KENTON

OPERATING INSTRUCTIONS FOR

PRO-4

MULTI-CHANNEL
MIDI TO CV CONVERTER

CONTENTS

INTRODUCTION

Congratulations on your purchase of the Kenton Electronics PRO-4 multi channel MIDI to CV converter, which has been designed to give you maximum flexibility, whilst maintaining ease of use.

The converter has eight completely independent sections - called channels A, B, C, D, E, F, G, & H. Each channel can be assigned its own MIDI channel, and controlled independently from each other.

The PRO-4 has four independent, MIDI programmable LFO`s that can modulate any of the CV outputs, and four of the auxiliaries. Each of the CV channels has a portamento function.

There are also many other features designed to make the PRO-4 as flexible as possible to allow as much control as possible over your analogue synthesizers.

The PRO-4 has a thorough MIDI system exclusive specification for those who wish to do data dumps or editing from their computer sequencer or generic patch editor.

Please take some time out to read through all of this manual which should hopefully explain all you will need to know.

THE PRO-4 CHANNELS

CHANNELS A, B, C, & D

These are for controlling analogue synths such as the SCI PRO-1, Roland SH-101, or indeed most other synths with CV and Gate inputs.

Note, the CV output for controlling the pitch uses the Volts per octave (V/oct) pitch scaling system. This is the most common system used in analogue synths, as used in Roland, SCI, Oberheim and Moog synths. Synths such as Korg & Yamaha, (MS20, MS10, CS5), work on a different pitch scaling system. This is called Hertz per volt (Hz/V). To control the pitch of these synths correctly, the optional four channel Hz/V board will need to be fitted. This is available as a plug in card. Contact us for details.

Some synths do not have CV, Gate or Filter inputs, such as the TB303. We can fit or supply socket kits for most monosynths that do not have inputs. Contact us for details.

CHANNEL E, the EDP Wasp port

This channel is a digital output for controlling the EDP Wasp or Gnat synth.

Note, the Wasp responds to three octaves of notes only - on a DX7 or other 61 note keyboard, this corresponds to bottom C#, to C, three octaves above. The Wasp does not respond to pitchbend - or indeed any other controls except sustain pedal, which will hold the current note, this is a design limitation of the Wasp itself.

CHANNEL F, MIDI channel filter

This is used to rechannelize or filter MIDI data.

Connect the synth to the PRO-4 MIDI out socket, and set the MIDI filter receive channel to the MIDI channel music data you want your old synth to respond to. Only data received on that channel will be sent out of the PRO-4 MIDI out, and any other channels will be filtered out. This data can be sent out on a different channel if required (see rechannellizing above). An example of rechannelizing might be to change the transmit channel of early DX7s, for instance, that can only transmit on MIDI channel 1, to another MIDI channel, say 2. An example of filtering might be on an early MIDI synth that can only receive in Omni mode (receive on all MIDI channels at the same time), the Jupiter 6, for example.

CHANNEL G, the DCB port

DCB (digital communications bus) is an old digital port Roland designed for linking up their poly synths, such as the Juno 60 or some Jupiter 8s. This is a polyphonic interface. It only sends note information, but on Jupiter 8s with DCB, it will also do program changes.

CHANNEL H, the KADI port

The KADI (Kenton Auxiliary Digital Interface) is a digital port. This can be used to play the TR606 or TR808 drum sounds over MIDI, although a small modification will have to be made to the drum machine.
It is also there for any possible future expansion. Note, special cables are needed to use the Wasp, DCB & KADI ports. These are available direct from Kenton.

SYNC 24 & Clock Pulse

The PRO-4 has a Roland SYNC 24 clock output. Instruments having a SYNC 24 input, such as the TB303, TR808, TR606, MC202, can be connected to the PRO-4. If the PRO-4 is receiving MIDI clock, these instruments will play their internal patterns in time to MIDI clock.

The PRO-4 also has a clock pulse (arpeggio output). This can be used to synchronize drum machines, analogue sequencers, and arpeggio`s to MIDI clock.

FRONT PANEL

Access to channels A to D`s tuning trimmers are gained from the front panel.

Each channel, A to D, has LED indicators to indicate when that channel`s Gate is on.

There are two more LED status indicators;
One is marked DATA. This indicates whether the PRO-4 is receiving MIDI data.
The other is marked SYNC. This indicates whether the PRO-4 is receiving MIDI clock messages.

Four buttons; PARAMETER, VALUE, LOAD and STORE, and also a Data Entry Dial.
These are for editing the PRO-4 & are explained later in the manual.

2x20 backlit LCD, and power switch.

BACK PANEL

From left to right, there is the;

   IEC power socket (power lead supplied).

   MIDI In, Out, and Thru DIN type sockets.

   Sync24 DIN socket.

   Clock pulse minijack output.

   The Wasp/DCB and KADI ports, D-type sockets.

   The eight auxiliary minijack outputs.

And the four analogue channels` Trig, Gate, CV & Hz/V (if fitted) minijack outputs.

SETTING UP YOUR PRO-4

MIDI CONNECTIONS

MIDI IN
- connect this to the MIDI Out of your MIDI synth or MIDI sequencer using standard MIDI cables.

MIDI OUT
- connect this to the MIDI In of your MIDI sequencer or old synthesizer. This is only needed if you will be editing the PRO-4 using SYSEX or doing MIDI data dumps, or if you are using the MIDI channel filter.

MIDI THRU
- this provides a copy of the information coming into the MIDI In socket so that you can "daisy-chain" several MIDI devices. It should be connected only to a MIDI In socket if needed.

ANALOGUE CONNECTIONS

CV A, B, C, & D (-1 volt to 5 volts)
- the control voltage output to control the pitch of most synths, such as Roland, SCI, and Moog.
Connect this output to the input marked CV, oscillator, KBD IN, VCO CV in, VCO, KEY Volt in, etc., of your synth.

Hz/V A, B, C, & D (optional)
- these optional outputs are to control the pitch on synths such as some of the KORG and YAMAHA synths. This output works in conjunction with the CV output.
Connect this output to the input marked CV, oscillator, KBD IN, VCO CV in, VCO, KEY Volt in, etc., of your synth.

GATE A, B, C, & D (off=0 volts on=+15 volts)
- the gate voltage output that provides the note on/off information for synths. This is used for most synths, such as Roland, ARP, or Oberheim.
Connect this output to the input marked Gate in, TRIG in, etc., of your synth.

