THURLBY THANDAR INSTRUMENTS

VIPS

Virtual Instrument Pod System

analogue and digital, input and output

six channel, 16-bit temperature module

simultaneous operation of up to four pods

VIPS *Virtual Instrument Pod System*

analogue and digital functions, input and output functions

Simplicity and economy

The VIPS concept is to provide sophisticated measurement and control from a PC with minimum cost and complexity.

The VIPS pod is connected to the PC parallel port and is powered from it. No power source is required. Any type of PC can be used including lap-tops.

Unlike competitive units, multiple VIPS pods can be operated and controlled simultaneously using one parallel port.

Single pod simplicity

Any single VIPS pod can be operated directly by simply plugging it into the PC parallel port. Each pod is supplied with full software, nothing else is needed.

Multi-pod sophistication

VIPS software enables up to four VIPS pods to be controlled and monitored simultaneously.

The X-Box expansion module enables multiple pods to be connected. It links to the parallel port via a cable (supplied) and gives a docking connection for up to four VIPS pods (in any combination) as well as providing a printer feed-through port.

VIPS X-Box Expansion Module

Windows control

The VIPS software operates under Windows (3.1, 95 or 98) and provides comprehensive display and control for between one and four VIPS pods.

It can be used simultaneously with other Windows applications such as spreadsheets, maths packages etc.

Multiple viewing modes

Data can be viewed in many different ways: as a virtual 'scope or logic analyser, as a graph, as a data list, as annunciators, as digital meters, or as vertical bars.

Data channels can be given labels and analogue values can be scaled to user-defined engineering units using Ax+B formulae on a per-channel basis.

The whole configuration can be saved to disk so that a variety of configurations can be called up as required.

Data logging to disk

VIPS software provides data logging for any input module, analogue or digital.

Data is stored at timed intervals and can be displayed directly or printed. Data is stored in text files and can be imported into spreadsheets such as Exel.

Alternatively raw data can be stored for use by mathematical programs and by waveform creation and editing programs such as WaveCad [1] or Waveform Manager [2].

DDE support

DDE (dynamic data exchange) links enable data from VIPS to be placed into another Windows application in real time.

Thus, with VIPS set up as a data logger, the results could be placed directly into a spreadsheet.

Conversly, VIPS output pods can accept data from another Windows application using DDE.

DLL drivers

DLL (dynamic link library) drivers are provided for users able to write programmes in languages such as Visual Basic.

These allow VIPS hardware to be directly controlled from user-created programes.

More pods to come

Further VIPS pods are to be introduced offering yet wider functionality. Check our Web page for updates.

Major VIPS features:

- Parallel port connection for fast bi-directional data transfer without special interface cards.
- Windows based control allows VIPS to be used alongside all your normal Windows applications.
- Simultaneous control of up to four pods from a single window using a single parallel port.
- Analogue and digital pods; input, output and switching. High resolution multi-channel temperature.
- No external power required. Can be used with notebook PCs in fully portable applications.
- Versatile display modes including Virtual DSO, charts, meters, bars, annunciators and listings.
- Logging to disk at timed intervals, import to spreadsheets, listings saved as printable text files.

VIPS T100 multi-channel temperature measurement module with 16-bit resolution and six miniature thermocouple connectors.

