USER'S GUIDE for the 200h

By the staff of
Buchla USA

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Introduction

Welcome to the 200h system. These notes will acquaint you with your Buchla h-series system, followed by individual descriptions of the various modules.

Important Safety Precautions

Do not disassemble this equipment. Refer all servicing to a qualified service engineer. But if you insist (or if you're definitely qualified), be sure to follow the next advice.

When installing, removing, or exchanging a module, please be certain to turn off the power supply. These modules are not designed to tolerate "hot patching" – power must be turned off before plugging in or unplugging modules.

Please note that both e-series and h-series connections and cables are keyed to be used in one direction only! Reversing the connectors can cause significant system damage.

We are not liable for damage or injury due to lack of common sense:
Do not use the 200h system near water; do not take it into your bath, sauna or hot tub. Take care not to spill liquids on or into the 200h.
Locate the 200h away from heat sources such as radiators, fireplaces, stoves or solar cookers.
Exercise close supervision when using the instrument near children or when children are using it.
The 200h's power supply is for indoor use only. Do not use a damaged or alternate supply.
Refer all servicing to qualified personnel. There are no user serviceable parts or adjustments inside the 200h.

System set up

Retrieve the system from its case or carton, saving all packing materials, and confirming the presence of a DC power adaptor with an AC cord, and patchcords. If anything is missing, inform your source of the shortage. Place the system on a flat surface with the connectors pointing to the rear. Unfold and extend the support feet and unfasten any latches (if any) and prop up the system. Connect the power adaptor to AC (110VAC or 220VAC) and the 12-volt DC (center-positive) to the power input jack. Turn on the switch (away from the power input connector on the LEM). A bunch of LED's should light up, indicating success in this portion of the endeavor.

Connect Audio: If your system contains a 206e, 207e, or 227e, convenient audio outputs may be located on the back of the case. If provided, these audio outputs are redundant ¼" outputs to the Tini-Jax outputs on the front of those modules. Connect to your sound system. If you have the ¼" output I/O panel, use the top two connectors for a stereo system. If you don't have a 206e, 207e, or 227e you can use any signal output – the common output of a 292h would be a good choice. You

can use common 3.5mm mono audio cables, but for the best connections, use the Tini-Plug audio cables that come with the Buchla system and adapt with a module that adapts from Tini-Jax (such as the 202h or 225h).

NOTE: Switchcraft "Tini-Jax" are the standard historical Buchla audio cable connections and are just slightly larger diameter and longer length than 3.5mm connections. They are sometimes referred to as 1/8" in Don Buchla's manuals, though they are actually .140" diameter connections. Many synth manufacturers now use 3.5mm cables. 3.5mm cables often work in a Tini-Jax jack, but we encourage use of the Tini-Jax/Plug cables as the Buchla standard within a Buchla system. Tini-Jax cables can cause damage to 3.5mm jacks.

COMMON BUCHLA SYSTEM STUFF

Before getting into the details of particular modules, lets pursue some items that all 200h modules share in common. First the connections: Like its predecessors--the 200e, 200, and 100--the 200h series differentiates between control voltages, signals, and pulses.

Control voltages (C.V.'s) are used to specify parameter levels, range from 0 to 10 volts, and are interconnected with banana jacks and cords.

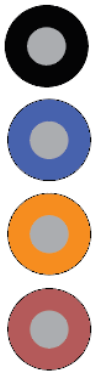
Pulses are used for timing information, and have two levels: 10 volt pulses transmit only transient information; while 5 volts carries the sustain information. Pulses, like C.V.'s, also employ banana interconnections.

Signals (audio signals) are the raw material of electronic music, and ultimately become the sounds we actually hear. They are nominally 1 volt in amplitude, but can range from infinitesimally small to 20 db in excess of the nominal. Signals are connected via Tini-Jax connectors and shielded patchcords.

Color-coding of cables and Banana Jacks:

Note that both types of patchcords are color coded to indicate their length-- a handy feature in complex patches.

