Tetra Midi Analog Performance Sequencer Manual

Important Safety Instructions

Declaration of Conformity

This product conforms to electrical safety standards when used only with the approved Signal Arts Technologies AC power supply adapter, supplied with the product. Signal Arts AC power adapters are UL / CSA approved. This product complies with FCC emissions standards for home or office use. This product is RoHS compliant.

DANGER! INSTRUCTIONS PERTAINING TO A RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS.

READ THESE INSTRUCTIONS:
When using Signal Arts products, basic precautions should always be adhered to, including the following:

1.   Read all instructions before using the Signal Arts Sequencer.

2.   To reduce the risk of fire or electric shock, refer all servicing to qualified service personnel. There are no user serviceable parts inside the unit. The Signal Arts Sequencer should be serviced by qualified service personnel when it does not operate normally or exhibits a marked change in performance.

3.   Do not expose the Signal Arts Sequencer to liquids in the form of rain, moisture, drips or splashes.

4.   Care should be taken so that objects do not fall, and liquids are not spilled into the enclosure of the Signal Arts Sequencer through its openings.

5.   The Signal Arts Sequencer should be located away from heat sources such as radiators, heat registers, fireplaces, stoves or ovens.

6.   The Signal Arts Sequencer should be connected only to a power supply or AC power adapter of the type described in the instruction manual, or as supplied by Signal Arts Technologies.

7.   Protect the power adapter cord from being walked on, pulled or pinched, particularly at the adapter, convenience receptacles, and the point where it is plugged into the unit.

8.   Unplug the Signal Arts Sequencer power adapter from the power outlet during lightning storms or when left unused for a long period of time.

9.   Only use attachments or make connections as recommended in the instruction manual.

10.   The Signal Arts Sequencer should be kept clean and dust free. Wipe the unit with a clean, lint free cloth. Do not use solvents or cleaners.

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INTRODUCTION

Congratulations! You have just purchased the composer's ultimate real-time performance tool.

The Tetra Midi Analog Performance Sequencer (Tetra MAPS) vastly improves on the first "MAPS" core design. Expect to use a sequencer that is more versatile and intuitive. Tetra MAPS gives you infinite virtual tracks, modulations and multiple, real-time versions of each sequence, polyphonic sequencing, four channels of CV output, computer network Open Sound Control and over 24,000 notes organized as:

> 16 Sets
> of 24 Bank Tracks
> of 8 Sequences
> of 8 Steps
> of 7 parameters
> Plus multiple virtual sequences
> Per-Step Note, Pitch, Velocity, Controller
> Per-Step Duration and Note Duration
> Per-Step Slew Rate
> A full-featured four channel polyphonic MIDI to CV converter
> Ethernet Open Sound Control (OSC) communications

How To Use This Manual

This manual is organized into the following sections:

- Basic Operation – Start quickly with manufacturer presets
- MIDI Use – Sequence performance from a MIDI keyboard controller
- Open Sound Control Use – Touch interface using TouchOSC and Lemur Apps
- Analog Use – Control CV based analog synthesizer gear
- Programming – Tap into the full potential of this product

If you are not using analog synthesizer gear with this sequencer, you may skip the *Analog Use* section of this manual. If you are using analog gear with this sequencer, you may want to review the *MIDI Use* chapter for important information on how this sequencer is set up using MIDI channel numbers.

These conventions are followed throughout the manual:
- **BOLD** upper-case letters refer to front panel controls.
- CAPITALS refer to physical input or output jacks on the sequencer.
- *Italics* refer to LCD display menu items and headings used in this manual.

The Tetra MIDI/Analog Performance Sequencer is ready to operate out of the box. For a quick start, read *Basic Operation* and you will be sequencing in seconds!

In addition to this manual you may also refer to the Signal Arts web-site (URL is listed in appendix G) for supplemental guides, operating system and manual updates. Check out helpful user "Tricks & Tips" on the web site's "FAQs" page.

Panel Button Labelling
Certain Tetra MAPS models' control buttons are labelled differently than in the manual. The following lists the button assignments used in this manual:

> **MODE1** equal to **STEP**
> **MODE2** equal to **TRACK**
> **ALT1**　 equal to **ALT**
> **ALT2**　 equal to **PROG**

Sequencer Features

Real-time Interface
Real-time Flexibility
- Continuous turn "encoder" knobs and LCD display for instantaneous access to any parameter
- Displays step parameters as bar graphics, octaves, en-harmonics, or numbers
- Perform from the sequencer using its encoder knob buttons to trigger and control sequences
- Perform the sequencer remotely from a MIDI keyboard controller or mobile device

Ethernet Open Sound Control (OSC)
Real-time interface with your computer or mobile device
- Communicate with OSC enabled applications such as Lemur, TouchOSC, MAX/MSP, etc.
- Create your own virtual sequencer interface on your mobile running Lemur, TouchOSC
- Communicate in-performance chord symbols to remote mobile devices
- Network multiple Tetra MAPS sequencers

Sequence Step Matrix
Moves beyond a typical MIDI Sequencer
- Real-time sequence step modes:
  note, scale, detune, velocity, controller, step duration, note duration, slew rate
- Step notes are tuneable to $1/64^{th}$ semitone "un-quantized" resolution
- Force step note to one of 50 musical scales
- Per-step glide or slew rate for MIDI pitch-bend slew or portamento output
- Sequence Loop and Link for long patterns, more than 1500 steps
  and multiple instances thereof
- Multiple sequence track modulation sources:
  A sequence or other source may modulate sequence pitch, velocity, event times and more
  Track modulation allows global and recursive sequence modulation
- Random step advance and pendulum modes
- Real-time control of MIDI program numbers
- Per-bank and global BPM tempos
- Ethernet input and output, 32 channel MIDI output
- Control Voltage modulation input for sequence transposition, step time and more

Variable Event Times and Durations
Moves beyond the traditional Step Sequencer
- Per-step step and note durations:
  Note off, skip step to 64th, dotted, whole note and triplet durations
- Over 24,000 note memory
- Polyphonic MIDI record
- Ability to create polyphonic and monophonic sequence combinations
- Sync triggers to beat or free-time, independent to each sequence
- Sync sequence loop to bar length, independent to each sequence
- Cross-rhythms are easily generated with Bar Sync
- Step fractional time-shift modulation via sequence modulator inputs
- Programmable external clock sources and timing resolution

Dynamic Sequence Triggering
Makes this *the* Performance Sequencer
- Concurrent triggering of each bank group of 8 sequences,
  with multiple virtual sequence iterations
- Meta trigger sequences with the single turn of an encoder knob

- Sequencer trigger sources:
  Sequences are knob button assignable and MIDI channel or note assignable
  Sequence iterations track MIDI trigger note, velocity, note duration, and note instances
  Trigger sequences with virtual Open Sound Control buttons or keyboards
- Global sequence track modulation
- Sequence cross-modulation
- Triggers sync to beat or free-time; create MIDI echo
- Sequencer trigger modes:

Multiple	sequences follow all trigger instances
Multiple Arp	multiple sequence note trigger taken as an arpeggiated note
Single	sequence follows monophonic trigger
Duration Follow	sequence note duration follows trigger duration
Loop Hold	sequence loops while trigger is held
Run/Stop	trigger play; trigger stop
Run/Stop Arp	run/stop sequence note trigger taken as an arpeggiated note
Seq Reset	trigger play; trigger reset sequence
Release	trigger sequence_n, sequence_n+1 on trigger release
Step Play	trigger plays the next successive step
Step Record	trigger sets step value
Step Randomize	trigger sets random step values
Chord Interpretation	interpret keyboard input as chord symbols for display

Polyphonic MIDI to Control Voltage Converter Features (MCV)
   Superb Analog Voice Control
- Four channels of full-featured MIDI to Control Voltage conversion
- Authentic mono synth emulation with 8 finger note buffer
- Configurable output ports
- Five octave linear note range
- Volts/Octave or Volts/Hertz output scaling
- Low / High / Last note priority
- Retrigger and Recycle note modes
- Linear or Exponential portamento slew
- Mono and polyphonic pitch bend modes with variable pitch bend width
- Velocity and MIDI controller support with 16 curve modifiers, inversion and scaling
- Three programmable MIDI input channel zones

Other Analog Ports
   Flexible Analog or MIDI Sync
- Analog Clock in at 4 and 24ppq
- Analog Clock out at 1, 2, 4 and 24ppq
- Analog drum DIN Sync out at 24ppq
- MIDI clock in and out at 24ppq
- External Foot Pedal / CV input for sequence modulation

File Data Exchange
- MIDI file dump data
- Flash upgradeable OS

Multiple Formats
- Available in a broad range of modular synthesizer formats

BASIC OPERATION

Quick Start

PLUG IN

Plug the supplied 9VDC power adapter into the power jack at the rear of the sequencer. Plug the adapter mains into an AC outlet. Users outside of North American may have to slide the appropriate AC plug attachment onto the power adapter first.