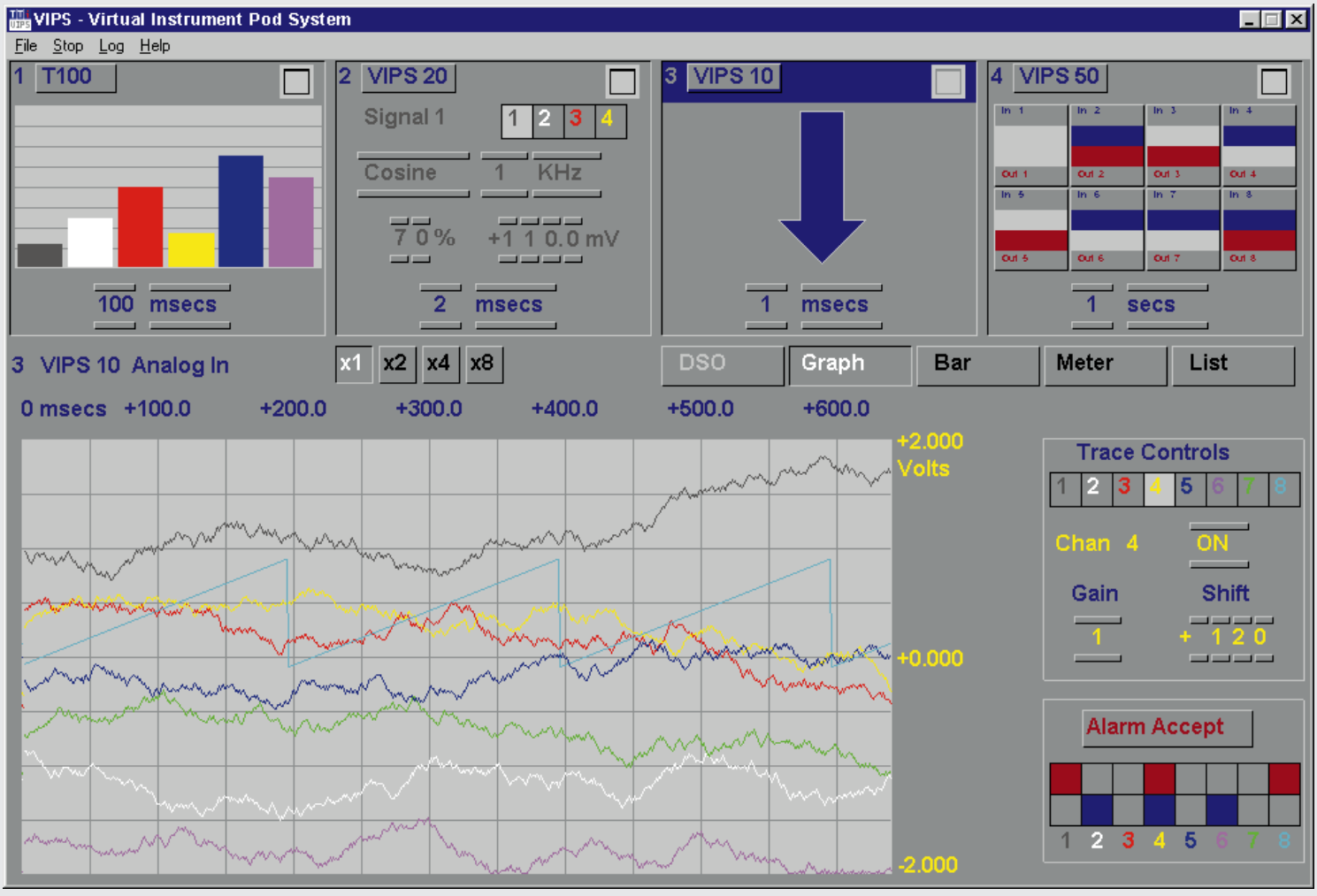
[1] *WaveCad is a Windows based programme for generating and editing arbitrary waveforms using graphical tools and mathematical equations.*

[2] *Waveform Manager is a Windows 95 based programme which provides translations between many different data formats used by DSOs and waveform generators.*

Full Windows® software supplied with every pod

multiple pods running simultaneously, powered from the PC

Current VIPS Range		
VIPS 10 12-bit analogue input, 8 channels	**VIPS 40** digital output driver, 8 channels	**VIPS T100** 16-bit temperature input, 6 channels
VIPS 20 12-bit analogue output, 4 channels	**VIPS 50** digital input and output, 8 channels of each	see our website for news of further VIPS units: http://www.ttinst.co.uk/vips
VIPS 30 opto-isolated digital input, 8 channels	**VIPS 60** analogue switch, 8 channels	



VIPS Control Software

Each VIPS unit is supplied complete with the VIPS control software which operates under Windows 3.1, Windows95 or 98.