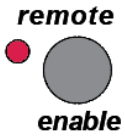
But more importantly, banana receptacles/jacks are color coded to indicate their function:



C.V. INPUTS are black and sometimes grey.
C.V. OUTPUTS are blue, sometimes violet, and occasionally green (such as velocity on 225's).

Pulse INPUTS are orange.
Pulse OUTPUTS are invariably red.

(The Music Easel/208 includes some minor exceptions to the color-coding standard.)



REMOTE ENABLE: Saving and retrieving module parameters

Some 200e/h modules contains a switch titled "remote enable". When a preset manager (e.g. 206e, 225e) is present in the system and the LED associated with the Remote Enable switch is off, the module functions exactly as expected independent of changes to "presets".*
When the Remote Enable LED is on, magical possibilities arise. This is further explained in the 225e description in the 200e User's Guide, but here is a summary:

*In systems without a 225e or 206e, the remote switch will be able to store the current preset, that on turn-on, will be automatically called. Presently, just a few modules include this feature

Blue knobs of the 200e and 200h series can have their settings saved and retrieved when directed by the preset manager. If the LED is off, the module's parameters will not respond to the preset manager messages. (Turning Remote Enable off can be very useful if you want to keep the settings for this module when you change presets, and then with Remote On on again, save in the new preset.) Be aware that when recalling a new preset, the saved knob setting will often not be the same as the current knob setting. But fear not. Turn the knob in the normal fashion, and the value will change in the same direction, eventually catching up with the current knob setting. Switch settings will be stored and LEDs will show the setting accurately.
Grey knob settings cannot be stored and will always represent the setting you see.

Ground reference connection:

On every Buchla boat/housing there is a black banana jack (sometimes labeled “gnd”, often near the card slot. When interconnecting/patching between two synthesizer systems, it is important that the ground reference is shared between the systems--including between two Buchla systems. The ground references should connect here through a banana cable. Without this shared connection, control voltages will have behave unpredictably. The connection is not necessary on an isolated system.

Card Slot:

This card connector is used for both Memory Cards and USB Firmware Cards.

Memory cards--used in conjunction with a preset manager (i.e.225e, 206e)--can be used to store settings of all the modules in a system. Modules store their own preset parameters, but there is a way to store these modules parameter information on the Memory Card so that if your system was stolen or damaged, you could replace the module(s) are rewrite all the saved parameters onto the new module by writing to and from the memory card. See more about this in the preset manager description.

USB Firmware Card: Firmware Updates

To allow improvements in firmware, we’ve come up with a USB card that can upload the various modules with the latest firmware versions.
With the power off, insert the card; then while holding a module’s reset enable switch, turn on the power. **See the website for up-to date instructions for each module.**

Reference Notes about exceptions and what to expect when downloading firmware to the h-series:

281h’s are loaded with the just as if it’s one half of a 281e, depressing the quad enable switch instead of the remote enable switch.

The 225h does not have a remote enable button since it does not store presets, but it can still accept reprogramming via firmware updates. You set this up by plugging the output of the blue banana labeled “out” (in the CV processor) to the white banana. Turn the CV processor pot fully clockwise to 5v. Then boot up the system with the Firmware card in it. *Tip: Once it starts programming—once the firmware card starts flashing fast—unplug that cable. Because if you leave it in, you might wonder why it won’t boot up the next time*...

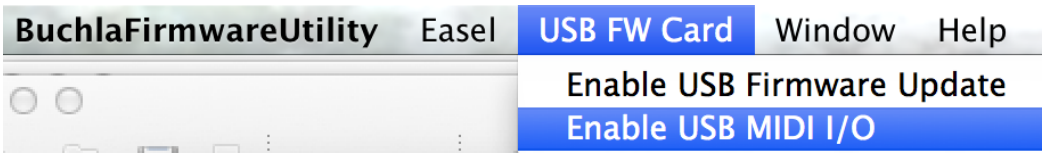
Wait up to two minutes or until the module’s lights return to their normal state.

Other indications of successful firmware downloading: You will the LED on the USB Firmware card blinking quickly when it is downloading software and any preset manager in a system will suspend it’s operation while the module downloads it’s firmware.