In the case of a modular unit to be installed into a synthesizer rack system, the power connection headers are located on the bottom right-hand corner of the circuit board, as viewed from the rear of the unit. Please refer to supplemental installation documentation and appendix F for power connection details.

MIDI OUT2 and Ethernet connection may also be made from the rear of the unit.

CONNECT

To Connect with MIDI Gear:

Plug the sequencer MIDI OUT1 into the MIDI input of a MIDI keyboard, sound module, or computer MIDI adapter. See *MIDI Use* for detail. Set your synthesizer to receive on MIDI channel 1.

Plug a MIDI keyboard, MIDI computer or other sequencer into the Tetra MAPS sequencer MIDI IN to remotely trigger and control sequences.

To Connect with Ethernet Gear:

Using a CAT5 Ethernet cable, connect the sequencer's Ethernet LAN port to a network router. Use an orange crossover CAT5 cable to make a direct connection to a network "bridge," computer, other Tetra MAPS sequencer or Ethernet enabled device. Upon sequencer power up, the boot display indicates "Link Established" when a physical connection is made. See *Open Sound Control Use* for additional set-up details.

To Connect with Analog Gear:

Using phone plugs, connect the sequencer CV1 to the note CV input of your analog synthesizer's oscillator. Connect the sequencer GATE1 to the gate input of your synthesizer's envelope generator. See *Analog Use* for detail.

POWER ON

Apply power to the sequencer. The sequencer has booted up when "Signal Arts Sequencer…" is displayed, followed by the serial number, link status, and bar graphs representing step note values.

Pressing the knob buttons 1-8 start sequences 1 to 8 that will play notes from your synthesizer. Alternatively, sequences may be triggered with MIDI IN notes, produced by an external MIDI source. Turn the encoder knobs to change the step values.

POWER OFF

Before turning the sequencer off, all changes should be saved, otherwise your data will be lost the next time you use the sequencer. See the *Programming – DATA Save* chapter heading on how to save your sequence data.

Front Panel Sequencer Controls

Multi-Character Display

TRACK Modulation 1

Sequence Step Lights

Turn Encoder Knob to Change Parameters

Press Encoder Knob to Trigger Sequences

Program and Control Buttons

TEMPO STOP BANK STEP TRACK ALT PROG
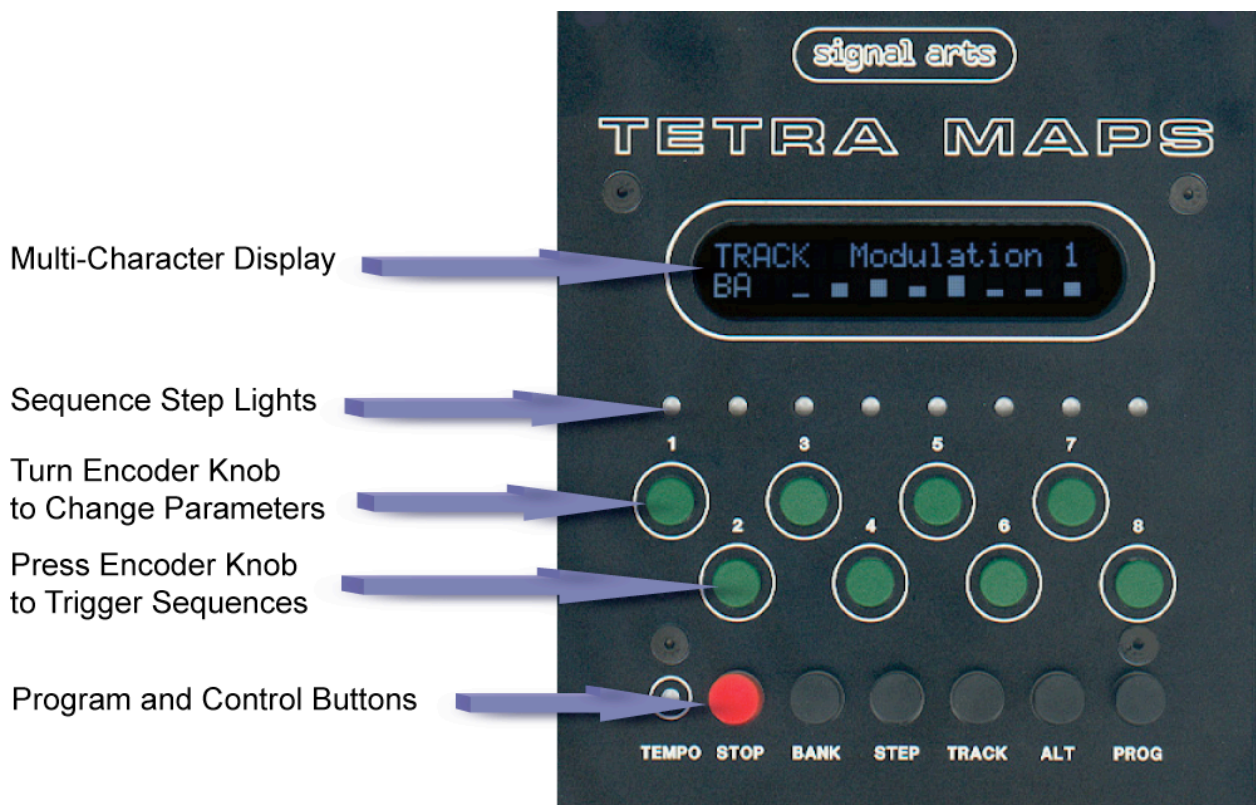
Tempo LED
The tempo LED indicates Beats Per Minute (BPM) tempo.

It flashes green when activity is being output to the CV ports or when recognized MIDI data is received from the MIDI IN. The LED flashes amber when activity over-flow or other error condition occurs.

Encoder Knobs
An encoder is a dial that turns continuously in either direction and therefore makes relative changes to a parameter. While in performance, the **STEP** and **TRACK** buttons select different step or track parameters that the encoders may act on.

In general, pressing a knob button triggers its associated sequence track 1-8. In some cases, an encoder knob press has an alternate function.

STOP
The **STOP** button halts the sequencer.

Hold **STOP** for a few seconds, or hold **STOP** and press **BANK** to clear all activity. This sends MIDI All Notes Off and All Controller Reset message commands to both MIDI outs. Use this in a "panic" situation, to cancel hung notes, reset controllers, reset clock down-beat and clear track modulators. Use this if your receiver has stopped responding to MIDI.

The **ALT / STOP** button combination stops all sequences running in the current bank. The **PROG / STOP** button combination stops all running sequences that were **not** triggered from the current bank. This combination is referred to as the "exclusive bank stop."
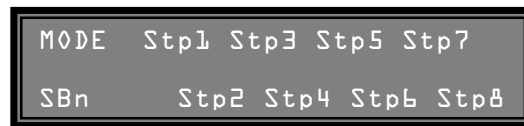
BANK

The **BANK** button advances to the next bank of sequences. Letters A to X represent one of 24 banks of 8 sequences each. Use the button combination **PROG / BANK** to go to the previous bank. Banks may also be advanced remotely by MIDI controller commands. (See *MIDI Use*)

The **ALT / BANK** button combination may be used to advance to the next Set of sequence banks.

STEP View

LCD Real-time Step Display


```
MODE   Stp1 Stp3 Stp5 Stp7

SBn        Stp2 Stp4 Stp6 Stp8
```

The bottom left corner of the display indicates the current Set, Bank and Sequence in the form: letter, letter, number. The first letter represents the Set (A to P). The second letter represents the Bank (A to X) and the Sequence is represented as a number (1 to 8). For example, *AB6* would represent sequence 6 of bank B of set A.