S-TRIG A, B, C, & D
- this output has 7 triggering options selectable in the software.
S-Trig - this is used to control Moogs, Korgs.
The tip of the jack is the trigger signal - if your synth has the CINCH/JONES connector with two flat pins, the narrower pin is the trigger signal and the wider one is ground.
Trigger - Can be used to trigger ARP envelopes or analogue sequencers.
Connect this output to the input marked S-Trig in, TRIG in, etc., of your synth.

AUXILIARIES 1 to 8 (-13 to +13 volts)

- a voltage output for connecting to an auxiliary input on a synth such as filter control or VCA volume.

Connect this output to the input marked VCF in, VCF fcM, Filter, etc, on your synth to control the filter cut-off, or the input marked VCA, Volume, loudness, etc., to control volume. You could also connect this to inputs such as portamento, pulse width, high pass filter cut-off, etc.

Cable Connections

All minijack outputs on the PRO-4 need standard 3.5mm mono minijack plug. The connection at the synth end of course depends on what synth you are using.

THE ARP CLOCK & SYNC 24 OUTPUTS

CLOCK PULSE - (arpeggio clock)

- this output provides a 5 volt clock pulse related to the incoming MIDI clock. The ratio of MIDI clocks to arpeggio pulses can be adjusted - (see CLOCK PULSE DIVIDE).

A 5 volt voltage will be outputed on the first MIDI clock after a MIDI start (or continue if selected) is received, and thereafter dependent upon the CLOCK PULSE DIVIDE ratio.

You may wish to connect this to an input marked Ext. Clock In on an analogue drum machine or sequencer. It could also be used to gate/trigger envelopes or Sample and Hold circuits in time to MIDI clock.

SYNC 24 - (DIN 24 sync, used on SOME ROLAND equipment)

- this output provides clock and stop/start signals.

     Pin 1 - Stop = 0 volts Start = 5 volts (or continue if selected)
     Pin 3 - 5 volt pulses; 24 clocks per quarter note, the same as MIDI
     Pin 2 - Ground
     Pins 4 & 5 are not used.

Cable Connections

MIDI leads are not suitable for connecting to the SYNC 24 socket as they have different pins connected. Use a 5 pin DIN to 5 pin DIN audio lead available from a HI-FI shop.

Connect this output to the SYNC 24 input on a TR606/808, MC202, or TB303 to synchronize these instruments` sequencers to MIDI clock.

TRIMMER ADJUSTMENTS FOR CHANNELS A, B, C, & D

Tuning in your PRO-4 and your analogue synths.

INITIAL (range approx 2 octaves)

- tunes the PRO-4 to the synth.

SCALE (range approx 20%)

- adjusts the octave scaling of the PRO-4 to match the synth. When the PRO-4 leaves the factory, this is set to the standard 1 volt per octave, but some synths may require some adjustment of this control if the octaves are out of tune with each other.

It may be that your synth is slightly out of tune, so it will be necessary to tune the PRO-4 to your synth;

1, Tune your synth (when playing from its own keyboard) correctly with your digital synths first. Do this by adjusting the tuning or pitch knob on your analogue synth whilst playing middle C on both synths. (To do this, you may need to disconnect the analogue synth from the PRO-4).

2, Now, with the PRO-4 connected to the analogue synth, play middle C on your digital synth. Both synths should sound. With a small flat blade screw driver, tune in the PRO-4 with your analogue synth by adjusting the INIT trimmer on the front panel.

3, When your digital and analogue synths are once again in tune, play a key two octaves up on your digital synth. Now adjust the SCALE trimmer till both synths are in tune. The analogue synth should now play correctly across its range from your master keyboard.

Use a small, thin and narrow, flat blade screwdriver to do this.

EDITING THE PRO-4

The PRO-4 is very easy to use. It uses a standard system of editing. It has a clear and informative 2x20 LCD with backlight, PARAMETER and VALUE buttons, and a Data Entry Dial (referred to as the DED).

To select the parameter you wish to edit, the parameter LED (the red light emitting diode), must be lit. If it is not, press the PARAMETER button. You can now scroll through the parameters using the DED.

To edit a value, press the VALUE button. The value LED will light up. Now by turning the DED the parameter value can be edited. Note that with many of the larger values (such as controller numbers and portamento rate) the values will loop from max to min, i.e from +127 directly to -127.

STORING AND RECALLING SET-UPS

To load a set-up, press LOAD.
Now with the DED, you can select which set-up, 1 to 8, you wish to load, or you can load back the default settings.

After selecting which set-up you want, press & hold LOAD till the display says LOADED.

The PRO-4 can be set to receive a SYSEX data dump. See SYSEX manual for full details on PRO-4 MIDI System Exclusive.

To store a set-up, press STORE.
Now with the DED, you can select which memory, 1 to 8, you wish to store your set-up in.

After selecting which memory you wish to store your set-up in, press and hold STORE till the display says STORED.

The PRO-4, the current set-up, or all 8 set-ups can be dumped by SYSEX.

Lastly, the system data can also be stored. This comprises of the display contrast, MIDI device number and The Auto-Load setting.

PARAMETERS

THE FOLLOWING PARAMETERS ARE THE SAME FOR EACH OF THE FOUR CHANNELS, A, B, C & D (where x is the channel)

CV > x MIDI Receive Channel (1 to 16, default: A=1 B=2 C=3 D=4)

- sets the MIDI receive channel for PRO-4 analogue channel.

CV > x NOTE PRIORITY (low/high/newest, default: newest)

- sets the note priority.
If set to "Lowest" then the new note played takes precedence if it is lower than the preceding note.
If set to "Highest" then the new note played takes precedence if it is higher than the preceding note.
If set to "Newest" then the newest played note played takes precedence regardless.

CV > x TRIGGER MODE (Single/Multiple, default: Multiple)

- sets the whether the envelope on your synth will retrigger when a new, overlapping note is played.
If set to "Single," then the Gate (or S-Trig) output will stay on, or the Trigger (if selected) will not re-trigger when a new note is played, if you are playing in a legato fashion, with notes over lapping.
If set to "Multiple," then the Gate (or S-Trig) output will re-Gate each time a new note is played, re-triggering your synth`s envelope generators, regardless of your playing style.

CV > x TRANSPOSE (-24 to +24 semitones, default: 0)

- allows you to Transpose the incoming MIDI notes in semitone steps. You can adjust this in real-time, allowing you to hear the changes you make to Transpose, without having to replay a key.