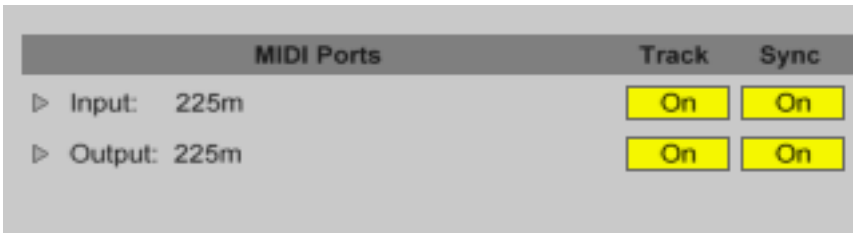
The USB Firmware Card's alternate use is as a USB MIDI to internal MIDI bus interface.

USB MIDI I/O Card (225m):

To Enable this facility, hook up the Firmware Card to Mac computer and use the Buchla Firmware Utility application to reprogram it's function as a MIDI interface for a 200e or 200h system.



In this mode, the USB device name for the Card becomes "225m".



An example of the device listed in an Ableton "Live" MIDI preferences window.

MIDI note messages sent on channels 1-4 will be put onto the internal busses A-D, as will MIDI clock/start/stop messages and vice-versa. That is, modules that generate messages on the internal bus will also produce USB-MIDI output on the 225m. That includes the 226h or 218e note messages (if enabled) or the 252e clock/start/stop.

For more information on the internal busses utilized by 200e and 200h modules, please see the 225e section of the 200e User's Guide.

If you loose USB-MIDI Port, use the BuchlaFirmwareUtility to program the card again and you should see the port reappear.
To return a Firmware Card's function to do Firmware Update's, simply use the FirmwareUtility again to Enable/reprogram the card for Firmware Update.

Conclusion and Further Development:

We hope that covers a basic introduction to the unique features of the Buchla systems. We are always looking to expand and improve our designs. So keep in touch.

For descriptions of individual 200h series modules, read the following pages.

Description – model 202h Adaptors and Converters

The 202h Adaptors and Converters is a multi-function module aimed at making it easier to interface 200e and 200h modules with other formats of modular synthesizers.

Adaptors

The left third of the module consists of three adaptors that allow for the conversion of jack types (banana, Tini-Jax, 3.5mm, and ¼"). 3.5mm connectors on this module are all to adapt to non-Buchla modules.

The lower two adaptors are completely passive adaptors for audio signals. Buchla audio signals are on Tini-jax connections which are very close to 3.5mm.

The top adaptor containing a banana jack is intended for C.V.'s and has a diode in the circuit to remove any negative voltages that could damage 200e or 200h CV inputs. (Buchla CV inputs are not protected from negative voltages, so using this adaptor or the CV processors is important.)

The following reminder of the color coding of Buchla connections helps make the functions of this module more evident.
Here is a banana jack summary:
C.V. inputs are black; C.V. outputs are blue
Pulse inputs are orange; Pulse outputs are red.
The white banana is unassigned/bidirectional

CV Processors

The middle section consists of three separate control voltage processors to make it easier to use modules with various pitch scaling and controller voltage scales.
The top processor expects 0-10v on the black banana jack input. This voltage can then be scaled by 0-1x, and a negative offset ranging from 0v to -5v can be added to create a bipolar modulation signal. The blue LED indicates the amplitude of the input signal, and the green/red LED indicates the output of the 3.5mm jack with green indicating a positive voltage and red indicating a negative voltage.

Examples with a 0-10v input:
scale it by 1x and offset -5v, you will get a -5v to +5v output
scale by .5x and offset by -2.5v to get -2.5v to 2.5v output
scale by .5x and offset by 0 and get 0-5v output
And because these are knobs, the variations are infinite.

The bottom two processors are to convert pitch CVs at a fixed scale. One converts Buchla voltage sources that follow a 1.2v/octave scaling to the 1v/octave scaling used by Euro Rack, 5U, and other modular formats.
The other converts from 1v/octave to 1.2v/octave. There are two trimpots on the back of module for fine adjustment of the scaling of these converters.