The **STEP** button selects one of eight step mode views. Each step view represents one (vertical) parameter of a sequencer step. All step parameters may be accessed in real-time by the encoders. Certain step parameters are also accessed by OSC messages. Two prefix characters denote the following step views:

♪ – **SC**   Note and Scale – defined as a MIDI keyboard note pitch. Select notes chromatically or force to a scale value in *SC* view.

DT   Detune – each step CV output is tuneable to $1/64^{th}$ (1.56 cents) of a semitone.

VL   Velocity – a control output associated with the note.

CT   An additional control output – defined as a MIDI controller number. The step value is the MIDI controller number's value. This output may be disabled in the program menu.

SD – ND   Two step views are given to duration times – defined as step values:
SD - Step Duration and *ND* - Note Duration.

The duration values range from off (step and/or note skip) to dotted whole note. *SD* and *ND* durations are independent of each other but the note duration copies the step duration value set. **When you want the note duration to be independent of its step duration, set the note duration AFTER you set its step duration**.

In the duration view modes, the knob buttons act as step or note skip. Press the knob to zero the duration. Press the knob again to preset the duration to an eighth note.

SL   Per-step note slew pitch-glides note pitches from one step to the next. This is also known as portamento. The rate may be set from 0 (no slew) to 15.

TRACK View and Tempo

LCD Track Display

```
Bank Track Numbers:
SB  1 2 3 4 5 6 7 8
```
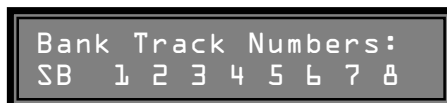
The **TRACK** button selects one of ten track mode views, including *Tempo*. In track view, the eight sequences of a bank are represented by front panel LED numbers 1 to 8. A track is simply a reference to a list of sequences linked across other banks. For example, track one *Meta Link* links A:1 to B:1, to C:1, to D:1, etc., forming a sequence "track." Each track view represents a parameter that is global to each of the eight sequence tracks. Track 1 to 8 parameter values are changed by the encoders as well as by OSC messages.

```
TEMPO 2-4Set 6-8Bank
AA            120 BPM
```

Global Set and Bank Tempos
Tempo is selected by the **TRACK** button. Tempo is in beats per minute which can be adjusted in fine or course increments. Encoder knobs 1 to 4 change the current Set tempo; encoders 5 to 8 change the current Bank tempo. Each Bank has its own tempo. Adjusting the Set tempo however, over-writes the Bank tempo and unifies all Bank tempos within the current Set, to the same BPM.

```
TRACK Volume / Mute
AA ■ ■ ■ ■ ■ ■ ■ ■
```

TRACK Volume
Track sequences may be volume (note velocity) adjusted or muted. Turn the encoder knob to adjust volume and press it to mute the track. Press again to un-mute the track.

```
TRACK  Modulation X
AA ■ ■ ■ ■ ■ ■ ■ ■
```
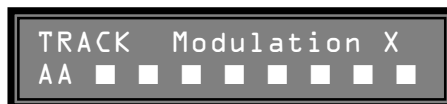
TRACK Modulation X and Y
Track sequences may be modulated by encoder knobs as determined by the function selected in the Bank *MODx/y Track Modulate* programming menu. Each track has two modulation parameters, *Modulation X and Modulation Y*. These track parameters may also be remotely controlled by user-addressable OSC messages. See Ethernet *OSC Track ModX/Y Input*.

```
TRACK   Patch Change
AA ■ ■ ■ ■ ■ ■ ■ ■
```

TRACK Patch Change
A track MIDI program change is sent on each turn of the track encoder knob. The initial program number is programmed in the *SEQ Patch* program menu. The message is sent on the sequence MIDI channel, *MidChan*. Pressing the encoder knob sends the initial program change number. Turning the encoder knob sends this patch number, incremented or decremented, according to the direction of the turn.

```
TRACK Seq Meta Link
AA  0 0 0 0 0 0 0 0
```

TRACK Seq Meta Link
Link sequences between banks to quickly create sequence "tracks." Turn an encoder knob to chain the current bank sequence to the same number sequence in the following successive bank(s). One of eight links may be made, chaining up to nine sequences together. The end sequence auto loops back to the start sequence.

```
TRACK  Seq Loop
AA  _ _ _ _ _ _ _ _
```

TRACK Seq Loop
Set bank track sequence loops. Sets the current bank sequences to even-numbered loops from 2 to 124. This controls the current sequence loop number. For more detailed control, use *SEQ Loop* program menu.

```
TRACK  Meta Trigger
AA      ->
```

TRACK Meta Trigger
Track sequences may be triggered and turned off by turning a track encoder knob. Pressing the knob triggers a sequence, as normal. Turning the knob clockwise triggers successive sequences. Turning the knob counter-clockwise successively turns the track sequence iterations off.

```
TRACK  Seq Record
AA            R
```

TRACK Seq Record
Press an encoder knob to select a track to record on to. The first MIDI note received from an external source begins recording on the selected track. Recording stops once the end of the sequence chain is reached and then playback begins. Or press the knob to stop recording and begin playback. Record polyphonically, as many notes as made available by the number of linked sequences. **Use *Meta Link* first to create a long track, suitable for recording on to.**

All MIDI channels record onto a track but the output MIDI channel is determined by the sequence(s) *MidChan*. The recording MIDI messages are echoed to MIDI THRU. Note that recording follows the sequence loop iterations.

```
TRACK   Text
AA
```

TRACK Text
The Text window displays general text messages generated by internal sequence scale chords, received *ChordInterp* triggers or received OSC text messages. An internal sequence generates a *TRACK Text* chord value when its program menu *SEQ Scale* is set to a "chord" value scale. The *Scale Root* value transposes the chord text output according to the scale root.

ALTernate Encoder Functions

The **ALT** button changes the function of the encoders while the **ALT** button is held. The following alternate functions are then displayed:

```
ALT 1Set 3Bank 5Seq#
AA1       6View 8Mode
```

There are five encoder alternate functions: *Set, Bank, Seq#, View*, and *Mode*. Hold the **ALT** button and then select the desired function. The number prefix is the encoder number to dial.

Set
Encoder 1 changes the Set, letters A to P. Each Set contains 24 banks of 8 sequences.

Bank
Encoder 3 changes the Bank, letters A to X. Each bank contains 8 sequence / tracks.

Seq#
The active sequence is displayed while in step view. Encoder 5 selects another sequence for display within the current bank and "freezes" this display until a new sequence is triggered. Use this to select a sequence prior to entering *Seq* program mode.

View
Encoder 6 is a short-cut alternate for the **STEP** and **TRACK** buttons, to select the real-time step or track views. See *Step View* and *Track View* for details on each view.

Mode
Encoder 8 selects the display mode for step views. There are six different display formats and combinations of displays for step values. Note pitch may be displayed as a bar graphic, keyboard letter accidentals, or MIDI numbers. Other step parameters may be displayed as numbers or bar graphics.

PROG Encoder Menus

The **PROG** button changes the function of the encoders while the button is held. The following program menu options are then displayed:

```
PRG Seq Bnk Eth Glbl
AA1 ↓    Program
```

Encoders 1, 3, 5, 7 enter programming mode and select the program menu page. To exit program mode, press **STOP** or **PROG**. **PROG** exits program mode without stopping sequences. The sequencer can be played while in program mode. Data save exits program mode automatically.