The main VIPS screen is divided into several working areas.

The four upper windows can be allocated to individual VIPS pods.

The large window provides a full-size control and display area for one of the pods and can be switched between them by a single mouse click.

A wide variety of display modes can be selected within the large window. These include DSO, Bars, Graph, Meters, Annunciators and Listing.

The channels can be displayed simultaneously using colour coding to aid clarity. Channels can be individually disabled.

Analogue displays can be scaled and shifted in software on a per-channel basis. Channels can be named and measurements shown in engineering units.

Data can be logged to disk at timed intervals and displayed, printed, or imported into spreadsheets.

Two alarms can be set for each analogue input channel. The alarms can be linked to a VIPS digital output module or analogue switch module to provide automatic control functions.

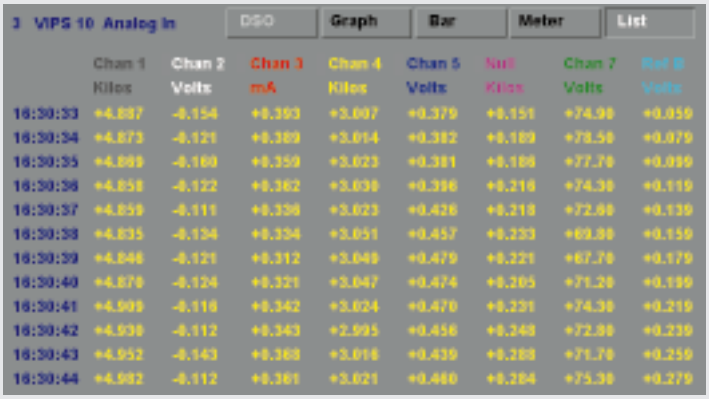
A complete system operating from the parallel port of your PC

An expandable multi-channel Data Logger

A VIPS 10 pod operating under VIPS software can act as a high speed, multi-channel 12-bit data logger.

It has 8 signal inputs which can be configured as 8 single ended measurement inputs or 4 differential inputs (or a mixture of the two).

If more channels are required, the system can be expanded by adding up to three further VIPS 10 pods thus providing up to 32 inputs.



Data can be acquired at rates between one sample per 10 hours and 10,000 samples per second.

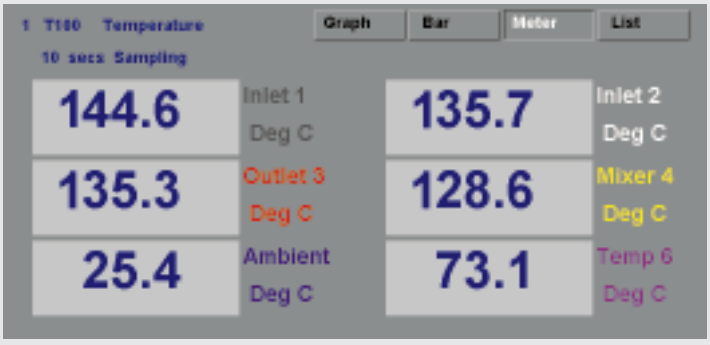
The data can be displayed in any of five formats (subject to an appropriate acquisition rate): Listing, Bar Graph, Digital Meters, Chart, DSO.

Logger results can be written to a file or sent to a printer. DDE links can be used to import to a spreadsheet or other application in real time.

High resolution temperature measurement

The VIPS T100 is a complete 16-bit resolution measurement module for thermocouples. Six miniature thermocouple connectors are provided, each suitable for types B, E, J, K, N, R, S or T. Thermocouple types can be mixed on the same T100.

Resolution for all types is 0.1°C, and temperature can be displayed in °C, °K or °F.



Each input can alternatively be used for voltage measurement with a sensitivity down to 1µV.

In common with the whole VIPS range, the T100 can be used as part of a multi-module system operating up to four VIPS units simultaneously. Where more thermocouple inputs are required, up to four T100s could be used together giving 24 temperature measurement channels.