Pulse Converters

The right side of module consists of four converters to allow for the translation of timing-related gates and triggers between modular formats.

The top two converters are expecting a 0-5v gate signal on the 3.5mm input, and upon the rising edge of that gate will generate a Buchla-compatible 10v pulse followed by a 5v sustain until the falling edge of the input gate signal.
Note: Buchla pulses have two levels: 10 volt pulses transmit only transient information; 5 volts carries the sustain. (There is no need for separate trigger and gate on Buchla pulse inputs.)

The bottom two converters take a Buchla style pulse input on the orange banana, and output a 0-5v gate on the 3.5mm jack corresponding to the sustain of the input pulse signal.

Description – Model 225h MIDI And CV Interface

The 225h is a MIDI to CV decoder module with the addition of jack adaptors and CV converters to interface 200e and 200h modules with other formats of modular synthesizers.

Adaptors

The left third of the module consists of three adaptors that allow for the conversion of jack types (banana, Tini-Jax, 3.5mm, and ¼"). 3.5mm connectors on this module are all to adapt to non-Buchla modules.

The lower two adaptors are completely passive adaptors for audio signals. Buchla audio signals are on Tini-jax connections which are very similar to 3.5mm connectors.

The top adaptor containing a banana jack is intended for C.V.'s and has a diode in the circuit to remove any negative voltages that could damage 200e or 200h CV inputs. (Buchla CV inputs are not protected from negative voltages, so using this adaptor or the CV processors is important.)

An additional feature of the top adaptor includes a gate-to-pulse converter that outputs on the red banana. The rising edge of that signal will generate a 10v pulse followed by a 5v sustain until the falling edge of the input signal. It works for any signal above 3.5v or more.

The following reminder of the color coding of Buchla connections helps make the functions of this module more evident.
Here is a banana jack summary:
C.V. inputs are black; C.V. outputs are blue with violet or green variations.
Pulse outputs are red.
The white banana is unassigned/bidirectional

CV Processors

The middle section consists of three separate control voltage processors to make it easier to use modules with various pitch scaling and controller voltage scales.
The top processor expects between -5v and +10v on the 3.5mm jack input. This voltage can then be scaled by 0-2x, and an offset ranging from 0v to 5v can be added to take a bipolar signal and make it entirely positive voltage for use with Buchla modules. *And because these are knobs, the variations are infinite.*

The green/red LED indicates the input voltage with green indicating a positive voltage and red indicating a negative voltage, and the blue LED indicates the positive voltage level present on the output banana jack.

Examples to get a 0-10v output at the banana jack:
Take a 5v to +5v input, scale it by 1x and offset +5v
Take a 0v to +5v input, scale it by 2x and offset 0v

The bottom two processors are to convert pitch CVs at a fixed scale. One converts Buchla voltage sources that follow a 1.2v/octave scaling to the 1v/octave scaling used by Euro Rack, 5U, and other modular formats. The other converts from 1v/octave to 1.2v/octave. There are two trimpots on the back of module for fine adjustment of the scaling of these converters.

MIDI Decoder

The right third of the module consists of 8 voltage outputs corresponding to various MIDI signals. The green MIDI LED is connected directly to the MIDI input and will display any MIDI activity being sent to the module. The red LED indicates an active pulse corresponding to a MIDI note event.
The pitch jack outputs a voltage of 1.2v/octave (.1v per semitone), and all other jacks, except the 'bend' jack, output 0-10v corresponding to the 0-127 MIDI value. The 'bend' jack outputs 5v nominally, and increases or decreases based on pitch bend messages received by the module.
The 225h is always in OMNI mode, meaning it will respond to MIDI messages sent on any MIDI channel but
The 225h will convert any MIDI note and sustain messages on MIDI channels 1-4 into message on internal busses A-D, respectively.
Oscillators will track the pitch of the internal bus that matches their module ID, and the 281h and 292h will follow note on/sustain and velocity messages respectively on busses A and B if their module IDs are set to A.