Key Combination Shortcuts

The following button combinations may be used to duplicate some common menu items. Press the second button while holding the first:

STOP / BANK   Stop and Clear everything – "panic" button
ALT / STOP   Stop the current Bank
PROG / STOP   Exclusive Bank Stop (stop all banks but the current bank)
ALT / BANK   Advance Set (change to the next set)
PROG / BANK   Bank Decrement (change to the previous bank)

Bank Dec

Panic

Set Inc

STOP BANK STEP TRACK ALT PROG

Stop Bank

Exclusive Bank Stop
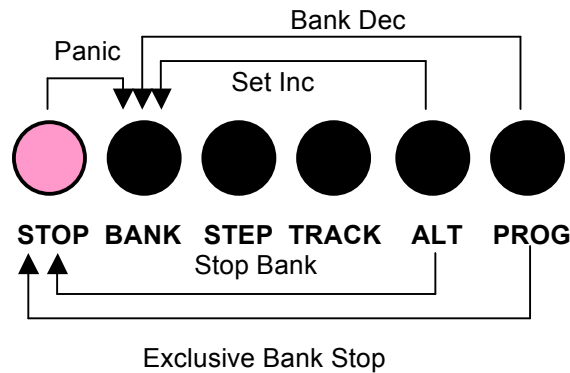
Button and encoder knob button combinations. Hold the button and press the encoder knob:

STEP / ENCODER n   Sequence Display (change to sequence n)
TRACK / ENCODER n   Track Record
ALT / ENCODER n   Mute Track (change to sequence n)
PROG / ENCODER n   Stop Track (change to sequence n)

Encoders…

STOP BANK STEP TRACK ALT PROG

Seq#   Record   Mute   Stop Track
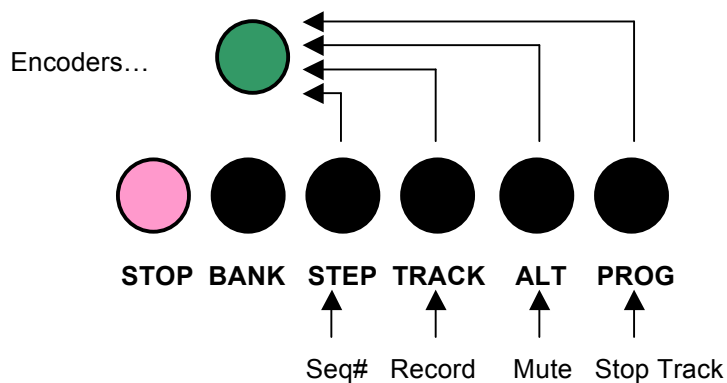
Overview – How the Sequencer Works

Block Architecture
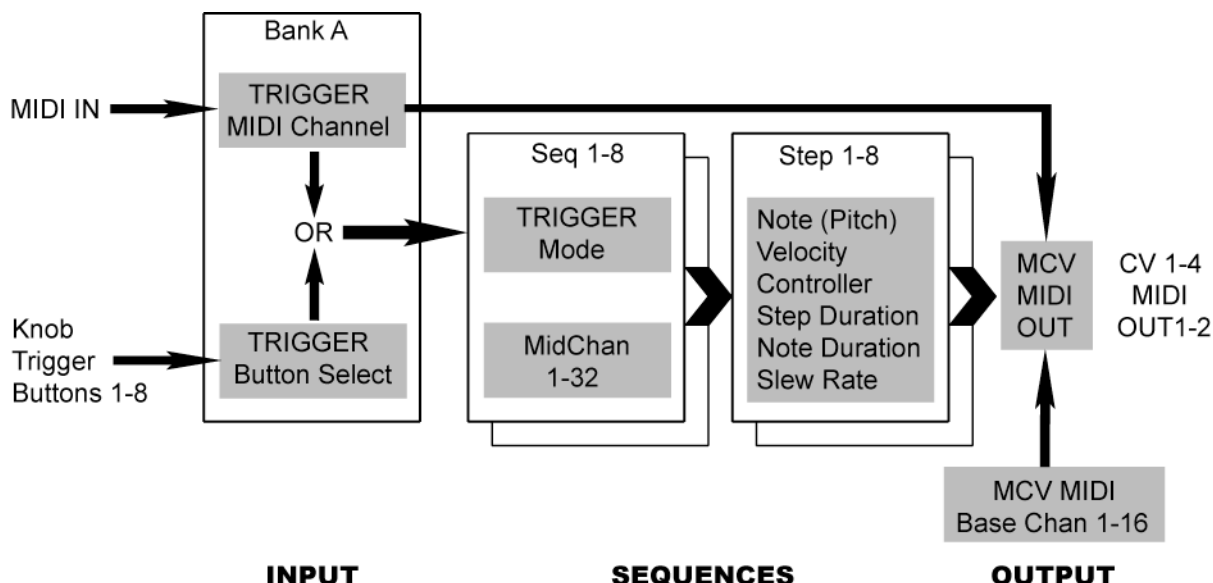
Sets
The core organization of the Tetra MAPS is a matrix of sequencer step note parameters. Steps are organized into 16 sets of 24 banks of 8 sequences of 8 steps of 7 parameters. Each Set is given a letter name, A to P and contains one set of 24 banks. Use a Set to store one large song or several smaller songs.

Banks
Each Bank is given a letter name, A to X and contains sequences, numbered 1 to 8. In step view, each sequence step is controlled by the associated encoder knob, 1 to 8.

Multiple virtual sequences exist over and above this matrix! Multiple sequences within the current bank may be played or "triggered" by the sequencer knob buttons or external events.

Tracks
A track is a reference to a list of sequences linked across banks. Sequences may be linked to each other by *Link* or *Meta Link*. Therefore, each bank of eight sequences is also considered to be a bank of eight tracks. Each sequence within the bank is the beginning sequence of the current bank sequence track.

In track view, each encoder controls a track modulation parameter. Each track parameter affects all sequences (linked and multiple) running on that track.

Input
There are three sources of sequence triggers. Sequences may be triggered by pressing an encoder knob, external MIDI note events or Ethernet OSC messages.

These triggers are sent to the bank's trigger parameter block. The bank trigger parameters determine the trigger source for each sequence. *TRIGGER Key* parameters assign sequences to button triggers, *TRIGGER Channel* parameters assign sequences to MIDI channel triggers and *TRIGGER Note* parameters assign sequences to MIDI note numbers. See *Programming* chapter, *TRIGGER*s.

Each sequence iteration carries the unique properties of its trigger. A sequence triggered by a MIDI note tracks the MIDI note properties such as note transposition, velocity and time duration (*DurationFollow* trigger mode). Retriggering the same sequence can generate many sequences at the same time, each with different properties, according to the performer's input and the sequence's trigger mode!

Sequences
One key to the power of Signal Arts' Tetra MAPS sequencer is its trigger modes, which allow multiple, simultaneous, virtual sequence generation. **To make the most exciting use of this sequencer explore these trigger modes!** Refer to the *Programming* chapter, *TRIGGER Mode*. Each sequence has its own trigger mode that determines its response to a trigger.

In step view, the step values of the current bank's last triggered sequence are displayed. These step values may be altered by the corresponding encoder knobs 1-8. The steps have one of eight parameter values displayed, as determined by the **STEP** button.

Each sequence has a MIDI output channel, *MidChan*. This is the MIDI channel on which a sequence is output. This channel also directs the sequence to the analog outputs.

Output
Sequence data is sent on its output MIDI channel, *MidChan*, and to the internal MIDI to Control Voltage converter (MCV). The sequencer data is sent to the analog port(s) whose MCV configuration channel is aligned with the sequence's *MidChan*. This channel alignment is determined by the sequence *MidChan* and the *BaseChan* channel numbers. See *MIDI Use – MIDI Channels* for details.

Analog outputs CV1, CV2, CV3, CV4 and their respective GATEs, output the appropriate control voltages.

The MCV may be used independently of the sequencer since it also receives data from MIDI IN.
To do this, isolate the Bank *TRIGGER Channel*s from the *MIDI BaseChan* and its offsets, so that the MIDI IN channel is sent directly to the MCV. Also see *MIDI to CV Converter – MIDI BaseChan*.

MIDI USE

The Tetra MAPS sequencer is a powerful MIDI performance tool. Unlike traditional step sequencers, the Tetra MAPS sequencer is designed to interact with its user in real-time to create spontaneous musical flow using simple techniques.

MIDI Factory Preset
The Tetra MAPS ships with the following user programmable configuration. Additional preset data sets are available for download from Signal Arts as they become available.

Global and base MIDI channel parameters are set to channel 1 except for the *MIDI SlewBaseChan*. The *SlewBaseChan* is set to employ MIDI portamento and not MIDI pitch bend for slew. All sequences output on MIDI channel 1, to MIDI OUT1. All sequences also output to the analog CV output ports. The trigger knobs are set so that encoder knob buttons 1-8 will trigger bank sequences 1-8. The trigger channels are set so that MIDI channels 1-8 note events will trigger bank sequences 1-8.

MIDI Ports

MIDI IN
The MIDI IN port receives MIDI messages from other sequencers, computers, or MIDI keyboards to trigger sequences or to modulate. These messages are then fed to the internal MCV so that the CV ports may also be driven directly by MIDI and used independently of the sequencer.

