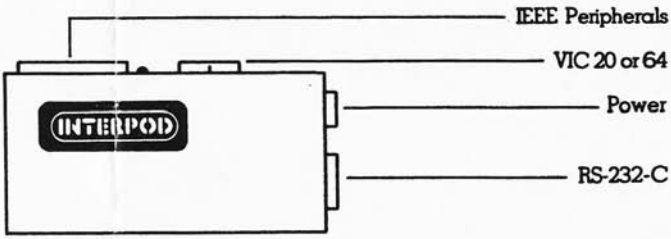
# INTERPOD End User Manual

Congratulations on your purchase of INTERPOD! Now your VIC or 64 will be able to communicate with a whole world of new peripherals including high-capacity dual disk drives and quality printers.

Interpod is a dual interface suitable for connecting the Commodore VIC and 64 computers to a maximum of 30 parallel IEEE-488 devices and a single RS-232-C device.

## Setting up Interpod

The diagram below gives all the information needed to install INTERPOD. **The connection between INTERPOD and the computer should be made with both devices switched off.** Peripheral devices may be connected and disconnected freely while INTERPOD and the computer are switched on.




The computer may be connected to either of the 6 pin din sockets. The remaining socket allows additional IEEE serial peripherals such as the 1541 disk drive to be connected to the system. Many such devices may be connected to Interpod by the usual chaining method.

Interpod can accommodate the following devices.

| Device | Example | Max Number |
|---|---|---|
| Controlling device | Commodore VIC or 64 | 1 |
| Serial IEEE devices | 1541 disk, VIC printer | 30* |
| Parallel IEEE devices | 8050 disk, 4040 disk | 30* |
| RS-232-C device | Diablo printer | 1 |

* The number of parallel IEEE and serial IEEE devices together must not exceed 30.

When INTERPOD powers up, it runs through a self-test procedure lasting about 1.5 seconds. If all is well, the courtesy light will flash and thereafter remain on. Failure to do so indicates a fault.

## Device addressing

Device addressing through INTERPOD is entirely transparent. However, because it is possible to connect both IEEE serial and IEEE parallel devices at the same time, situations may arise in which two peripherals with the same device address need to be connected simultaneously. In these circumstances INTERPOD will recognise only the serial device. In order to access say a 1541 single disk drive and an 8050 dual disk drive both of which are device 8, it is necessary to change one of the device numbers. Most Commodore disk drives can change their device numbers under software control. Programs for this purpose are listed here.

## Changing the device number of the 4040 or 8050

```
10 input"old device number, new device number";od,nd
20 open 1,od,15
30 print#1,"m-w";chr$(12);chr$(0);chr$(2);chr$(nd+32);chr$(nd+64)
40 close 1
```

## Changing the device number of the 1541

```
10 input"old device number, new device number";od,nd
20 open 1,od,15
30 print#1,"m-w";chr$(119);chr$(0);chr$(2);chr$(nd+32);chr$(nd+64)
40 close 1
```

## RS-232 devices

The RS-232 standard allows for a wide variety of baud rates and other options such as parity, stopbits etc. Interpod is easily configured to cope with all of these but in most cases no configuration will be necessary. INTERPOD powers up with the RS-232 interface configured as in Table 1.

RS-232 devices do not have device numbers associated with them. For this reason INTERPOD can only be connected to a single RS-232 device. To allow compatibility with existing software, INTERPOD will treat any RS-232 device by default as device 4. Note that this does not prevent a device 4 peripheral from being used on either of the IEEE buses. INTERPOD will recognise any device 4 peripheral present. Only in the absence of an IEEE device 4 will INTERPOD send data to the RS-232 port.

It is possible to change the RS-232 device address using the CHANGE command (see below). When this is done however, INTERPOD will assume that there are no other peripherals of the same device number connected.

The defaults provided by INTERPOD allow it to be used in the majority of applications without the user having to select any of the additional options available. In order to allow communication with all RS-232 devices however, INTERPOD has been provided with a command channel similar to channel 15 on the Commodore disk drives.

## Sending commands to INTERPOD

The INTERPOD command channel can be selected in the same way as any other IEEE device. This may be achieved from BASIC as follows:

OPEN lfn,4,31:print# lfn,"<command>":close lfn

where lfn is a quite arbitrary logical file number.

Note that the secondary address of 31 should only be used when communicating with the INTERPOD command channel. RS-232 devices themselves do not require a secondary address.

Commands consist of either a single keyword (eg BREAK) or a keyword followed by a parameter or parameters. The table below shows the keywords with alternative parameters enclosed in square brackets. For example, the following commands would set the baud rate to 300 and turn the carriage return delay on:

open lfn,4,31:print#lfn,"baud=300":print#lfn,"crdelay=on":close lfn

The following is a complete list of commands that may be sent to the INTERPOD command channel.

| Command | Meaning | Default |
|---|---|---|
| baud=[50,75,110,134.5, 150,300,600,1200,1800, 2400,3600] | set Baud rate † | 1200 |
| parity=[odd,even,none] | set parity † | none |
| chrsize=[7,8] | 7 or 8 bits † | 8 |
| crdelay=[on,off] | carriage return delay (¼ sec.) | off |
| stopbits=[1,2] | select number of stop bits | 1 |
| break | send break | N/A |
| unbreak | release break | N/A |
| change (see text) | re-address INTERPOD's command channel and RS-232 port | Device 4 |
| clear (see text) | clear buffer | N/A |
| convert | convert CBM ASCII to standard ASCII * | No conversion |
| unconvert | cancel CONVERT | No conversion |

Table 1

† The RS232 device and INTERPOD should have the same settings.