CV > x PITCHBEND (0 to +/-24 semitones, default: 12)

- sets the maximum range the pitchbend will bend the CV (or Hz/V) output.

CV > x PORTAMENTO CONTROLLER(off,on, vel, aft, controllers 1-120, default: #65)

- assigns which MIDI controller turns the portamento on and off. Note that the portamento can also be forced on or off manually.

CV > x PORTAMENTO (Fixed rate/time, default: Fixed rate)

- sets whether the portamento function will have a fixed time or fixed rate.
Fixed rate: the time taken to glide between notes depends on the amount of notes in the glide range. The glide time between semitones is constant.

Fixed time: the time taken to glide between notes is the same no matter how far apart the notes are.

CV > x PORTAMENTO Rate (1 to 256, default: 201)

- sets the portamento time/rate taken to glide between notes.
This value can also be varied using MIDI controller number 5 (protamento time). If this parameter is on the display, its new value will not be displayed when varied from controller 5. (If varied via SYSEX, the new value will be displayed).

CV > x LFO DEPTH CONTROL (pb, vel, aft, controllers 1-120, default: #1 mod wheel)

- assigns which MIDI controller will control the LFO depth to modulate the CV (Hz/V) output.

CV > x LFO DEPTH For cntrl Min (0 to 127, default: 0)

- set the minimum LFO depth that will modulate the CV (Hz/V) output when the MIDI controller is at a minimum.

CV > x LFO DEPTH For cntrl Max (0 to 127, default: 64)

- set the maximum LFO depth that will modulate the CV (Hz/V) output when the MIDI controller is at a maximum.

CV > x LFO ASSIGN Use LFO number (1 to 4, default: A=1, B=2, C=3, D=4)

- lets you assign which of the four inbuilt LFOs will modulate the CV (Hz/V) outputs.

CV > x TRIGGER JACK SOCKET (default: S-Trig no pull-up)

- you can select the following type outputs for the TRIG output;

    S-trig no pull-up
This would probably be used for Moogs & Korgs instead of the Gate output.

    S-trig 5v pull-up
    S-trig 15v pull-up
This would probably be used on the Yamaha CS range of synths instead of the Gate output.

    Gate V-Trig 5v
    Gate V-Trig 15v
The 15v Gate is the same as the Gate output. The 5v gate may be needed for synths that require a lower gate voltage.

    Trigger pulse 5v
    Trigger pulse 15v
These should be used to trigger envelope generators on the ARP 2600 or Odyssey, or they could be used to trigger analogue drum machines or sequencers.

DIGITAL OUTPUT PARAMETERS

WASP>E MIDI Receive Channel (1 to 16, default: 5)

- sets the MIDI receive channel for the WASP port.

WASP>E NOTE PRIORITY (low/high/newest, default: newest)

- sets the note priority.
If set to "Lowest" then the new note played takes precedence if it is lower than the preceding note.
If set to "Highest" then the new note played takes precedence if it is higher than the preceding note.
If set to "Newest" then the newest played note played takes precedence regardless.

FILTER>F MIDI Receive Channel (1 to 16, default: 6)

- sets the MIDI receive channel for the MIDI channel filter.
Only MIDI data on this channel will be retransmitted to the PRO-4
MIDI out. It can be retransmitted on a different channel if necessary; see below.

FILTER>F MIDI Transmit Channel (1 to 16, default: 1)

- sets the channel that the MIDI data from the MIDI channel filter is retransmitted on.
This might be used to change the transmit channel of early DX7s, for instance, that can only transmit on
MIDI channel 1.

DCB >G MIDI Receive Channel (1 to 16, default: 7)

- sets the MIDI receive channel for the DCB port.

KADI>H MIDI Receive Channel (1 to 16, default: 8)

- sets the MIDI receive channel for the KADI port.

Using the KADI port with your modified TR606/808

Connect the special multi-way cable supplied to the TR606 or TR808 and to the PRO-4 KADI port. The TR606/808 can now be played from your master keyboard/sequencer.

The sounds will play with or without Accent. A velocity level of over 70 will cause the sound to be accented, subject to the level of Accent selected on the TR606/808.

Below is the MIDI drum map for the TR-606 sounds;

NOTE	MIDI NOTE NUMBER	TR-606 SOUND
C	36	BASS DRUM
C#1	37	SNARE DRUM
D1	38	LOW TOM
D#1	39	HIGH TOM
E1	40	CYMBAL
F1	41	OPEN HIHAT
G1	42	CLOSED HIHAT

Below is the MIDI drum map for the TR-808 sounds;

NOTE	MIDI NOTE NUMBER	TR-808 SOUND
C	36	BASS DRUM
C#1	37	SNARE DRUM
D1	38	LOW TOM/CONGA
D#1	39	MID TOM/CONGA
E1	40	HI TOM/CONGA
F1	41	RIMSHOT/CLAVES
F#1	42	CLAP/MARACAS
G1	43	COWBELL
G#1	44	CLOSED HIHAT
A1	45	OPEN HIHAT
A#1	46	CYMBAL

AUXILIARY OUTPUTS

THE FOLLOWING PARAMETERS ARE THE SAME FOR EACH AUXILIARY 1 TO 8
(where x is the auxiliary number)

AUX > x CHANNEL LINK Connected to Chan > (A to H default: 1 to 8 set to A to H respectively)
- assigns the auxiliary to which ever PRO-4 channel you wish to set it to, i.e. the auxiliary will respond to MIDI controllers on the same MIDI channel as the PRO-4 channel it is assigned to.

AUX > x CONTROLLER (pb, vel, aft, controllers 1-120, default: #16 general purpose controller)
- sets the MIDI controller source to control the analogue auxiliary output level, to control filter cut-off, VCA etc.

AUX > x OUTPUT LEVEL For cntrl Min (-128 to +127, default: 0)
- sets the auxiliary output level for when the MIDI Controller Source is at its minimum.

AUX > x OUTPUT LEVEL For cntrl Max (-128 to +127, default: 100)
- sets the auxiliary output level for when the MIDI Controller Source is at its maximum.

AUX > x OUTPUT LEVEL Reset Level (-128 to +127, default: 0)
- sets the level that the auxiliary will reset to when a MIDI reset command is received.