MIDI OUTs
The two output ports are MIDI OUT 1 and 2. MIDI OUT2 is accessible from the rear of the sequencer. MIDI OUT1 sends user data MIDI file dump messages as well as regular sequence data on MIDI channels 1 to 16. There are 16 MIDI channels per MIDI port. Therefore, MIDI OUT2 makes 32 MIDI output channels available to the sequencer, since MIDI channels 17 to 32 are routed to MIDI OUT2. Either MIDI OUT may also be configured to double as a MIDI THRU to output MIDI input data that was not used by the sequencer.

MIDI Input Control

MIDI Triggers
Sequences may be triggered by external MIDI note events as well as by the knob buttons and OSC messages.

Each sequence carries the properties of its trigger. A sequence triggered by a MIDI note inherits, or tracks, the MIDI note properties. This means that the triggered sequence takes the note pitch as a sequence transposition and its velocity as a sequence velocity offset. For the *DurationFollow* trigger mode, a sequence also inherits the note duration of the MIDI note. This is the length of time the trigger note is held on. These properties are also propagated to linked sequences.

There is an order to which MIDI in data is processed. Received messages are directed to the bank's trigger parameter block first. The *TRIGGER Channel* parameters determine the sequence(s) triggered by the message. When no sequence is assigned to the trigger message, the message is passed to the MCV. MIDI note messages are passed to MIDI THRU when there is no MCV matching note event found. MIDI controller messages are passed to MIDI THRU regardless.

MIDI Remote Control
The *MIDIin Chan* parameter acts as the sequencer global MIDI channel. This special channel receives MIDI messages that act globally on the sequencer.

MIDI program change and controller numbers received on the global channel may be used to change sequencer banks, sequence numbers, and encoder step values.

MIDI messages and their function are detailed below:

MIDI Command	CCN	CC Values	Function
bank lsb controller	32	0..23	bank letters A..X
program change	n/a	0..7	sequences 1..8
NRPN lsb controller	98	0..7	sequence steps 1..8
NRPN lsb controller	98	127 (>7)	7F (NULL) terminates inc / dec action
data dec controller	97	0	encoder value -1
data inc controller	96	0	encoder value +1

Other MIDI controllers such as Sustain, Portamento Time and Portamento Switch are received on MCV note channels.

MIDI general purpose controller numbers 16 and 17 affect *TRACK Modulation X* and *Y*, respectively. The *BANK Trigger Channels* receive the general controller MIDI channel number, so that each track modulation may be MIDI channel addressed independently:

MIDI Command	CCN	Track Function
general controller	16	Modulation X
general controller	17	Modulation Y

MIDI Channels

The sequencer is configured using MIDI channel numbers. The sequencer has four channel parameters that are accessed in the programming menus.

SEQ MidChan
Sequencer *MidChan* is a sequence's output MIDI channel. Sequence step values output on this MIDI channel.

TRIGGER Channels
These are the sequence's trigger receive MIDI channels. A *TRIGGER Channel* is the MIDI channel on which a specific sequence receives its trigger. Each of the eight sequences in a bank may be triggered by a different MIDI channel note, for example.

MIDI BaseChan
BaseChan is the MCV base channel offset. *BaseChan* positions the MCV in the sequencer's channel map space, channels 1 through 16. This allows the MCV to receive sequencer data or external MIDI IN messages in the channel space that it occupies. The MCV has up to four receive channel offsets, added to the *BaseChan* base. (See *Programming* chapter, *MCV CVout Configuration*)

MIDI SlewBaseChan
The *SlewBaseChan* is also a base channel offset. The *SlewBaseChan* positions MIDI pitch bend slew channels in the sequencer's 32-channel map space. This enables the use of either MIDI pitch bend or MIDI portamento commands for step MIDI slew. MIDI pitch bend slew uses four offset channels, added to the *SlewBaseChan* base. For example, to enable non-pitch bend portamento, set the *SlewBaseChan* to a space that is not used by the sequencer output. (See *Programming* chapter, *MIDI Pitch Bend Slew*)

The following illustrates an example channel configuration:

MIDI Output Channel Map

MIDI OUT1 (MCV in *triple* configuration)   MIDI OUT2
BaseChan = 9   CV:1   2   3 |

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

SlewBaseChan = 17   Pitch bend slew: 1   2   3   4
                                                                (offset channels)
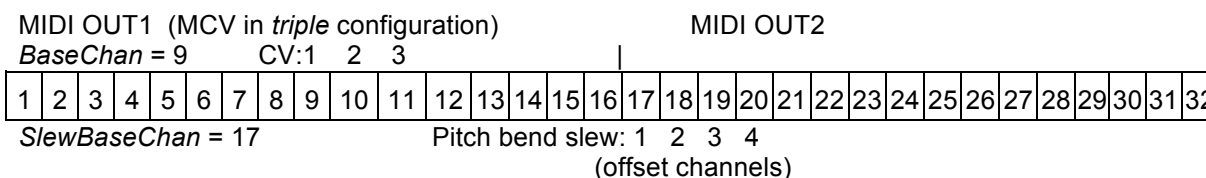
OPEN SOUND CONTROL USE

The Tetra MAPS Ethernet Local Area Network (LAN) port provides a direct high-speed connection to computers, other Tetra MAPS sequencers or Ethernet enabled music equipment. Music control communication is based on the Open Sound Control (OSC) protocol over Internet UDP packets. OSC is an open protocol now used in many music software products as a way to implement real-time control of musical events through computer network communications. The Tetra MAPS communicates with OSC enabled applications. The Ethernet RJ45 jack is located on the front panel or is accessible from the rear of the sequencer.

When plugged into a WiFi bridge router, the Tetra MAPS readily connects to a mobile device (such as iPhone / iPad) running "TouchOSC" or "Lemur" applications. User-made custom templates maybe created using the Lemur or TouchOSC computer editors to interface with the Tetra MAPS built-in OSC functions, providing a full performance, virtual interface for the Tetra MAPS sequencer. Example templates are provided online to get you started in creating your own custom sequencer interface!

In addition, the Tetra MAPS has user-programmable OSC addresses for sending text, sequence note MIDI and value data. There are user-programmable OSC addresses for receiving sequence triggers, track modulation and text. The Tetra MAPS sends and receives OSC MIDI messages.

See appendix E for the Tetra MAPS user programmable OSC addresses with examples.
See the supplemental "TetraMAPSWifi.pdf" document for WiFi setup with the iPhone / iPad running OSC apps and the Tetra MAPS current implementation of OSC.

OSC Communication Details

To establish communications between the Tetra MAPS and a remote computer application, both the Tetra MAPS and the application must be setup with following information: send and receive IP addresses, port numbers, and the OSC addresses particular to the functions required. The Tetra MAPS net mask is internally set to 255.255.0.0, therefore IP addresses should begin with the prefix 192.168, since addresses outside of this local network will default to the internally preset default router IP 192.168.0.1.

OSC messages are designed to be very flexible, so the user is free to decide how OSC messages should be used. OSC messages begin with a symbolic address that typically designates the function for which the message is to be directed. The Tetra MAPS OSC user-programmable addresses are programmed in the *OSC ETH* program menus. See *ETH* program menu for details. The address is followed by the data format and data. OSC also supports standard MIDI messages. When creating custom templates, one may need to be aware of the OSC data type being used since incompatible data types may be ignored.

ANALOG USE

The Tetra MAPS has an internal MIDI to Control Voltage (MCV) converter with four analog Control Voltage (CV) and associated GATE outputs. The Tetra MAPS MCV has superior analog synthesizer voice control with more features found than in most stand-alone MIDI to CV converters.

The MCV receives messages from the MIDI IN and from the internal sequences. Therefore the MCV may be used independently, or in combination with sequences. This is configured by the *BaseChan* channel parameter. (See the previous section, *MIDI Use – MIDI Channels*, as well as *MIDI to CV Conversion*)

Analog Ports

Four analog control voltage (CV) outputs and their associated GATEs are located on the panel. A "CV port" is defined as a CV and GATE output pair, or a polyphonic grouping of more than one CV/GATE output pairs. The MCV CV port configuration is programmable. One of sixteen presets is available under the programming menu *CVout Configuration*. This preset determines what appears at the CV and GATE outputs of the sequencer.

Factory preset, the sequencer CV ports are configured as *mono vel mod exp*: CV1 monophonic note (on MIDI channel 1), CV2 note velocity, CV3 modulation, CV4 expression. For this configuration and *BaseChan* equal to 1, sequences with *MidChan* set to 1 output their note, velocity and controller values to these ports.