Unlike the other VIPS modules, the T100 is housed in a compact metal case and is connected to the computer (or to the VIPS X-Box) via a screened cable (supplied). VIPS software provides the full range of display modes and each channel can be allocated an individual name.

A multi-channel waveform generator

The VIPS 20 incorporates four high speed 12-bit DACs perfectly suited to waveform generation.

VIPS software includes easy-to-use function generator controls which allow the generation of sine, square, triangle and ramp waveforms as well as dc levels and random noise.

The software provides precise control of frequency, level and dc offset as well as waveshape - all on a per-channel basis.

Alternatively arbitrary waveforms can be created and replayed from disk based files. Waveforms can be captured from a VIPS 10, or imported from Exel spreadsheets or from mathematical programs and waveform creation and editing programs such as WaveCad[1] or Waveform Manager[2].

A full Measurement and Control system

VIPS can provide much more than just data logging. It can combine analogue and digital inputs with analogue and digital outputs to form a complete measurement and control system.

VIPS software enables up to four pods to be monitored and controlled simultaneously.

Each analogue input can have two user defined alarm levels with visual indication of status provided on screen. The alarms can be linked to a digital output pod to provide control functions based upon analogue measurements.

Digital inputs can be displayed as lamp-style annunciators, as an event list, or as an event chart (graph mode).

More experienced users, particularly those with programming skills, can make use of DDE links or DLL drivers to take direct control of VIPS hardware and create dedicated measurement and control functions.

Applications thoughout science and engineering

Virtual instrumentation for:

- Waveform capture
- Digital storage 'scopes
- Digital thermometers
- Logic analysers
- Waveform generation
- Digital multimeters
- Chart recorders
- Logic sequencers

Typical application areas:

- Laboratory experiments
- Temperature measurement
- Process control systems
- Education and training
- Data logging systems
- Power control
- Servo mechanisms
- System simulation

Other applications

Applications for VIPS exist in virtually every branch of science and engineering. By linking together the functionality of several pods, complex and sophisticated tasks can be performed.

Four major application areas are covered on the previous page. Here are a few more.

VIPS 10 applications

In addition to operation as a data logger, the VIPS 10 has many other applications including:

Multi-channel DSO

The VIPS 10 pod can be used as a digital storage oscilloscope at speeds up to 10kS/s. Unlike a conventional DSO, resolution is 12 bits and up to 8 channels can be recorded and displayed simultaneously.

Digital chart recorder

At lower speeds, the graph mode can be used to provide a virtual chart recorder. Sample periods can be selected between 1ms and 10 hours.

Self-contained temperature monitor

The VIPS 10 incorporates a temperature sensor within the pod which generates a voltage of 10mV per °C. By connecting this output to an input channel, temperature can be displayed and logged.

VIPS 20 applications

The VIPS 20 provides 12-bit precision analogue outputs (up to 4 channels) from DC to kHz. As well as waveform generation, applications include:

Automated calibration source

The high resolution and accuracy of the VIPS 20 makes it suitable as a calibration source for a variety of test equipment.

Programmable power supplies

Many power supplies provide a voltage control input whereby both output voltage and output current can be linearly controlled. The four outputs of a VIPS 20 could be used to control two PSUs in this way.

VIPS 30/40/50 applications

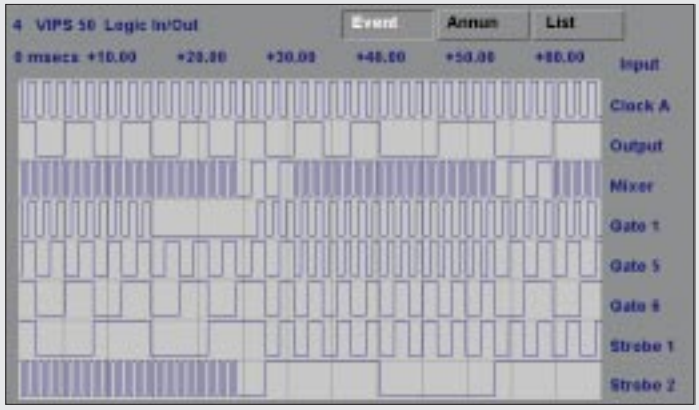
The VIPS 30, 40 and 50 pods provide multi-channel digital inputs and outputs. Typical applications include:

Relay control and monitoring

The high current open-collector outputs of the VIPS 40 can be used as relay drivers for power control.

