PC-31
multi-output card
with
8 serial RS232 ports

&

PC-76
software package
for PC-31

User manual

PC-31 MULTI-OUTPUT CARD
8 SERIAL RS232 PORTS

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INTRODUCTION AND SPECIFICATIONS

The PC-31 is a multi-output card for PC-XT and compatibles. The card can be used with AT compatibles at lower CPU speeds, but for high AT CPU speeds the PC-31/AT should be used. This uses the 16450 communication chip instead of the 8250 chip used by the PC-31. Both cards provide eight standard RS232 interface ports for asynchronous communications and are supplied complete with cables and connectors for all eight ports. The setting of start, stop and parity bits is fully programmable, and baud rate can be programmed from 50 to 19.2Kbaud. The card's interrupt system controls transmit, receive, error, line status and data set interrupts. Interrupt request level (IRQ3 or IRQ4) is set by jumper.

The hardware switching makes a variety of addresses available to the user. All addresses are given in hexadecimal, and SW4 is not used. One PC-31 or PC-31/AT card can be set up to use the standard DOS addresses for COM1-COM8 (with SW1 off and SW2 and 3 on), or a number of other addresses. Cards can be paralleled within a system.

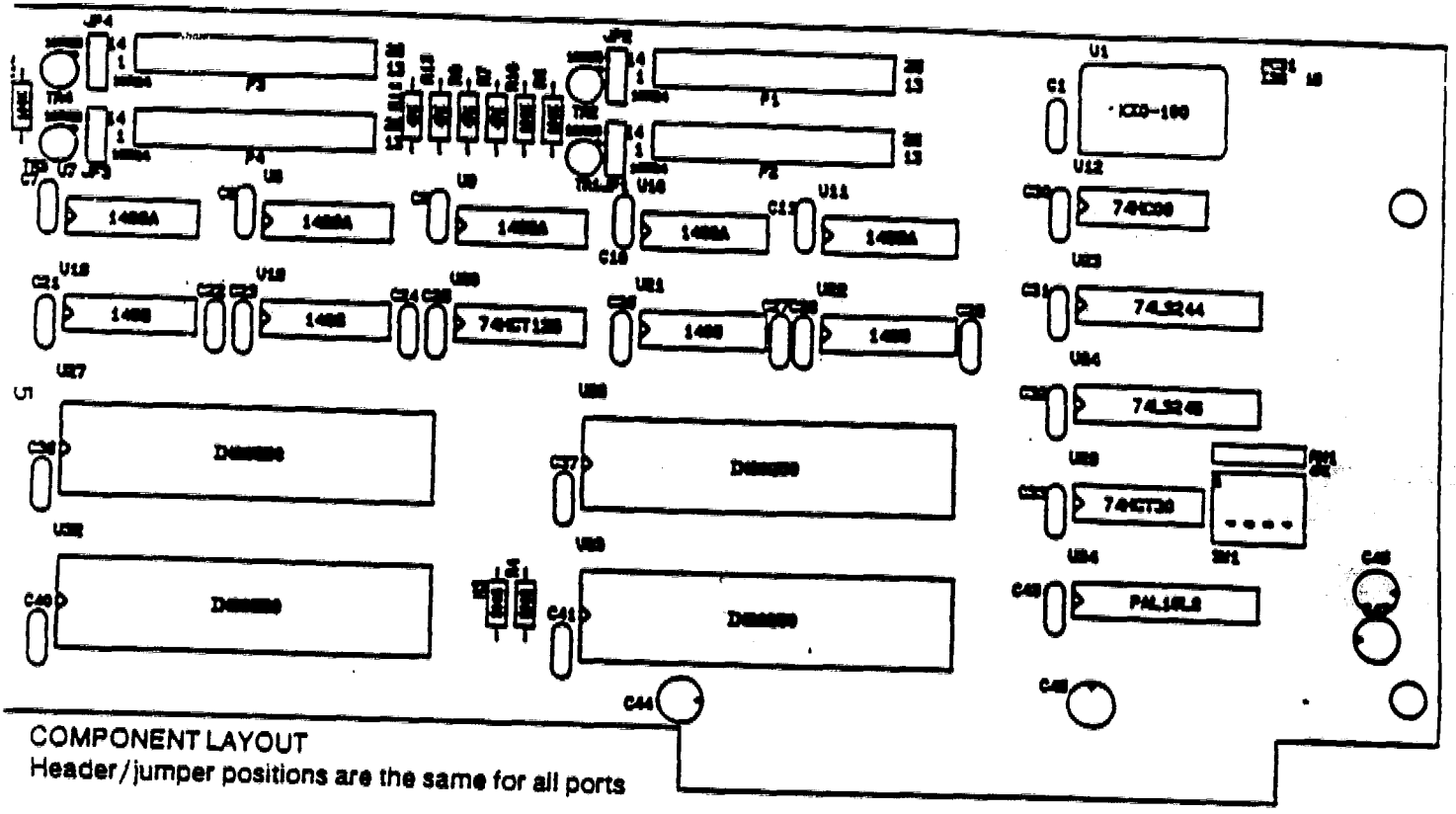
DOS standard COM port addresses are:

COM1: 3F8-3FF
COM2: 2F8-2FF
COM3: 278-27F
COM4: 2E8-2EF
COM5: 280-287
COM6: 288-28F
COM7: 290-297
COM8: 298-29F

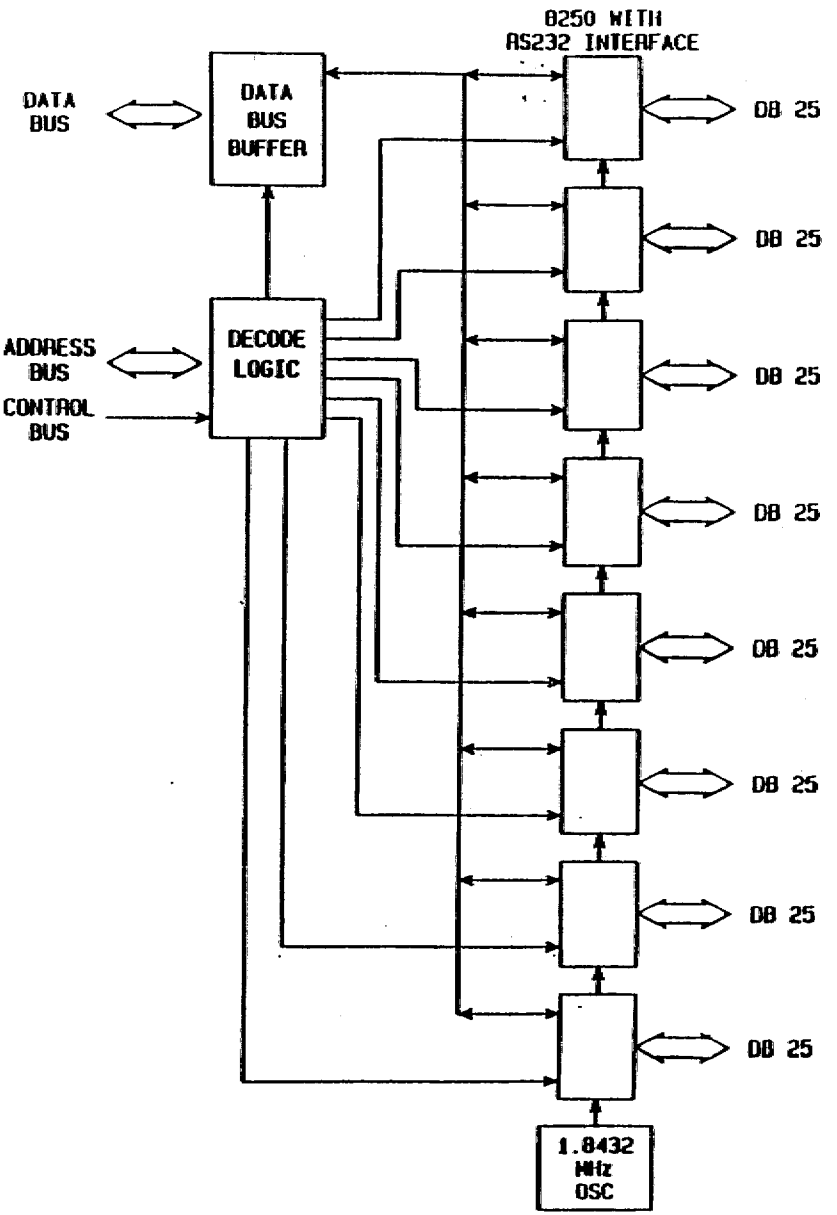
Specifications
Crystal oscillator frequency: 1.8432MHz
Type of communication: asynchronous
Baud rate: programmable from 50 to 19.2K baud
Data bits: 5, 6, 7, or 8
Stop bits: 1, 1.5 or 2
Parity bit: Odd, even or none
Master chip: PC-31: 8250 PC-31/AT: 16450
RS232 interface I.C.s: 1488, 1489
Physical size: 336 x 100mm