The range of -127 to +127 corresponds to an output voltage of approximately -12.7 Volts to +12.7 Volts. Most synths, such as Roland, for example, may only need a range of 0 to +10 Volts (0 to 100 on the PRO-4). Some other synths may need a different range. Korg MS10s and MS20s, for example, use a range of -5 to +5 Volts to control their filter cut-offs, etc. (-50 to +50 on the PRO-4). By setting the Controller Minimum to a higher number than Controller Maximum, the range can be reversed. Say you want a range of +5 Volts to -5 Volts (as opposed to -5 to +5), set the Max level to -50, and the Min level to +50. This way, when your controller is at its minimum, the auxiliary output will be +5 Volts, and at -5 V when the controller is at its maximum. Adjust these settings to what seems to work best with your synth.

AUX > x LFO DEPTH CONTROLLER (pb, vel, aft, controllers 1-120, default: #1 mod wheel)
- sets the MIDI controller source to control the LFO depth that will modulate the auxiliary output.

AUX > x LFO DEPTH For cntrl Min (0 to 127, default: 0)
- set the minimum LFO depth that will modulate the auxiliary output when the MIDI controller is at a minimum.

AUX > x LFO DEPTH For cntrl Max (0 to 127, default: 64)
- set the maximum LFO depth that will modulate the auxiliary output when the MIDI controller is at a maximum.

AUX > x LFO ASSIGN Use LFO number (1 to 4, default: 1=1, 2=2, 3=3, 4=4. The LFOs cannot modulate auxiliaries 5 to 8)
- lets you assign which of the four inbuilt LFOs will modulate the auxiliary.

LOW FREQUENCY OSCILLATORS

THERE ARE FOUR INDEPENDENT LFOs, 1 to 4 (where x is the LFO number)

LFO > x SPEED = (1 to 100, default: 1=91 2=81 3=71 4=61)

- sets the speed of the LFO

LFO > x WAVETABLE # (1 to 9, default: 1=1 2=2 3=3 4=4)

- sets the wave shape for the LFO

|		
1, Triangle		2, Sawtooth up
3, Sawtooth down		4, Square
5, PulseWidth 10%		6, PulseWidth 20%
7,1 PulseWidth 30%		8, PulseWidth 40%
9, Sample + Hold (random depth)		

LFO > x MIDI SYNC (off, 1 to 96, default: off)

- allows the LFO waveform to be synchronised to MIDI clock, with a variable divide ratio. The LFO waveform will automatically adjust its length so that it will start at the beginning of a bar, and last for what ever musical time it is set for (see below for divide ratios).

If set to 1, there will be 1 cycle of the LFO for every 1 MIDI clock. (i.e. 24 cycles per quarter note)
If set to 24, there will be 1 cycle of the LFO for every 24 MIDI clocks. (i.e. 1 cycle of the LFO per quarter note)

Note; MIDI sends 24 clocks per quarter note.

Below is a table of values you can set the divide ratio to to obtain LFO cycles of various musical lengths:

Note type;	Divide ratio;
Semibreve	96
Minim	48
Crotchets	24
Crotchet triplets	16
Quavers	12
Quaver triplets	8
Semiquavers	6
Semiquaver triplets	4
Demisemiquavers	3
Demisemiquaver triplets	2

SYNC SETTINGS

CLOCK PULSE OUTPUT (arpeggio clock)

SYNC > ARPEGGIO Clock Divide (2 to 24, default: 2)

- sets the ratio of MIDI clocks to output pulses from the clock pulse output.

If set to 1, there will be 1 pulse from the clock pulse output for every 1 MIDI clock. (i.e. 24 pulses per quarter note)

If set to 24, there will be 1 pulse from the clock pulse output for every 24 MIDI clocks. (i.e. 1 pulse per quarter note)

Below is a table of values you can set the divide ratio to to obtain a clock pulse at various musical time intervals:

Note type;	Divide ratio;
Crotchets	24
Crotchet triplets	16
Quavers	12
Quaver triplets	8
Semiquavers	6
Semiquaver triplets	4
Demisemiquavers	3
Demisemiquaver triplets	2

SYNC > ARPEGGIO Normal/Inverted clock pulse (default: Normal)

- sets the type of clock pulse sent from the clock pulse output.
Most synths, sequencers & drum machines require this to be set to Normal, but there may be a few that require it to be set to Inverted.

SYNC > MIDI CLOCK Continue is ignored/= start (default: ignored)

- If set to ignored, MIDI continue messages are ignored. If set to Continue=start, MIDI continue messages are treated as if they were MIDI start messages.

PROBLEMS USING MIDI CLOCK

When using the MIDI clock in conjunction with the PRO-4 or our retrofits please note the following. The Kenton add-on cannot sync the arpeggio if it is not actually receiving the MIDI clock this is not as silly as it sounds, there are a few points to watch for:-

Some MIDI mergers & patch bays actually remove MIDI clock information from the MIDI data stream or you may have to enable it for the port you are using.

Users of CUBASE note that the default for MIDI clock is for it NOT to be sent, you will have to go into MIDI Synchronization page and select MIDI Clock to transmit.

Users of UNITOR/EXPORT on an Atari note that the MIDI clock will only come out of port A, (that is the Atari's own MIDI port), unless you can re-assign it.

SYSTEM SETTINGS

SYSTEM > MIDI Device number = x (x=1 to 16, default: 1)

- sets the PRO-4 MIDI device number. If you have several PRO-4s, you would set each PRO-4s device number differently, so you can identify which PRO-4 you may wish to send/receive MIDI SYSEX data to/from. This is saved with system data.

SYSTEM > AUTO-LOAD LOAD from (defaults or Memory #1 to 8, default: Defaults)

- sets which memory, 1 to 8 or default settings, the PRO-4 will load when the power is switched on.

SYSTEM > DISPLAY Contrast x (x=0 to 127, default: 100)

- sets the display contrast. This is saved with system data.

MIDI DIAGNOSTICS MODE

The *Pro-FOUR* also has a MIDI analyser function. This feature allows you to see what types of MIDI messages are being transmitted by your master keyboard/sequencer making the *PRO FOUR* a useful diagnostic tool, which can aid you when you have a problem with your MIDI set-up.

To enter analyser mode, you must power on the *PRO FOUR* whilst holding the **PARAMETER** button. The display will then show CHANNEL, NOTE# and VELOCITY, and will display the relevant data, below the heading.