The following table illustrates the given example of this CV port assignment. A trigger event causes a sequence to play, the output of which drives the CV port. Note that triggering more than one sequence on the same channel will create modulating patterns on the CV outputs!

Trigger →	Seq 1 Step Views	CV Ports
knob button 1 **OR** a note on MIDI channel 1	♪ - *SC* – Note	CV1, GATE1
note's velocity	*VL* – Velocity	CV2, GATE2
modulation controller on MIDI channel 1	*CT* – Controller	CV3, GATE3
	SL - Slew Rate	CV1
portamento time controller on MIDI channel 1		CV1
expression controller on MIDI channel 1		CV4

CV Outputs

A Control Voltage determines the pitch of an analog synthesizer's oscillator. Connect the sequencer's CV output to the pitch control voltage input of your analog synth using a phone plug.

CV outputs 1, 2 and 3 may be programmed as either Volts per Octave or Volts per Hertz under the *Cvscale* program menu. To interface to a vintage Korg or Yamaha analog synthesizer, you may need to set the CV scale to *V/Hz*. Most other synths require a *V/Oc* setting.

CV outputs configured for use as controllers, for example velocity or controller value, should be set to *V/Oc*. You can connect these CV "modulation" outputs to analog synth modulation input points such as "filter cut-off." **Note that slewed sequences make flexible LFO modulators.**

Gate Outputs

A gate provides the signal that triggers your analog synthesizer's envelope generator. Without a gate there is no note articulation. Connect the sequencer's GATE output to the gate input of your analog synth using a phone plug.

The sequencer's gate outputs also respond to controller values. When the CV port is being used as a controller output, its gate will turn off for controller values 0-63 and on for values 64-127.

Sync Output

SYNC is an analog drum (DIN) sync output which interfaces to analog drum machines.

The MIDI OUT2 jack doubles as a drum sync jack. The drum sync 5-pin DIN-jack output has these control signals: pin 1 control, pin 2 ground, and pin 3 clock. When the sequencer is slaved to MIDI clock, MIDI IN system real-time commands drive these signals directly. MIDI Clocks, defined as 24 pulses per quarter-note (ppq), drive the clock signal. MIDI Start and Continue commands set the control line to high, and MIDI Stop resets it.

Analog Clock

Sequencer models with ¼ inch jacks use a "Tip/Ring/Sleeve" (TRS) stereo jack for CLOCK. The TRS tip is clock out and the ring is clock in. Sleeve is common ground. Clock in may be accessed by using a stereo plug or mixer "insert" cable which separates the tip and ring signal paths into two mono plugs.

Clock In
The CLOCK in port slaves on the positive-edge of an analog clock signal. The Tetra MAPS sequencer slaves to external clocks at a rate of either 4ppq or 24ppq. External clock source and time resolution is programmed in the *CLOCK Source* program menu.

Note that low ppqs have less time resolution, reducing note duration resolution.

You may need to synchronize the down-beat when slaving the sequencer to an external analog or MIDI clock. This is done by halting the external clock and then pressing **STOP** / **BANK** (for "panic" reset). On panic reset, the sequencer resets the tempo down beat so that the next clock pulse is taken as the down-beat pulse.

Clock Out
The sequencer outputs a clock pulse when a sequence is running.   The CLOCK jack tip sends clock pulses for every sequencer step. The clock output rate may be changed to 1, 2, 4 or 24ppq. (See *CLOCK Output Rate* program menu.)

CV / Pedal Input

This input serves as an additional modulation source. Its function is programmed in the *CVin* program menu. Sequencer models with ¼ inch jacks use a "Tip/Ring/Sleeve" (TRS) stereo jack for CV IN. A TRS jack accommodates a generic foot expression (potentiometer-type) pedal. Alternatively, an external control voltage from 0 to 5 volts, may be input to the tip of the TRS jack through either a mono or stereo phone plug.

PROGRAMMING MENUS

Overview

Knowing how to program the Tetra MAPS sequencer will give you control over its components. This chapter is divided into six sections:

Sequence
The sequence menu pages give you individual control of each sequence for looping, linking, synchronization and sequence modes. This is also where you select the important trigger mode for each sequence.

Bank
The bank menu pages affect a bank grouping of eight sequences. This where you assign sequence trigger sources and track modulation functions.

Global MIDI
These are the pages where global MIDI channels are configured.

Ethernet OSC
The ethernet pages handle Ethernet setup and OSC addresses for OSC communications.

MCV
MCV menu pages configure the analog ports for the sequencer, critical in properly interfacing analog synthesizers. Menu pages for CV input modulation function and tempo clock interface are also described here.

Global Data
These are the global data management pages for the sequencer.

LCD Program Menu Display

```
SEQ   Parameters…
AB1 ↓ Values…
```

Programming mode is entered by holding **PROG** and then turning encoder numbers 1, 3, 5 or 7. These encoders scroll through the respective menu pages. The lower row of encoders, 2, 4, 6, 8, change the parameter values of the menu pages.

The current displayed Set, Bank and Sequence, is what is programmed upon entering programming mode. Therefore, first select the desired Set, Bank (and Sequence, as it applies) before entering programming mode. One may quick select the sequence first, by holding **PROG** and pressing the sequence encoder knob before entering program mode. Or, the *PRG Seq* number may be selected by encoder 2 in the sequence program menus.

The above *LCD Program Display* is the generic display format for a program menu page. In this example, *SEQ*uence number one of bank B of set A is to be programmed.

Sequence

These program menu pages apply to the current sequence number upon entering this mode. These parameters are unique to each sequence.

```
SEQ    MetaLink  Link
AA1 ↓    8        B:s
```

MetaLink
Meta link is a short cut for making sequence links across multiple banks. Meta link links a sequence to the same number sequence in the next, successive bank(s), creating a "track"; a sequence chain from bank to bank. The end sequence auto loops back to this, the start sequence. For example, selecting 8 *MetaLinks*, links nine sequences together, forming a 72-step track. The starting sequence is the current bank sequence.

Meta links are applied upon bank changes and therefore a meta link over-rides the regular *Link*, but only while in the current bank. Note that individual *Loop*, *Step Modes* and other parameters still apply to each linked sequence. Also note that meta links can share sequences which are a part of another bank's meta links. For convenience, the meta link is also accessible from the *TRACK Seq Meta Link* view.

Link
This links one sequence to another sequence. After the sequence finishes its loops, it links to the *Link* bank sequence. Link may be turned off. Note that Link may link sequences within the current bank or to sequences in other banks. Link may be temporarily superceded by a meta linked sequence.

```
SEQ    Loop
AA1 ↓ 120
```

Loop
Loop is the number of times a sequence plays, looping upon itself. A sequence may play to a maximum of 126 times. Link the sequence to itself to create an infinite loop. *TRACK Seq Loop* sets this value to even loop numbers.

```
SEQ    Bank LSB Patch
AA1 ↓    3    0   127
```

Bank
Bank is the MIDI program change bank number. This first number is the most-significant (MSB) bank number. Pressing the corresponding *TRACK Patch Change* encoder sends the *Bank* MSB, *LSB* and *Patch* program change numbers. When Bank (MSB) is set to *off*, no program change is sent.

LSB
The LSB number is the least-significant MIDI bank program change number. The bank LSB allows a total range of banks numbers up to 128 X 128, equal to 16,384 banks. This number should be set to zero when not required.

Patch
Patch is the MIDI program instrument change number within the MIDI bank. The *TRACK Patch Change* encoders send a program number added to, or subtracted from this initial number.

```
┌──────────────────────────────┐
│  SEQ  OutPort MidChan         │
│  AA1 ↓ EthMIDI  03            │
└──────────────────────────────┘
```

OutPort
Sequence output may be directed to Ethernet, MIDI, or as a modulator. *EthMIDI* directs the output to both Ethernet and MIDI ports. *ModSeq* employs the sequence as a sequence modulator whose destination is determined by the *SEQ Mod Dest* parameter in the following menu page. *ModX/Y* employs the sequence's controller value as a track X or Y modulator whose destination is determined by the *MidChan* that matches the bank's *TRIGGER Channel*.

MidChan
This is the MIDI channel on which sequence data is sent. There are 32 channels in all. Channels 1-16 output to MIDI OUT1 (OSC MIDI port 0). Channels 17-32 output to MIDI OUT2 (OSC MIDI port 1).

```
┌──────────────────────────────┐
│  SEQ Mod Receive Dest         │
│  AA1 ↓    enable  B:s          │
└──────────────────────────────┘
```

Modulation
Multiple modulation sources may be applied to running sequences. Modulation sources for sequence modulation include sequence modulators, encoder knobs, CV IN, MIDI and OSC messages. Recursive and sequence cross-modulation is also possible with the Tetra MAPS.