Installing: Connecting MIDI input:

To connect the 225h to the MIDI 5-pin DIN and USB connectors, find a 10-pin header labeled "225h". (This 10-pin header is larger than the h-series power supply header.) These headers can found on the LEM 3-boat case or the h-series 'h-MIDI' MIDI I/O panel unit. There is also a header on the Easel/8-boat that accepts either 225h or 225e MIDI Inputs.
The smaller 2mm 10-pin cable is for power.

Firmware update setting: (This is mentioned early in this manual, but worth noting again.)
The 225h does not have a remote enable button since it does not store presets, but it can still accept reprogramming via firmware updates. You set this up by plugging the output of the blue banana labeled “out” (in the CV processor) to the white banana. Turn the CV processor pot fully clockwise to 5v. Then boot up the system with the Firmware card in it. *Tip: Once it starts programming—once the firmware card starts flashing fast—unplug that cable. Because if you leave it in, you might wonder why it won’t boot up the next time.*

Description – Model 226h CV To MIDI Converter

The 226h has six busses that convert control voltages and pulses into MIDI note output. Each bus can be assigned to any MIDI channel. The MIDI channel and continuous controller number for each bus is stored as a preset.

Generate MIDI Notes (Note on/off, pitch, velocity)

Select an input bus to edit:
To switch between input bus, MIDI channel and controller selection modes, push down on the knob and it acts a switch. The red LED will indicate the selection. Now with the LED on "input bus", use the rotary knob to select the bus. The orange LEDs will indicate the selected bus.

Select a MIDI Channel:
Push the knob switch again to select "MIDI channel" mode and turn the knob to select the MIDI channel number (1-16).
Assign the MIDI controller number.
Push the knob switch again to select "controller" and turn the knob to select continuous controller assignment 1-99. (Common numbers include 1 for modulation; 7 for MIDI volume.)

If you are not connecting to the controller input it is not recommended to select a MIDI controller. It is not required if you are ONLY using the bus for MIDI notes.

Connect C.V.s to generate MIDI Notes:

1) You MUST connect a pulse to the orange banana "note on" input.
2) To generate pitches with those notes, connect a C.V. to pitch input.*
3) Optionally connect a C.V. to the gray "velocity" input. If you do not connect to the velocity input, notes will have a default velocity. *When you do connect, be careful not to have 0v on the input. Notes with 0 velocity will not be heard.*

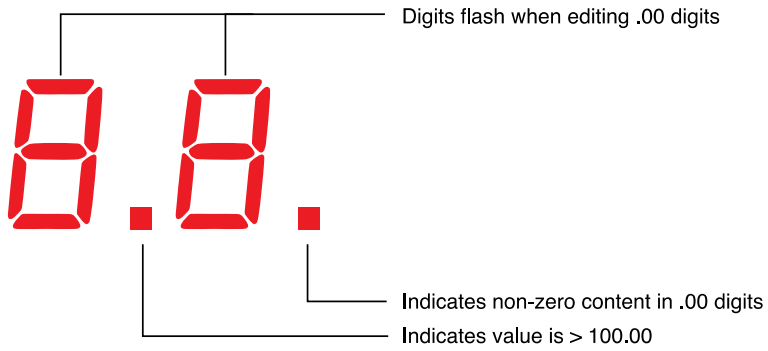
Only when a pulse is detected will readings from the pitch and velocity C.V.'s be translated into MIDI notes. If you want to read continuous C.V. changes, you must use the continuous controller input.

*Scaling the pitch input to match variable volts/octave:

To compensate for potential variations in pitch voltage sources, each input bus has an adjustable scaling factor that is stored **independently** of preset.
To adjust this scaling, the module must be in the 'input bus' select mode. Once in this mode, press the 'remote enable' button and the encoder shaft at the same time. The red 'input bus' LED should begin flashing to indicate the scaling edit mode is now active. Turning the encoder will now allow you to choose which input bus' scaling to edit.
Pushing the encoder shaft in will select the current input bus to edit and its orange LED will begin flashing to indicate that the scaling for that particular bus is now being edited. The 7-segment display will now show the scaling for the selected input bus.
The scaling can be adjusted from 0.00-199.99%. This could be useful for a number of applications.
At the default 100%, the setting is for 1.2v/octave. (.1v per semitone.) But setting the scaling to 120% would make the converter track 1v/oct. Setting the scaling to 8.33% would give you a single octave for the full 0-10v range, allowing for the quick quantized sequencing limited to a single octave using a full-range voltage source.