Using the **LOAD**, **STORE**, **PARAMETER** and **VALUE** buttons, different types of MIDI messages received may be displayed;

STORE	Short press	CLOCK, STATUS, SYSEX and ACTIVE SENSING for checking MIDI data.
PARAMETER	Short press	CHANNEL,NOTE# and VELOCITY for checking note information.
VALUE	Short press	CHANNEL,CONTROLLER# and VALUE displays controller information.
	Long press	CONTROLLER IDENTITY - displays the name of the rec'd controller.
LOAD	Short press	CHANnel,PROG# and BANK# - displays program change as rec'd.

Although pitchbend and after-touch are not controllers, when Controller number is selected, they will be displayed when received. If Controller values is selected, and pitchbend or after-touch are received, their values will be displayed.
During analyser mode some of the LED's on the front panel also give information. The red LED next to the parameter button flashes whenever a 'note on' is received, while the value LED flashes when a 'note off' message is received.

POLYPHONIC MODE

This mode allows you to use the four CV channels polyphonically. This lets you play 4 separate analogue monosynths as if they were one 4 voice poly synth. Some four 4 voice poly synths such as the Oberheim OB-4 can be fitted with CV/Gate/Filter inputs allowing it to be played polyphonically from the PRO-4. The poly mode parameters can be found after the System parameters.

POLY> CHAN ASSIGNMENT All Channels = Mono (default)

A+B=Poly C+D=Mono
A+B+C=Poly D=Mono
A+B+C+D=Poly
- This setting lets you decide which PRO-4 channels are assigned for use in poly mode.

POLY > NOTE ASSIGNMENT Regular Cyclic Mode (default)

Memory Cyclic
Reset Mode
- This setting decides how the PRO-4 assigns incoming MIDI notes to the PRO-4 poly channels being used (as set by CHAN ASSIGNMNT above). This setting only has effect if the PRO-4 is in poly mode.

Regular Cyclic Mode;
Incoming MIDI notes are assigned the next free CV channel. (Even if it is the same note played repeatedly).
If, for instance you have channels A+B+C+D set to poly, each time you play a note it will step through and assign channels A, B, C, D then back to A again to it as you play.
If you hold a note, new notes will be assign to the next channel in the line free.
If all channels are assigned to held notes, the next newest note will use the CV channel first held.

Memory Cyclic;
When you play four notes four channels are assign in a cyclic manner similar to the regular cyclic mode. If you play any of those same 4 notes, the same channels as previously assigned will be used for the same four notes.
If a new note is played, the oldest channel assigned will be assigned to the new note.

Reset Mode;
As you play, the lowest free channel (A being the lowest) is assigned to the new note.
When in poly mode, certain parameters for channels B, and C and D if assigned to poly mode, will be slaved to channel A.

If you scroll to `CV >A NOTE PRIORITY`, you will see `Poly mode Master Chn`. In poly mode, Note priority is not used.
If you scroll to the other channels assigned to poly mode, you will see `Slave to channel >A` for parameters;

`CV >x MIDI` (where x is B, C, or D),
`CV >x NOTE PRIORITY`, and
`CV >x TRIGGER MODE`.
The values for these parameters will be taken from channel A`s settings.
The previous settings for these parameters are not overwritten by channels A`s settings, they are held in memory and will be reset back when the poly mode is switched off back to mono mode.
If you have auxiliaries linked to any of the poly CV channels, and the auxiliary source is velocity, the auxiliaries will take their velocity levels from the note they are assigned to, giving you polyphonic velocity.
One interesting feature is that you can set different Pitch Bend and Transpose ranges, LFO settings, etc., for each of the poly voices, allowing interesting effects to be produced.

PRO-4 MIDI SYSEX INFORMATION

The first five bytes of sysex for the PRO-4 are always the same for all data types;

[1]   0F0h   - Sysex command
[2]   00h   - Company ident first byte
[3]   20h   - Company ident second byte
[4]   13h   - Company ident third byte
[5]   04h   - Product code
[6]   0dddnnnn   - where nnnn = device number & ddd is data type
                               if ddd = 100 = memory dump   40
                               if ddd = 010 = information change   20
                               if ddd = 001 = information request   10
----
 ddd = 001 = information request
[7]   0000bbbb   - where bbbb = block requested - valid are 0 - 8
[8]   0F7h   - end of exclusive

The PRO-4 responds with a memory dump of the block requested.
----
ddd = 010 = information change
[7]   0000llll   - where llll = low 4 bits of parameter address
[8]   0000hhhh   - where hhhh = high 4 bits of parameter address
[9]   0000llll   - where llll = low 4 bits of data
[10]   0000hhhh   - where hhhh = high 4 bits of data
[11]   0F7h   - end of exclusive

The PRO-4 responds by changing the specified data and updating the display if necessary. - See below for parameter addresses.
----
ddd = 100 = memory dump
[7]   0000bbbb   - where bbbb = block requested - valid are 0 - 8
[8]   0000llll   - where llll = low 4 bits of number of bytes in dump.
[9]   0000hhhh   - where hhhh = high 4 bits of number of bytes in dump.
[10]   0000llll   - where llll = low 4 bits of data
[11]   0000hhhh   - where hhhh = high 4 bits of data
          Bytes 10 & 11 are repeated the number of times specified in 8/9
[12]   0lllllll   - where lllllll are the lowest 7 bits of crc
[13]   0mmmmmmm- where mmmmmmm are the middle 7 bits of crc
[14]   000000hh   - where hh are the high 2 bits of crc
[15]   0F7h   - end of exclusive

The PRO-4 will send the above data when requested either from the front panel or by the sysex information request listed above.
When memory dump data is sent to the PRO-4 the following will happen:-
If the dump specifies block 0 (current setup) the data will be immediately utilised and the display will be updated.
If the dump specifies any other block (a stored memory location) the dump will be ignored unless the display is first set to show "WAITING TO RECEIVE SYSEX DATA"
When a block (or blocks) is received, the display changes to RECEIVED followed by the number(s) of the block(s) received.To save this/these to memory, press and hold the LOAD button. Any other button will abort the dump.

You may change the device number and block number of a memory dump without causing any problem. The CRC is calculated only on the actual data itself. For example, data that came from memory 6 could be returned to the current setup by merely changing the 06 in byte [7] to a 00.