Logic Analysis

The VIPS 30 and VIPS 50 provide 8-channel logic inputs which can be displayed as a timing diagram or as a state listing.



Automated controls

VIPS digital output modules can be linked to Alarm points on the VIPS 10 or VIPS T100 modules. Thus automated responses can be generated allowing, for example, a process temperature to be maintained.

VIPS 60 applications

The VIPS 60 provides eight independent analogue switches that can be used to link analogue (or digital) signal points together.

These switches allow multiplexers and routers to be configured. The VIPS 60 can be controlled automatically from the alarm settings of a VIPS 10 or VIPS T100. Thus, for instance, different motor drive signals generated from a VIPS 20 could be selected automatically in response to a transducer measurement.

As with all VIPS modules, DLL drivers are available which enables the module to be controlled from a user defined program.

Technical Specifications

COMMON SPECIFICATIONS (PODS)

Input/Output Connectors:	25-way Female D-connector
Interface Connector:	25-way Male D-connector for connection to parallel port
Size:	65 x 55 x 16.5mm (LxWxD)
Weight:	45 grms

External DC Input

If the computer cannot provide enough power from its printer port to power the VIPS pods, an external source of between 2V and 3.6V can be connected via the 2.1mm power socket.

VIPS 10 POD

No. of Channels:	8 single ended or 4 differential channels or a mixture of both.
Resolution:	12 bits.
Conversion Time:	10µs.
Sampling Rate:	20µs per channel (computer dependent).
Input Voltage Range:	0 to 4.096V (Unipolar), ±2.047V (Bipolar).
Internal Reference:	4.096V ±3mV (Trimmed).
Internal Ref Temp coefficient:	±50ppm/°C (max.).
Ext. Ref. Range:	1.5V to 5.0V.
Relative Accuracy:	±1 LSB (max.).
Offset Error:	±3 LSB (max.).
Max. Permissable Input Voltage:	±6V (Inputs Protected Against ESD).

Temperature Sensor Output

Output Scale:	10mV/°C or, using internal gain, 15mV/°C or 30mV/°C.
Accuracy:	±3°C.
Output Impedance:	100Ω.

Display Modes using VIPS Software

Control Display:	Bar Graph.
Main Display:	DSO, Graph, Bar, Meter, List.

VIPS 20 POD

No. of channels:	4.
Resolution:	12 bits.
Settling Time:	25µs to ± ½LSB.
Output Range:	±2.047V (bipolar), 0V to 2.047V (unipolar) or 0V to 4.095V (unipolar).
Internal Reference:	2.048V (typ) (2.017min to 2.079max).
Temp. Coefficient:	50ppm/°C.
Relative Accuracy:	±1 LSB.
External Ref. Range:	-3V to +3V (can use as MDAC input).

Multiplying DAC

Any output can be configured to operate as a four-quadrant multiplier whereby the output level is controlled by the digital code input.

Display Modes using VIPS Software

Control Display:	Waveform Generation.
Main Display:	Graph, Bars, Meter.

Waveform Editing and Control

Optional WaveCad and Waveform Manager software packages are available for waveform creation, editing and management.

VIPS 30 POD

No. of Channels:	8 opto-isolated.
'ON' Voltage:	<1.1V (No series resistor).
'OFF' Voltage:	<0.9V (No series resistor).
'ON' Current:	1mA.
Input Current:	10mA at 5V in (Use series resistor for higher voltages).
Max. Input Current:	18mA.
Max. Reverse Volts:	6V
Isolation Voltage:	50V with respect to gnd.
Data Rate:	180kHz (computer dependent).

Display Modes using VIPS Software

Control Display:	Annunciators.
Main Display:	Event Graph, Annunciators, Event List.