Modulation sources are directed to a bank track, which in turn, modulate the sequences running on that track. Each bank track has its own modulation accumulators, affecting all sequences (with *Mod Receive enabled*) running on the respective track. The effective modulation is the algebraic difference of all the modulation sources.

Tracks may receive modulation input from MIDI IN Foot controller (CCN 4) messages, CV IN and *TRACK Modulation* via encoder knobs or OSC messages. To program a sequence as a sequence modulator, set its output port to *ModSeq*, as referred to in the previous menu. Its target destination is determined by *SEQ Mod Dest*. To program the sequence as a track modulator, set its output port to *ModX* or *Y*.

SEQ Mod Receive enables the current sequence to be modulated by the bank track modulation. Sequences are preset to receive enabled, therefore set *Receive* to *disable* when it is desirable to **not** have a particular sequence modulated. When a sequence modulator is directed to a track running another sequence modulator, affecting the first sequence, cross-modulation results.

The modulator sequence step values modulate the corresponding values in the modulated track sequence. Nominal step values have no modulation effect. The nominal step values are: Note=Middle-C5, DT=0, VL=64, CT=0, ND=8, SL=0. Therefore, nominal step values may be used as step null modulators. In other words, use these nominal step values to omit modulation on a per-step basis. The track modulator sequence's step controller values set the bank's *TRACK Modulation X* or *Y* values, according to all *TRIGGER Channels* matching its *MidChan*.

Note that a sequence modulator has no MIDI output. Also, when using sequence modulation, avoid the use of *single* trigger mode, since single trigger mode may prevent the modulator and modulated sequences from playing simultaneously.

```
SEQ     Scale        Root
AA1 ↓  Octave         C
```

Scale
This menu selects the musical scale to which the sequence notes are programmed and play. Step notes are set chromatically in the Note step view. In the *SC - scale* step view, note values follow the selected scale values (when *Scale* is not set to *Off*). Sequence (Chord) *Scale* and *Root* are also set by OSC messages.

The scale selection is *Octave*, numbered scale, or a chord value. Fifty common scales are listed in appendix B, in the key of C. In addition, there are nine "Chord" scales. When a chord scale is selected, the sequence also outputs the chord symbol in the *TRACK Text* window and outputs OSC chord text messages.

The selected *Root* is the key signature of the given scale. Once established, all following step changes will follow in the new key. For chord scales, the root transposes the chord symbol output.

Additional scale combinations may be created by changing the scale and/or root in-between setting other step notes. Changing the root key in the midst of setting sequence notes, for example, creates a bi-tonal scale.

```
SEQ    Controller CCN
AA1 ↓ modulation 01
```

Controller CCN
The controller number selects the MIDI output controller number for the steps of the sequence. MIDI controller output may be disabled by turning *Controller* off.

Controller numbers from 0 to 99 may be selected. Encoder 4 selects controllers from a predefined list of common controller numbers. Encoder 8 selects a controller by number and is displayed as *Number →* controller number nn.

The individual step MIDI controller number **values** are changed in the *CT* step view, as selected by the **STEP** button in performance mode.

The following lists some predefined common MIDI **Continuous Controller Numbers** (CCNs):

      off disable sequencer *CT* MIDI controller output

1 modulation	12 effect control 1
2 breath	13 effect control 2
4 foot	16 – 19 general purpose 1 - 4
7 volume	70 – 77 sound controllers 1 - 8
11 expression	80 – 83 general purpose 5 - 8
	91 – 95 effects 1 - 5

```
SEQ    Step Mode
AA1 ↓ Normal
```

Step Mode
The sequence *Step Mode* determines the sequence step direction behaviour:

Normal	Plays the sequence forward
Reverse	Plays the sequence backwards
RandomStep	Plays the sequence steps in random order
Brownian	Randomly deviates from the current step position

(Note that the use of random step modes conflicts with *DurationFollow* trigger mode. See *DurationFollow*)

Pendulum mode	Reverses sequence direction at the end of its loop
PendulumRepeat	Reverses sequence direction, repeating the end steps
CVinStep	Step position is determined by an external control voltage input

Linked sequences propagate the current direction to the next sequence. Therefore, asymmetric patterns are created by linking multiple sequences with differing loop values. **Note that single, un-linked sequences must have *Loop* set to greater than 1 for the pendulum modes to take effect.**

```
SEQ TrigSync BarSync
AA1 ↓ on        off
```

TrigSync
Trigger sync turned on, synchronizes triggers to the tempo beat. When trigger sync is off, sequences trigger in free time. With trig sync off, for example, MIDI echo may be created using fast repeated triggers.

BarSync
Bar sync on forces a sequencer loop to align itself on bar-beat divisions.

This feature ensures a constant bar time while changing real-time duration values, by subtracting the time difference required for an even bar from the last step duration. With bar sync off, a sequencer loop time is the sum of all eight step durations. Complex sequence cross-rhythms are created with bar sync off.

```
SEQ  TRIGGER Mode
AA1 ↓ DurationFollow
```

TRIGGER Mode
The sequencer has many modes of sequence triggering. Sequence trigger sources may be knob buttons, external MIDI notes or Ethernet OSC. Sequences that are triggered by MIDI notes inherit the properties of the note such as pitch, velocity, and note duration (*DurationFollow*).

The following describes each trigger mode:

Multiple
A sequence iteration fires for each and every trigger event received. Each virtual iteration may have its own uniquely modified values; critical to unleashing the power of this sequencer!

MultipleArp
A sequence iteration fires for each and every knob button trigger event received. MIDI note triggers set the step values of the running sequences, thus creating arpeggiations of the notes entered.

Single
Single mode triggers a single sequence in the style of a traditional step sequencer. Only one sequence plays at a time on the track. A sequence is triggered upon the initial trigger event. Subsequent triggers transpose the sequence, according to the trigger note, as the sequence plays.

DurationFollow
Sequence step note durations follow the duration of the trigger (note or knob button) being held, until released. **Do not to use *DurationFollow* trigger mode with sequence random *Step Mode*s. This will cause hung notes since random step note offs cannot track random step note ons.**

LoopHold
A sequence loops until the trigger (note or knob button) is released, for up to *Loop* number of times. Sequence *Loop* must be set to greater than 1 loop for loop hold to take effect. The sequence jumps to the next link (when enabled) upon loop hold release.
This trigger mode does not work for an infinite link loop (a sequencer linked to itself). To do this, set *Loop* to a large number like 100, for example.

RunStop
A sequence fires on the first trigger and is stopped, on the second and same trigger. Knob buttons can also be used to control *RunStop* sequences.

RunStopArp
A sequence fires on the first knob button trigger and is stopped, on the second and same knob button trigger. MIDI note triggers set the step values of the running sequence, thus creating an arpeggiation of the notes entered.

SeqReset
A sequence fires on the first trigger and is reset to the first step, on the second and same trigger.

Release
A sequence fires on a trigger and a second sequence fires on the trigger's release. The second sequence is the next adjacent sequence number in the bank.
For example: if sequence 8 is triggered it will roll-over and fire sequence 1 on the trigger's release. This feature is useful for creating an envelope generator or other two-stage events.

StepPlay
Each step of the sequence is played, one per trigger. Step play ignores step duration and step direction modes.

StepRecord
The Step record modes allow for trigger events to step program a sequence. MIDI note triggers successively set step pitches. Enter keyboard notes one at a time, per step. **To quickly clear sequence steps, use the button trigger to fill steps with middle C's and nominal values.**

StepRandomize
Either MIDI notes or knob button triggers program successive steps with random values.

ChordInterp
MIDI or OSC virtual keyboard input is interpreted as chord symbols, displayed on text outputs.

Bank

Bank menu pages select the trigger source and modulation function for bank sequences 1 to 8. These menus include setup for knob button triggers and MIDI IN note message channel triggers. Two menu pages cover sequences 1-4 and 5-8 for each *TRIGGER* parameter menu.

```
TRIGGER Knobs     1-4
BNK ↓  1   3   4   5
```

TRIGGER Knobs
Set sequence to trigger from knob button number n. Each bank sequence may be triggered by any button, or by none when set to "0".