Parameter data is stored in the following addresses:-

          Parameter   **Valid range**   **{Notes} Address Default**

RECEIVE CHANNEL >A	0 - 15	{ 1 }	00h	0	
RECEIVE CHANNEL >B	0 - 15	{ 1 }	01h	1	
RECEIVE CHANNEL >C	0 - 15	{ 1 }	02h	2	
RECEIVE CHANNEL >D	0 - 15	{ 1 }	03h	3	
RECEIVE CHANNEL >E	0 - 15	{ 1 }	04h	4	
RECEIVE CHANNEL >F	0 - 15	{ 1 }	05h	5	
RECEIVE CHANNEL >G	0 - 15	{ 1 }	06h	6	
RECEIVE CHANNEL >H	0 - 15	{ 1 }	07h	7	
TRANSMIT CHANNEL >F	0 - 15	{ 1 }	08h	1	
TRANSPOSE >A	232 >0 > 24	{ 2 }	09h	0	
TRANSPOSE >B	232 >0 > 24	{ 2 }	0Ah	0	
TRANSPOSE >C	232 >0 > 24	{ 2 }	0Bh	0	
TRANSPOSE >D	232 >0 > 24	{ 2 }	0Ch	0	
PORTAMENTO TIME >A	0 - 255		0Dh	200	
PORTAMENTO TIME >B	0 - 255		0Eh	200	
PORTAMENTO TIME >C	0 - 255		0Fh	200	
PORTAMENTO TIME >D	0 - 255		10h	200	
PORTAMENTO TYPE >A	0 - 1	{ 3 }	11h	0	
PORTAMENTO TYPE >B	0 - 1	{ 3 }	12h	0	
PORTAMENTO TYPE >C	0 - 1	{ 3 }	13h	0	
PORTAMENTO TYPE >D	0 - 1	{ 3 }	14h	0	
TRIG/PRIORITY/POLY >A	TMRC0PPP	{ 4 }	5h	10000100	
TRIG/PRIORITY/POLY >B	T000SPPP	{ 4 }	16h	10000100	
TRIG/PRIORITY/POLY >C	T000SPPP	{ 4 }	17h	10000100	
TRIG/PRIORITY/POLY >D	T000SPPP	{ 4 }	18h	10000100	
TRIGGER/PRIORITY >E	00000PPP	{ 4 }	19h	00000100	
TRIG JACK CONFIG >A	0 - 6	{ 5 }	1Ah	0	
TRIG JACK CONFIG >B	0 - 6	{ 5 }	1Bh	0	
TRIG JACK CONFIG >C	0 - 6	{ 5 }	1Ch	0	
TRIG JACK CONFIG >D	0 - 6	{ 5 }	1Dh	0	
PITCHBEND RANGE >A	0 - 96	{ 6 }	1Eh	48	
PITCHBEND RANGE >B	0 - 96	{ 6 }	1Fh	48	
PITCHBEND RANGE >C	0 - 96	{ 6 }	20h	48	
PITCHBEND RANGE >D	0 - 96	{ 6 }	21h	48	
CHANNEL LINK AUX >1	0 - 7	{ 7 }	22h	0	
CHANNEL LINK AUX >2	0 - 7	{ 7 }	23h	1	
CHANNEL LINK AUX >3	0 - 7	{ 7 }	24h	2	
CHANNEL LINK AUX >4	0 - 7	{ 7 }	25h	3	
CHANNEL LINK AUX >5	0 - 7	{ 7 }	26h	4	
CHANNEL LINK AUX >6	0 - 7	{ 7 }	27h	5	
CHANNEL LINK AUX >7	0 - 7	{ 7 }	28h	6	
CHANNEL LINK AUX >8	0 - 7	{ 7 }	29h	7	
CONTROLLER NUM AUX >1	252> 0 > 120	{ 8 }	2Ah	16	
CONTROLLER NUM AUX >2	252 > 0 > 120	{ 8 }	2Bh	16	
CONTROLLER NUM AUX >3	252 > 0 > 120	{ 8 }	2Ch	16	
CONTROLLER NUM AUX >4	252 > 0 > 120	{ 8 }	2Dh	16	
CONTROLLER NUM AUX >5	252 > 0 > 120	{ 8 }	2Eh	16	
CONTROLLER NUM AUX >6	252 > 0 > 120	{ 8 }	2Fh	16	
CONTROLLER NUM AUX >7	252 > 0 > 120	{ 8 }	30h	16	
CONTROLLER NUM AUX >8	252 > 0 > 120	{ 8 }	31h	16	
CONTROLLER MIN AUX >1	0 > 128 > 255	{ 9 }	32h	128	
CONTROLLER MIN AUX >2	0 > 128 > 255	{ 9 }	33h	128	
CONTROLLER MIN AUX >3	0 > 128 > 255	{ 9 }	34h	128	
CONTROLLER MIN AUX >4	0 > 128 > 255	{ 9 }	35h	128	
CONTROLLER MIN AUX >5	0 > 128 > 255	{ 9 }	36h	128	
CONTROLLER MIN AUX >6	0 > 128 > 255	{ 9 }	37h	128	
CONTROLLER MIN AUX >7	0 > 128 > 255	{ 9 }	38h	128	
CONTROLLER MIN AUX >8	0 > 128 > 255	{ 9 }	39h	128	
CONTROLLER MAX AUX >1	0 > 128 > 255	{ 9 }	3Ah	255	
CONTROLLER MAX AUX >2	0 > 128 > 255	{ 9 }	3Bh	255	
CONTROLLER MAX AUX >3	0 > 128 > 255	{ 9 }	3Ch	255	
CONTROLLER MAX AUX >4	0 > 128 > 255	{ 9 }	3Dh	255	
CONTROLLER MAX AUX >5	0 > 128 > 255	{ 9 }	3Eh	255	
CONTROLLER MAX AUX >6	0 > 128 > 255	{ 9 }	3Fh	255	
CONTROLLER MAX AUX >7	0 > 128 > 255	{ 9 }	40h	255	
CONTROLLER MAX AUX >8	0 > 128 > 255	{ 9 }	41h	255	
CONTROLLER RES AUX >1	0 > 128 > 255	{ 9 }	42h	128	
CONTROLLER RES AUX >2	0 > 128 > 255	{ 9 }	43h	128	
CONTROLLER RES AUX >3	0 > 128 > 255	{ 9 }	44h	128	
CONTROLLER RES AUX >4	0 > 128 > 255	{ 9 }	45h	128	
CONTROLLER RES AUX >5	0 > 128 > 255	{ 9 }	46h	128	
CONTROLLER RES AUX >6	0 > 128 > 255	{ 9 }	47h	128	