VIPS 40 POD

No. of channels:	8 driver outputs (open collector).
V_{CE}:	50V maximum.
Max. sink current:	200mA per channel.
$V_{CE(SAT)}$:	1.1V at 100mA, 1.3V at 200mA.
Max. Power:	1W.
Data Rate:	400kHz (computer dependent).
Max. load current:	5mA (+5V O/P).

Display Modes using VIPS Software

Control Display:	Annunciators.
Main Display:	Event Graph, Annunciators, Event List.

VIPS 50 POD

No. of Channels:	8 digital inputs & 8 digital outputs.
Input Resistance:	100kΩ pull ups.
Input levels:	CMOS levels.
Max. Input Voltage:	-5V, +10V.
Input Protection:	330Ω series resistors and diode clamps (14mA max. input current).
Output levels:	CMOS levels.
Output Current:	1mA maximum.
Output Protection:	330Ω series resistors.
Data Rate:	500kHz (computer dependant).
Max. load current:	5mA (+5V O/P).

Display Modes using VIPS Software

Control Display:	Annunciators.
Main Display:	Event Graph, Annunciators, Event List.

VIPS 60 POD

Number of Channels:	8 Analogue switches.
Analogue signal range:	-10V to +10V.
ON Resistance:	150Ω.
Max. Current:	30mA (1 switch only).
OFF Isolation:	90dB.
Data Rate:	300kHz (computer dependent).

Display Modes using VIPS Software

Control Display:	Annunciators.
Main Display:	Event Graph, Annunciators, Event List.

VIPS T100 MODULE

No. of channels:	6.

Thermocouple Mode

Thermocouple Types:	B, E, J, K, N, R, S, T; each selectable per-channel.
Displayed Units:	°C, °K or °F.
Conversion Time:	100ms.
Basic Accuracy:	±0.2% or ±0.4°C.
Resolution:	0.1°C (all types).
Cold Junction Comp.:	Via precision thermistor.

Overall Ranges (at 25°C):

Type	Range	Type	Range
B	275°C to 1845°C	N	-175°C to 1325°C
E	-175°C to 1025°C	R	-25°C to 1793°C
J	-185°C to 1225°C	S	-25°C to 1793°C
K	-175°C to 1397°C	T	-175°C to 425°C

Voltage Mode

Resolution:	16 bits (1 in 65536).
Measurement Range:	Settable as 0 to ±30mV or 0 to ±120mV.
Max. Resolution:	1µV (low range).
Input Impedance:	100kΩ

General

Input Connection:	6 x miniature thermocouple connectors.
PC Connection:	To parallel port or to VIPS X-Box using cable supplied.
Power Requirement:	None; powered from PC.
Size/Weight:	120 x 70 x 35mm / 240g

VIPS SOFTWARE

Each VIPS pod/module is supplied with full VIPS software for Windows on 3.5" disk.

The main VIPS program includes control windows for up to four pods and display modes of DSO (digital storage oscilloscope), Graph (chart recorder), Bars (bar graph display in real time), Meters (digital displays scaled to engineering units) and List (tabulated results or events).

Data can be logged to disk using the LOG function which creates text files for printing or viewing. Files of raw data can also be stored. Waveform generation functions are included for use with the VIPS20.

VIPS-DDE is provided for use with other Windows applications that support DDE. DLL hardware drivers are provided for each VIPS pod/module.

VIPS X-BOX

This expansion box is required when more than one VIPS module needs connecting to a single parallel port or when a printer is also required to be connected to the same parallel port. Any VIPS module can be connected to any position. The printer can be used whilst the VIPS modules are connected, but they will have to be disabled whilst a document is being printed.

VIPS CONNECTION BOARD

Connections to a VIPS pod are normally made via the 25-pin D-connector. Where this is not convenient, the VIPS connection board provides an alternative.

It provides screw terminal connection points for all 25 pins. The terminals can be unplugged from the board when required.

Thurlby Thandar Instruments Ltd. operates a policy of continuous development and reserves the right to alter specifications without prior notice.

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