Switch settings

SW1	SW2	SW3	PORT1	PORT2	PORT3	PORT4	PORT5	PORT6	PORT7	PORT8
ON	ON	ON	3F8-3FF	2F8-2FF	2B0-2B7	2B8-2BF	1A0-1A7	1A8-1AF	1B0-1B7	1B8-1BF
ON	ON	OFF	160-167	168-16F	170-177	178-17F	180-187	188-18F	190-197	198-19F
ON	OFF	ON	2A0-2A7	2A8-2AF	2B0-2B7	2B8-2BF	1A0-1A7	1A8-1AF	1B0-1B7	1B8-1BF
ON	OFF	OFF	2F8-2FF	2A8-2AF	2B0-2B7	2B8-2BF	1A0-1A7	1A8-1AF	1B0-1B7	1B8-1BF
OFF	ON	ON	3F8-3FF	2F8-2FF	3E8-3EF	2E8-2EF	280-287	288-28F	290-297	298-29F
OFF	ON	OFF	210-217	218-21F	220-227	228-22F	230-237	238-23F	240-247	248-24F

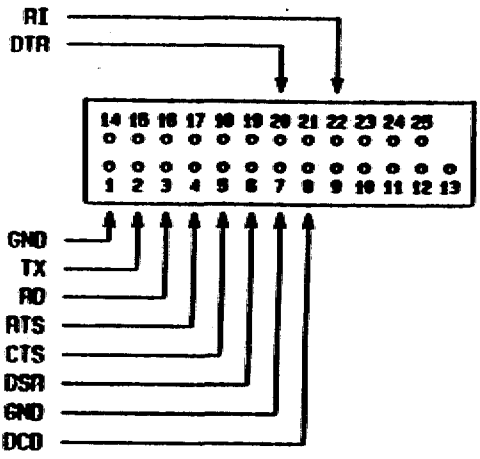


COMPONENT LAYOUT
Header/jumper positions are the same for all ports



BLOCK DIAGRAM

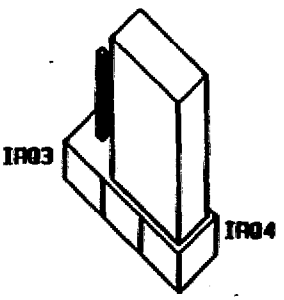
CARD CONNECTION



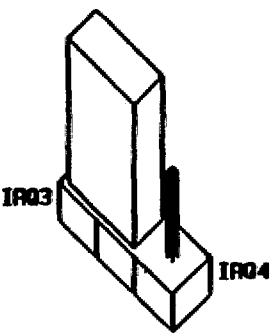
Connected to a female or male D25 standard connector.

CARD JUMPER SETTING

Each interface card jumper controls the interrupt level of its respective port. To allow the PC-31 to send interrupts to the system, bit 3 of the modem control register (refer I/O decoding) must be set high.

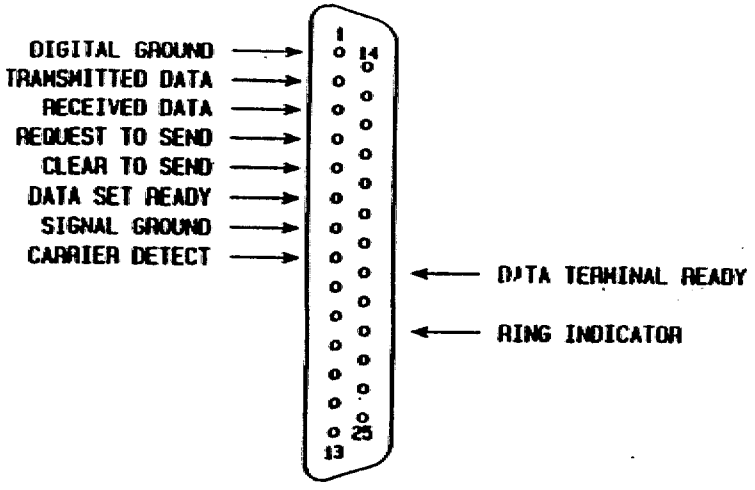


IRQ4 CONNECTED

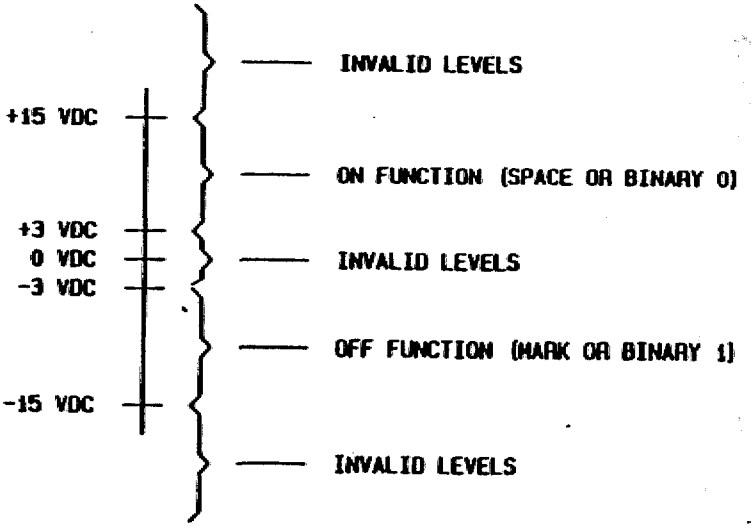


IRQ3 CONNECTED

25-PIN-D-SHELL CONNECTOR :