|				
CONTROLLER RES AUX >7	0 > 128 > 255	{ 9 }	48h	128
CONTROLLER RES AUX >8	0 > 128 > 255	{ 9 }	49h	128
LFO CONTROL CHAN >A	252 > 0 > 120	{ 8 }	4Ah	1
LFO CONTROL CHAN >B	252 > 0 > 120	{ 8 }	4Bh	1
LFO CONTROL CHAN >C	252 > 0 > 120	{ 8 }	4Ch	1
LFO CONTROL CHAN >D	252 > 0 > 120	{ 8 }	4Dh	1
LFO CONTROL AUX >1	252 > 0 > 120	{ 8 }	4Eh	1
LFO CONTROL AUX >2	252 > 0 > 120	{ 8 }	4Fh	1
LFO CONTROL AUX >3	252 > 0 > 120	{ 8 }	50h	1
LFO CONTROL AUX >4	252 > 0 > 120	{ 8 }	51h	1
LFO MINIMUM CHAN >A	0 - 255		52h	0
LFO MINIMUM CHAN >B	0 - 255		53h	0
LFO MINIMUM CHAN >C	0 - 255		54h	0
LFO MINIMUM CHAN >D	0 - 255		55h	0
LFO MINIMUM AUX >1	0 - 255		56h	0
LFO MINIMUM AUX >2	0 - 255		57h	0
LFO MINIMUM AUX >3	0 - 255		58h	0
LFO MINIMUM AUX >4	0 - 255		59h	0
LFO MAXIMUM CHAN >A	0 - 255		5Ah	128
LFO MAXIMUM CHAN >B	0 - 255		5Bh	128
LFO MAXIMUM CHAN >C	0 - 255		5Ch	128
LFO MAXIMUM CHAN >D	0 - 255		5Dh	128
LFO MAXIMUM AUX >1	0 - 255		5Eh	128
LFO MAXIMUM AUX >2	0 - 255		5Fh	128
LFO MAXIMUM AUX >3	0 - 255		60h	128
LFO MAXIMUM AUX >4	0 - 255		61h	128
SPEED LFO >1	0 - 100		62h	90
SPEED LFO >2	0 - 100		63h	80
SPEED LFO >3	0 - 100		64h	70
SPEED LFO >4	0 - 100		65h	60
WAVESHAPE LFO >1	0 - 9	{ 10 }	66h	0
WAVESHAPE LFO >2	0 - 9	{ 10 }	67h	1
WAVESHAPE LFO >3	0 - 9	{ 10 }	68h	2
WAVESHAPE LFO >4	0 - 9	{ 10 }	69h	3
LFO ASSIGN CHAN >A	0-3	{ 11 }	6Ah	0
LFO ASSIGN CHAN >B	0-3	{ 11 }	6Bh	1
LFO ASSIGN CHAN >C	0-3	{ 11 }	6Ch	2
LFO ASSIGN CHAN >D	0-3	{ 11 }	6Dh	3
LFO ASSIGN AUX >1	0-3	{ 11 }	6Eh	0
LFO ASSIGN AUX >2	0-3	{ 11 }	6Fh	1
LFO ASSIGN AUX >3	0-3	{ 11 }	70h	2
LFO ASSIGN AUX >4	0-3	{ 11 }	71h	3
LFO SYNC DIV LFO >1	0 - 96	{ 12 }	72h	0
LFO SYNC DIV LFO >2	0 - 96	{ 12 }	73h	0
LFO SYNC DIV LFO >3	0 - 96	{ 12 }	74h	0
LFO SYNC DIV LFO >4	0 - 96	{ 12 }	75h	0
ARPEGGIO DIVIDE	0 - 23	{ 13 }	76h	1
CONT=START	0 - 1	{ 14 }	77h	0
ARP CLOCK NORM/INVERT	0 - 1	{ 14 }	77h	0
PORTAMENTO CNTRL # >1	252 > 0 > 120	{ 8 }	78h	65
PORTAMENTO CNTRL # >2	252 > 0 > 120	{ 8 }	79h	65
PORTAMENTO CNTRL # >3	252 > 0 > 120	{ 8 }	7Ah	65
PORTAMENTO CNTRL # >4	252 > 0 > 120	{ 8 }	7Bh	65

{ NOTES }

{ 1 }   Data 0-15 corresponds to MIDI channels 1-16.

{ 2 }   232=-24 semitones 0=no transpose 24=+24 semitones 25 to 231 are invalid.

{ 3 }   Type 0=fixed rate 1=fixed time

{ 4 }   tmrcspp in binary where t=trigger; t=0 - single, t=1 - multiple ppp=priority; 100=newest 010=highest. For channel A; M=1 means poly mode set (A being the master), then RC=00=Ordinary cyclic mode, RC=01=memory cyclic mode, RC=10 or 11=reset mode. For channels B, C, & D, S=1=that channel slaved to A in poly mode. Adjacent channels must be slaved, i.e. B, or B & C, or B, C & D, not B and D or just C, for example.

{ 5 }   0=strig [no pullup], 1=strig +5v, 2=strig +15v, 3=vtrig +5v, 4=vtrig +15v, 5=trigger pulse +5v, 6=trigger pulse +15v

{ 6 }   where 1 semitone=4, thus 1 octave (12 semitones)=48

{ 7 }   0=channel A 7=channel H etc.

{ 8 }   253=pitchbend, 254=velocity, 255=aftertouch, 0-120=controllers 0-120. 121 to 252 are invalid (NB - For Portamento 252=off 253=on)

{ 9 }   0=-128 128=0 255=+127

{ 10 }   0=triangle 1=saw up 2=saw down 3=square etc. as display

{ 11 }   128=LFO>1 129=LFO>2 130=LFO>3 131=LFO>4 any other numbers are invalid and will crash the PRO-4.

{ 12 }   0-96 corresponds to sync divide 1 to 96 0=sync off

{ 13 }   1-23 corresponds to arpeggio divide 2 to 24

{ 14 }   Byte 77H - 00A0000C - C=0=continue ignored C=1=continue equals start. A=0=Apr clock normal pulse A=1=Arp clock inverted pulse.

PIN OUTS FOR DCB/WASP PRO-4 CABLES

Juno 60 (and some Jupiter 8s) connector
4 way IEEE plug (viewed from terminals).