Indicators for > 100% scaling and fine tuned scaling:

A decimal between the digits indicates that the scaling amount is equal to the display +100%, and a decimal to the right of the digits indicates that the .00% digits are non-zero.
For fine scale adjustment, hold down the encoder shaft until the digits begin flashing. The digits will then display the .XX% digits of the scale value. To return to rough adjustment, hold down the encoder shaft until the digits stop blinking.



Fine tuned scaling allows the users to compensate for voltage drops experienced when a CV is connected to several modules and also potential variation in electronic component tolerance. Those variations can lead to pitch misinterpretations, especially as the voltages get higher.

Saving and Locking-in the scaling:

When finished editing the scale value for a particular input bus, press (don't hold) the encoder shaft. The orange LED for the selected input bus will cease blinking, and you will be able to select a different input bus to edit the scaling of. When you are finished editing the scaling for the busses and you would like to store the values, press the 'remote enable' button and encoder shaft at the same time. Just

to reiterate, **these scaling values are locked-in for the module**, and will remain constant regardless of the currently loaded preset.

Installing/Connecting to hardware MIDI Connectors

The most common connector configuration for the 226h is to use only the 5-pin DIN MIDI connector labeled “MIDI Out” on the back of the LEM 3-boat case or the separate h-series MIDI I/O panel (h-MIDI). This connection is made with a 3-pin keyed cable. The 3-pin connectors are polarized so that the cable can only be inserted one way.

(Some of the early models of the LEM 3-boat cases were shipped with non-keyed connectors. If this is the case with your system, the two prongs on the 3-pin cable should point towards the rear of the case where the connectors are.)

The 226h can also be connected to the USB port on the LEM 3-boat case, or separate h-series MIDI I/O panel. This connection is made using an additional 10-pin ribbon cable to connect to the connector labeled “200h only” on the LEM 3-boat case power board.

It is **NOT** possible to share the USB port between a 226h AND a 225h.

To get around this, a second USB connection can be made with an h-series MIDI I/O board may be installed in an I/O slot using the h-series MIDI I/O panel (h-MIDI).

Internal bus connections for Buchla Oscillators/Modules:

When you assign the 226h output MIDI channels to 1-4, you are also assigning the note outputs to internal busses A-D. For example,this allows a 252e or any C.V generator to use the 226h get equal tempered tunings over the internal bus when needed. For more info about the internal busses, see your module’s manual and read about the Internal busses in the 225e manual. just like a 225e. Having internal busses communication means you gain the ability to get accurate pitches from the 261e and 259e oscillators in tandem with responses from the 281e/h and 292e/h with fewer patch cables.

Description – Model 281h Dual Function Generator

The 281h has two function generators. The two generators, A and B, normally function independently, but can be paired to operate in a quadrature mode.

Independent Operation

A momentary switch selects one of four modes: transient, sustained, cyclic or none. On receipt of a pulse, output voltage A ramps up to 10 volts at a rate determined by the sum of an applied control voltage and the setting of the attack time knob. If in the sustained mode, the voltage will stay high as long as the input pulse is maintained. If not in the sustained mode, or when the input pulse terminates, the output ramps down to zero at a rate determined by the sum of the decay voltage and the setting of the decay knob. If no mode is selected, incoming pulses will have no effect – envelopes will be initiated by internal MIDI signals.

At the end of the decay, a pulse is generated and applied to pulse out A. If in the cyclic mode, the cycle now repeats.

Same for section B.

The time range for both attack and decay is from .001 to 10 seconds. The scale is linear from .001 to .03 seconds (input value from 0 to 3/8), and exponential from .03 to 10 seconds (input value of 3/8 to 1).