VOLTAGE LEVEL OF CONNECTOR :



I/O address decoding

Base + 0: Tx holding register/THR (DLAB 0 WR.)
Base + 0: Rx buffer register/RBR (DLAB 0 RD.)
Base + 0: Divisor latch LSB/DLL (DLAB 1)
Base + 1: Divisor latch MSB/DLH (DLAB 1)
Base + 1: Interrupt enable register/IER (DLAB 0)
Base + 2: Interrupt identification register/IIR
Base + 3: Line control register/LCR
Base + 4: Modem control register/MCR
Base + 5: Line status register/LSR
Base + 6: Modem status register/MSR

PC-76 software for PC-31

The PC-76 software package is an option available for the PC-31. It is intended as an introduction to the PC-31, and includes source code so that the files may be altered to suit user purposes. The disc contains:

PC76READ.ME
PC76MODE.EXE
PC76MODE.C
PC76DRVR.SYS
PC76DRVR.ASM
PC76TALK.ASM
PC76TALK.COM
PC76TEST.EXE
PC76TEST.C

PC76READ.ME is the documentation for the PC-76.

PC76MODE is a utility program which allows the user to configure the operational parameters for any of the eight RS232 ports on the PC-31.

These parameters may be configured:

Baud rate: 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200
Parity: Odd, even or none
Number of data bits/character: 7 or 8
Number of stop bits/character: 1 or 2

Each port is referred to as COMn:, where n = 1....8. E.g., to configure COM5: to 9600 baud, 8 data bits, one stop bit and no parity, type the following after the system prompt:

A>PC76MODE com5:9600,n,8,1

PC76MODE will either return and re-display the configuration, or return an error message. The COM port and the baud

rate must be specified. Parity, the number of data bits and the number of stop bits are optional. The default parity is none, and defaults for data and stop bits are 7 and 1 respectively. However, at 110 baud the stop bits default to 2.

The general form of the PC76MODE command is:

PC76MODE device:baud [,parity][,databits][,stopbits]

where:
Device is COM1,COM2.....COM8
Baud is 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200
Parity is none, odd or even
Databits are 7 or 8
Stopbits are 1 or 2
[] indicates that this is an optional configuration.

PC76MODE cannot be used to redirect devices as the standard DOS MODE command does. Nor does it support the DOS MODE command's "P" option, where COM1...COM8 devices permanently retry either input or output characters (but see PC76DRVR).

PC76MODE assumes that the PC-31's I/O addresses are:

COM1: 3F8H
COM2: 2F8H
COM3: 3E8H
COM4: 2E8H
COM5: 280H
COM6: 288H
COM7: 290H
COM8: 298H

The PC76MODE commands can be placed in your AUTOEXEC.BAT file. This will automatically set up the COM ports during booting.

PC76DRVR contains example device drivers for the eight RS232 ports on the PC-31. It allows the ports to be used in a

similar way to files named COM1: to COM8:. For example, to transmit the PC76READ.ME file from the RS232 port COM5, you would type:

copy PC76READ.ME > COM5:

PC76DRVR also allows programmers to refer to the ports by their logical names in programs.

To install PC76DRVR, enter this line into CONFIG.SYS:

DEVICE = PC76DRVR.SYS

and place PC76DRVR.SYS in the root directory (\). PC76DRVR will be installed when the system is rebooted. During booting the following message should be displayed: "PC-76 drivers (v1.1) for COM1: to COM8: installed".

Before using the devices, configure the baud rate, etc., with PC76MODE.

PC76DRVR assumes that the PC-31's I/O addresses are as shown for PC76MODE. It performs permanent retries on COM1:...COM8: to either input or output characters. It will hang if the output is stopped on output, or if no input characters are available during input.

PC76DRVR does not support IOCTL calls, although the entry points to the various functions are provided in the source code.

PC76TALK is a simple terminal emulator which is included as an example of using interrupts with the COM ports. As supplied, it will operate in full duplex via COM1:, emulating a subset of the Televideo 950 control codes. It uses IRQ4, and this must be selected by jumper on the PC-31 card before the emulator is run. Baud rate, parity, data and stop bits must be set up using PC76MODE before running. PC76TALK does not use the PC76DRVR drivers.

To exit from PC76TALK, use any special function key, such as F1. The program explains how to modify the program to run in half duplex, use IRQ3, and use the other COM: channels.

PC76TEST is a very simple terminal emulator written in C, which can be configured to communicate by any of the PC-31 COM ports.

This program is provided both to allow you to test simple serial I/O via any of the serial ports, and also as an example of how to write your own C-based comms applications without the need to use Assembler.