* This facility substitutes upper case letters for lower case and vice versa.

All commands are issued in lower case (unshifted) characters.

Not all combinations of word length, stopbits and parity are catered for by INTERPOD. Only the following combinations are legal. Other combinations will give rise to an ATT ERR (attribute error).

7 Bits, Even Parity, 2 Stop Bits
7 Bits, Odd Parity, 2 Stop Bits
7 Bits, Even Parity, 1 Stop Bit
7 Bits, Odd Parity, 1 Stop Bit
8 Bits, 2 Stop Bits
8 Bits, 1 Stop Bit
8 Bits, Even Parity, 1 Stop Bit
8 Bits, Odd Parity, 1 Stop Bit

It is possible for an error condition to occur during a command sequence that will be cleared when the sequence is complete. For this reason the command channel should not be read until all commands have been issued (see below).

## Reading the error channel

It is also possible to obtain a message from INTERPOD via the command channel. This may be done as follows:

OPEN lfn,4,31:input#lfn,e$:close lfn

e$ will now contain one of the following messages:

| No. | Message | Meaning |
|---|---|---|
| 1 | ixxx | Power up message. xxx is issue number. |
| 2 | ok | This message indicates the absence of any error condition. |
| 3 | cmd err | The last command issued to INTERPOD was not understood. |
| 4 | att err | Illegal combination of parity, stopbits and character size. |

Table 2

Changing the RS-232 and command channel device number.

In the absence of other device 4 peripherals, INTERPOD sends all data addressed to device 4 to the RS-232 port. INTERPOD's own command channel is accessed by sending a secondary address of 31 to device 4. The change command allows a program to alter this device number. After a change command, all data sent to the new device number will be directed to the RS-232 port. The command channel will also move to the new device number with the secondary address still 31. Device address 4 now behaves like any other device address. The syntax of the change command is as follows:

print#lfn,"change";chr$(nd)

where nd is the new device number.

The following program will change the command and RS-232 device address to 5.

10 open 1,4,31:print#1,"change";chr$(5):close 1

NB The file opened to the command channel should be closed and re-opened to the new device if further use of the command channel is required.

## The clear command

INTERPOD will work transparently with all Commodore peripherals and most other IEEE devices. Occasionally however, certain IEEE instruments whose output is not accessed sequentially will give rise to unsolicited characters when interfaced through INTERPOD. The solution is very straightforward. Whenever a request is made to the device to access a new (non sequential) piece of data, INTERPOD should be issued a CLEAR command as follows:

print#lfn,"clear";chr$(dv);chr$(sa)

Where dv is the device number of the IEEE device
and sa is the secondary address

The above assumes that a previous OPEN lfn,4,31 has been issued.

## Examples

1) Addressing an RS-232 printer

The following program will send the message INTERPOD to the RS-232 port provided that there is no IEEE device 4 connected.

10 open 4,4: print #4,"INTERPOD":close 4

2) Hard copy listing

The following commands will list a BASIC program to an RS-232 printer.

open 4,4: cmd 4: list

print#4: close 4

3) Sending commands to INTERPOD

The following program sets up INTERPOD for use with an 1800 baud, even parity printer.

```
10 open 4,4,31:rem open a file to INTERPOD's command channel
20 print#4,"baud=1800":input#4, er$:if er$<>"ok" then
print er$:close 4:end
30 print#4,'parity=even":input#4,er$:if er$<>"ok" then
print er$:close 4:end
40 close 4
```

Lines 20 and 30 send the necessary commands and check INTERPOD's command channel for errors.

## Connecting RS-232 Devices

Interpod conforms fully to the RS-232-C specification (including voltage levels). The notes below are to enable the user to link Interpod to a wide range of RS-232 equipment.

The first step when linking Interpod to an RS-232 device is to ascertain whether the device uses a DCE (female) or a DTE (male) connector. There are few rules about which connector a device will have, and in the case of printers it varies from model to model. Interpod's RS-232 connector is male; the data transmitted line is linked to pin 2 and the data received to pin 3. For obvious reasons, this is reversed in female devices so a pin-to-pin connection can be made. When Interpod is being used with another male device the data transmission line must, of course, be linked to the data received line on pin 3. A gender changing cable will also be necessary to facilitate connection.

Another line which may require attention is the CTS line (pin 5). Interpod extends the use of this line to allow a device such as a printer to assert the line high during the sending of text, holding Interpod up until it is ready to receive more characters. Many devices have a line to match the CTS line (the actual line used varies from device to device) and this should be connected to Interpod's CTS line. If the printer has no such facility, the safest way to prevent loss of characters is to set the baud rate at a suitably low speed.

If in any doubt as to how the pins should be configured, we recommend that your consult your dealer.

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