Quadrature Mode

Generators A and B operate in tandem to provide more complex envelopes. The quadrature mode is toggled by a push switch and indicated by LED's near the outputs.

As before, a pulse applied to the A input triggers the attack phase of A. When A's attack is completed, B begins its attack while A stays high. When B's attack is complete, A begins its decay while B stays high. And finally, when A's decay is completed, B begins its decay. (The B-trigger input has no function in quadrature mode.)

Like the trigger itself, the trigger logic (the switch setting) for the quadrature mode is also derived from section A. If set to the sustain mode, A will stay high until the end of the initiating pulse. If A is in the cycle mode, the cycle repeats when B's decay ends.

In quadrature mode, the outputs are OR'd together at the B output. The A output will be at full value in both outputs, but the more complex OR'ed envelope output is derived from the A voltage and the scaled B voltage at the B output banana. This output may be used to establish an initial attack transient followed by a sustain at some lower value. Other applications will occur to you, but keep in mind that the OR level is not stored as part of a preset.

Unlike the 281e, the relative level of B to A can only be adjusted using a trimpot on the rear of the module. For example, setting the trim to 12 o'clock (2 o'clock on early revisions) will scale the B voltage range to 0-5v. It is likely preset to this as the most sonically useful setting. But one feature of the 281h over the 281e is the ability to change the function of the B-output without re-patching.

Remote Enable

To connect or disconnect this module from the central library function, push the remote enable switch. The red LED show it's status.

Presets and internal MIDI bus response

With Remote Enabled, 281h's settings may be stored and retrieved with the model 225e or the 206e preset manager. In fact the preset manager does not distinguish between a 281e and a 281h. (The 281e communicates as two halves.)
In conjunction with the 225e/h or 226h, the 281h can also monitor the internal MIDI bus, responding to note on and note off messages as well as controller 64 (sustain). To perform this function, the device ID select DIP switches (on back of unit) must be set to device A.
To read the device ID selection, depress the quadrature switch for a couple of seconds. The 225p or the 206p will display "module 281 A1" if the switches are set for A. Additionally, the code version number will be displayed. Note that—like the 281e -- to load or display firmware for this module, you must use the quadrature switch instead of the remote enable switch.

For further explanation of the above features, please consult the description of the 225e in the 200e User's Guide.

Description – Model 292h Dual Dynamics Manager

Functionally identical to half of the original 292, with the exception of two new features. One: the 292h has velocity inputs, allowing additional control over volumes. Two: its settings can be stored as a part of a 200e series preset.
In fact it is functionally identical to the 292e, with half the inputs.

The 292h sports two independent voltage controlled amplifiers (VCA's). Each has a signal input and output, a control voltage input that varies the unit's gain from - 120 to + 3db, an offset adjustment, and a velocity input to add further control to the gain. When using velocity inputs with CV input, observe that a 0v input will silence the output. If nothing is connected to the velocity input, the internal voltage will pull high and the output will not be affected.

The typical arrangement is to connect an envelope generator's output (such as the 281e/h) to the inputs of the 292h.

A three state switch selects one of three operating modes: straight gate (VCA), lowpass filter (VCF), or a combination of the two, in which the spectral response varies as the gain is changed.

This frequency domain gating can impart a dynamic tonal variation to sounds that gives the listener a sense of absolute loudness. This quality is characteristic of all acoustic instruments (the harder you strike, pluck, or blow, the richer the overtone structure).

Both independent outputs and mix of the two output signals is provided.

Remote Enable
A push button switch enables (or disables) this remote connection; an LED indicates the current status.

Presets:
Gain adjustments and switch positions may be stored for later recall by a Preset Manager, (e.g. 225e or 206e) In conjunction with the 225e/h, or 226h, the 292h can also monitor an internal MIDI bus, responding to the velocity of MIDI note on messages. To perform this function, the device ID DIP switches (on back of unit) must be set to to A. To read the device ID selection, depress the remote enable switch for a couple of seconds. The 225p or the 206p will display "module 292 A" if the switches are set for A For further explanation of the above features, please consult the description of the 225e or 206e.