Output Control:
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edh	VHHENID+0
eeh	VHHENID+1

Total 16 bits assigned to 16 pins on test-socket.

edh	bo :	pin 40	eeh	b0 :	pin 27
	b1 :	pin 36		b1 :	pin 26
	b2 :	pin 34		b2 :	pin 9
	b3 :	pin 32		b3 :	pin 7
	b4 :	pin 31		b4 :	pin 5
	b5 :	pin 30		b5 :	pin 1
	b6 :	pin 29		b6 :	not used
	b7 :	pin 28		b7 :	not used

Writing a high to a particular bit will apply the VCC source to the relevant test-socket pin. Writing a low will disable the VCC source output to that pin.

Example: After writing ID byte VCCENID+0 to the IDPORT, and then outputting 8 bit data to the DATAPORT, VCC will be directly applied to the relevant test-socket pins 28 through 40.

VHH Level Output to Extra Pins Control Device:

The difference between these extra pins and the previously listed VHH pins is that these extra pins have no 22 ohm current limiting resistor in series with the VHH source. This is to permit some PAL VCC pins to be driven at high voltage (over 12 volts) and high current.

f5h	VHHENCID+0
f6h	VHHENCID+1

Total 16 bits assigned to 16 pins on test-socket.

f5h	bo :	not used	f6h : not used now
	b1 :	not used	
	b2 :	not used	
	b3 :	pin 32	
	b4 :	pin 31	
	b5 :	pin 30	

b6 : pin 29
b7 : pin 28

Writing a high to a particular bit will apply the VHH source to the re
levant test-socket pin. Writing a low will disable the VHH source outp
ut to that pin.

Example: After writing ID byte VCCENCID+0 to the IDPORT, and then
outputting 8 bit data to the DATAPORT, VHH will be directly
applied to the relevant test-socket pins 28 through 32.

"Other Pins" Control Device:

Some additional pins not previously specified will be listed here.

efh OTHERENID

Total 8 bits assigned to 9 pins on test-socket

efh b0 : low will set pin 20 to ground
high will set pin 11, 30 to ground

b1 : hi will output VOP (source - 2.4) volt to pin 7.
low will disable output.

b2 : hi will output VOP (source - 2.4) volt to pin 25.
low will disable output.

b3 : high will output oscillator TTL level to pins 2 and 3.
Each pin is the inverse of the other.
low will disable output.

b4 : high will output oscillator TTL level to pins 18 and 19.
Each pin is the inverse of the other.
low will disable output.

b5 : high will select 4.432 mhz oscillator
low will select 2.216 mhz oscillator

b6 : not used

b7 : not used

Note: 1. All devices are reset to a low output at PC power on.

2. Voltage drops exist between the power sources and the test socket pins. These voltage drop factors need to be included in the D/A power source level settings.

   These voltage drops are:

   VCC drop : 0.6 v, (= 15 steps)
   VHH drop : 0.6 v, (= 10 steps)
   VOP drop : 0.6 v, (= 6 steps)

Example: The following code sets the #1 D/A to 21 volt:

```
outp (IDPORT, VOPID)
outp (DATAPORT, 210+6)
```

3. Before inputting TTL levels, or outputting VOP, VHH, VCC voltages, the user must output a high to the specified pin. Otherwise, the relevant TTL input, or the specified supply voltage will be pulled down to ground. This will result in damage to the affected supply.

4. In the version(?) we supply the source listing for TESTPRO.EXE. TESTPRO source is a good sample file for the user who wishes to develop his own software to program new devices.