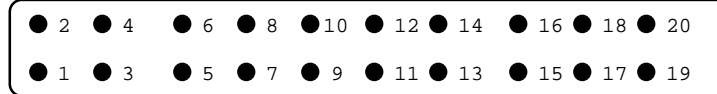| ● 7 | ● 6 | ● 5 | ● 4 | ● 3 | ● 2 | ● 1 |
| ● 14 | ● 13 | ● 12 | ● 11 | ● 10 | ● 9 | ● 8 |
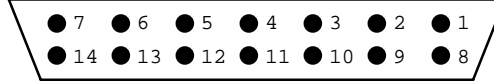
PIN 1 - Busy   PIN 2 - Data
PIN 3 - Clock   PIN 4 - Ground
No other pins connected. Insulate the screen at this end.

Other Jupiter 8s connectors
20 pin bump polarised socket (viewed from terminals).

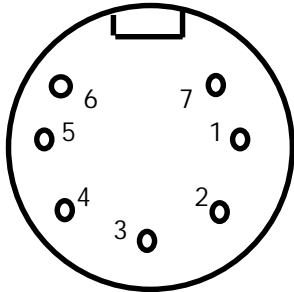| ● 2 | ● 4 | ● 6 | ● 8 | ●10 | ● 12 | ● 14 | ● 16 | ● 18 | ● 20 |
| ● 1 | ● 3 | ● 5 | ● 7 | ● 9 | ● 11 | ● 13 | ● 15 | ● 17 | ● 19 |

PIN 7 - Clock   PIN 9 - Data
PIN 10 - Ground   PIN 11 - Busy

As this header is an IDC you will need to put a 6 inch length of 16 way IDC ribbon cable in the header, then join the cables.
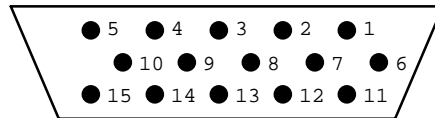
Wasp connector
7 pin DIN plug (viewed from terminals).

1	Kybd Data (least significant bit) (0)
2	Kybd Data (Next significant bit) (1)
3	Kybd Data (Next significant bit) (2)
4	Kybd Data (Next significant bit) (3)
5	Kybd Data (Next significant bit) (4)
6	Kybd Data (Most significant bit) (5)
7	Note on trigger

PRO-4 DCB/Wasp Connector; (PRO-4 end of cable)
15 way high density D plug (viewed from terminals).

● 5	● 4	● 3	● 2	● 1
● 10	● 9	● 8	● 7	● 6
● 15	● 14	● 13	● 12	● 11

Wasp wiring;

1	Kybd Data (least significant bit) (0)	5	Kybd Data (Next significant bit) (4)
2	Kybd Data (Next significant bit) (1)	6	Kybd Data (Most significant bit) (5)
3	Kybd Data (Next significant bit) (2)	7	NC (No Connection)
4	Kybd Data (Next significant bit) (3)	8	Note on Trigger

screen all remaining wires, (insulate screen).

DCB wiring;

| 12 | busy | 14 | clock |
| 13 | data | 15 | ground |

No other pins connected for DCB (only for Wasp)

CONNECTING YOUR MODIFIED TB303 (5 SOCKET RETRO) TO THE PRO-4

PRO-4	to	TB303
CV CHANNEL A	>	CV IN
GATE CHANNEL A	>	GATE IN
AUX1	>	FILTER
AUX2	>	SLIDE
AUX3	>	ACCENT

Set the AUX sources to which ever MIDI controller you wish to control the Filter, Accent or Slide, and link them all to CV channel A (or which ever you are using).

Using Slide;
The AUX2 controller range should be set to 0 minimum, and 50 maximum. Reset value should be 0. To turn the SLIDE on/off, the MIDI controller must be set to 65 for on, and 0 for off. When the slide is on, all following notes will glide into each other. It is best to play legato style for good results.

Using Accent;
The AUX3 controller range should be set to 0 minimum, and 50 maximum. Reset value should be 0. To turn the ACCENT on/off, the MIDI controller must be set to 65 for on, and 0 for off.

CONNECTING YOUR MODIFIED SH101 (Filter & Modulation SOCKET RETRO) TO THE PRO-4

PRO-4	to	SH101
CV CHANNEL A	>	CV IN
GATE CHANNEL A	>	GATE IN
AUX1	>	FILTER
AUX2	>	MOD

Set the AUX sources to which ever MIDI controller you wish to control the Filter and Modulation, and link them all to CV channel A (or which ever you are using).

Using Mod;
The AUX2 controller range should be set to 0 minimum, and 50 maximum. Reset value should be 0. To turn the MOD on/off, the MIDI controller must be set to 65 for on, and 0 for off. When the MOD is on, all following notes will modulate subject to the level of modulation set by the `LFO MOD` slider (bender/mod section on bottom left of SH101).

SPECIFICATIONS

Power;   240v AC 50Hz (UK) See note below.
                         18W

Dimensions;   Standard 1U 19" rack

Weight;   4.5Kg

CONNECTIONS

Inputs;   Power socket   (IEC)
                         MIDI In   (5 pin DIN type)
                         8 trimmers
                         4 push buttons
                         Data Entry Dial

Outputs;   MIDI Out, Thru   (5 pin DIN type)
                         Sync24   (5 pin DIN)
                         Clock Pulse   (minijack)
                         8 Auxiliaries   (minijack)
                         4 Control Voltage outputs   (minijack)
                         4 Hertz/volt outputs - optional (minijack)
                         4 Gate outputs   (minijack)
                         4 Trigger outputs   (minijack)
                         Wasp/DCB combined port   (15 pin D-connector)
                         KADI port   (15 pin D-connector)
                         LCD 2x20 backlit
                         8 LED indicators

Accessories;   Operating Manual, Power cable

Optional Accessories;   1/2/4 channel plug in Hz/V board
                         DCB cable
                         Wasp cable
                         DCB/Wasp splitter cable
                         KADI cable

Note

The Kenton Electronics PRO-4 MIDI-CV converter has a built in mains transformer factory set to 240 volts AC 50Hz unless otherwise marked. The transformer has tappings for 240/220/120/100 volts AC. Contact us if this adjustment needs to be made.

Warranty

The PRO-4 comes with a 12 month (from purchase date) back to base warranty, (i.e. customer must arrange and pay for carriage to and from Kenton Electronics). The Warranty is only valid if the PRO-4 is returned in its original packaging.

KENTON

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