In the above *TRIGGER Knobs* example display, "1 3 4 5" refers to sequences 1 to 4, respectively. When the first trigger knob entry is changed from 1 to 2 for example, sequence 1 is now triggered from button 2. (Not button 1 triggers sequence 2.) **In this way multiple sequences may be triggered in parallel, polyphonically by a single button.**

```
TRIGGER Channels 1-4
BNK ↓ 01  02  04  04
```

TRIGGER Channels
Set the sequence trigger MIDI channel number nn. Each bank sequence may be triggered by a note on a MIDI channel, or not triggered when set to "00".

In the above *TRIGGER Channels* example display, sequences 3 and 4 are triggered by any note event received on MIDI channel 4.

```
TRIGGER Notes     1-4
BNK   C#5 D#5 E5  F5
```

TRIGGER Notes
Set sequence to trigger from MIDI note number nnn.

When *TRIGGER Note* is set to "off", **any** MIDI note received on the corresponding trigger channel will trigger a sequence, transposed by the received note value. When *TRIGGER Note* is set to a note value, a sequence is triggered by that note only. The MIDI note plays the sequence without transposition. Velocity and other sequence parameters still track the trigger note's values.

```
MODx Track Modulate
BNK ↓  2    note
```

MODULATE Track Function
Select the function by which a track of sequences is to be modulated. This menu configures the modulation function, whose value is reflected in the *TRACK Modulation X* and *Y* views.

Track selects the sequence track number and *Modulate* selects the modulation function for that track. The modulation functions are as follows:

note	Diatonic sequence transposition
timeScale	Step duration fractional time shift
step time	Step duration incremental time shift
note dur	Note length duration
ctl mod	Controller modulation
slew rate	Step slew
cv 1,2,3,4	Direct output to MCV CV output ports 1, 2, 3 or 4
	(works best when directed to an MCV port configured as a controller)
ctl CCN, …+1	MIDI controller and controller CCN+1 change
patch	MIDI program change
volume	Track volume

Global MIDI

The following *ETH* program menus are global and therefore common to all Sets. The first of these menu pages is MIDI configuration, followed by the Ethernet connection for an OSC session.

```
MIDIin Chan Split1-2
ETH ↓   01   G4  C6
```
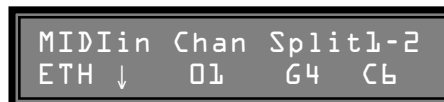
MIDI In Chan
Chan is the sequencer's global MIDI channel. This is the MIDI channel that receives special global use MIDI controller and program change messages. (See *MIDI Use* chapter, *Remote MIDI Control*)

MIDI In Zones
MIDI input on a single channel may be divided into two or three zones defined by two MIDI keyboard note splits. This gives more control over sequence trigger assignment when a single MIDI channel keyboard is used to trigger sequences.

MIDI input received on the selected *Chan*, may be re-channelled at two split points defined by note split points, *Split 1* and *2*. These split points re-channel three MIDI key ranges as follows:
keys up to *Split 1* remain the same; keys in-between both splits re-channel to *Chan* +1; keys above *Split 2* re-channel to *Chan* +2. *Split 2* also transposes notes that are above note B5, one octave lower. Splits may be selected by the corresponding encoders or by playing the key from your MIDI keyboard.

Therefore, in the above *MIDIin* example display, MIDI notes C1 to F#4 received on MIDI channel one is taken verbatim. Notes G4 to B6 are taken as if received on MIDI channel two. Notes C6 to C9 are taken as if received on MIDI channel three and transposed down one octave.

```
MIDIout Thru
ETH ↓ disable
```

MIDI Thru Assignment
MIDI IN controller messages and MIDI messages which are not used by the sequencer, may be passed through to MIDI OUT Ports 1, 2, or Ethernet OSC MIDI. Use this to direct MIDI in keyboard controller messages to the appropriate MIDI THRU output.

```
MIDI   SlewBaseChan
ETH ↓       17
```

MIDI Pitch Bend Slew
The Tetra MAPS sequencer has exponential or linear analog CV slew and MIDI slew. The *SlewBaseChan* determines whether portamento or pitch bend MIDI commands are used to generate MIDI slew. The sequencer step slew values output either, as determined by the MIDI slew base channel number offset. To enable MIDI portamento commands, set the pitch bend *SlewBaseChan* to a channel greater than the sequences' *MidChan*(s) you are using.

If your synthesizer does not respond to MIDI portamento commands, MIDI pitch bend may be used for pitch slew. To enable MIDI pitch bend slew, align the slew base channel space with the sequence's *MidChan*(s) you are using. The slew base channel maps MIDI pitch bend messages, to be used for pitch slew, to sequencer *MidChan* MIDI output channels. The MIDI slew base has 4 channel offsets. Therefore, when the slew base channel is 3, for example, sequences with *MidChan*s 3, 4, 5, or 6 will output MIDI pitch bend for slew. Your synthesizer should be set to maximum pitch bend sensitivity, usually +/- one octave.

MIDI pitch bend slew has limitations. Slew range is limited to the maximum pitch bend depth of your synthesizer. Pitch bend slew is restricted to 4 consecutive channels to limit MIDI congestion. MIDI pitch bend applies to all notes on one MIDI channel. Using pitch bend messages for slew does not allow the use of normal pitch-wheel bend on the slew-designated MIDI channels.

Ethernet Open Sound Control

IP Status The *Ethernet IP Status* menu displays the last known status of the OSC communications.

```
IP Host Address
ETH  192.168.001.001
```

IP Addresses
The *Host Address* (192.168.xxx.xxx) is the Internet address of the Tetra MAPS sequencer. The *Remote Peer Addr* is the Internet address of the remote device to which the connection is to be made. Note the remote address may be set to broadcast 255.255.255.255 but there is no guarantee that broadcast messages will pass though a network router.

```
PORTS Receive  Send
ETH    8001    8000
```

IP Ports
The Receive and Send Port numbers must be matched with the corresponding (UDP Internet protocol) port numbers of the remote device. Send and Receive Port numbers should not be the same. The Lemur app receives on port 8000. If Lemur objects require OSC targets, set *Send* to 8000.

User Programmable Open Sound Control Addresses
OSC sources and destinations are represented by symbolic text addresses. An OSC address must begin with a forward slash. Use encoder knobs 2 or 4 to position the cursor and then 6 or 8 to select the text character in the address.

The address function is disabled by an empty address. To do this, turn the encoder knob 6 or 8 fully counter-clockwise at the first character space to create a blank address.

Avoid using non-alphanumeric characters in an address since some characters may have an alternate use. Use these special characters as follows:

%   This is an address replaceable parameter for the track number. A "%" placed at the end of a transmit address is replaced with the track number 1 to 8. In a receive address a "%" suffix is taken as the track number. ("%" is a wild character; all characters, except those in place of a "%", are matched with the address function.)

?   This is an address replaceable parameter for the bank or set letter. A "?" placed at the end of an address is taken as a capital letter A to X. (The "?" is used internally by the sequencer.)

```
OSC Trigger Receive
ETH /aaaaaaaaaaaaa
```

The *OSC Trigger Receive* address functions as a virtual knob button press. Received OSC trigger address messages with a track number suffix, trigger sequences on the respective track. A "%" suffix at the end of the address is taken as the replaceable parameter for the track number (when a number is present) in the received address. Otherwise this address triggers track one sequences.

OSC Track ModX and *ModY Input* is the address assigned to track view modulations X and Y. *OSC Track Mod X Input* receives a track value for the *TRACK Modulation X* parameter on the respective track, addressed by a track number suffix. A "%" suffix at the end of the address is taken as the replaceable parameter for the track number (when a number is present) in the received address. Otherwise this address modulates track one sequences.

Track ModXY Inpt takes two float variables in one message, as output by an X/Y controller. Therefore an OSC virtual X/Y controller may be used to control both *Mod X* and *Y* track modulators simultaneously. The modulated function is selected in the Bank *MODx/y Track Modulate* menu.

OSC Sequencer Output is the address on which sequence-generated OSC MIDI messages are sent.

OSC Value Output is the address on which sequence generated note values are sent. A "%" placed at the end of the address appends the track number to the address.

OSC Text messages are received and transmitted on the respective text addresses. Receive messages are displayed in the sequencer *TRACK Text* view. The current Set:Bank:Seq is sent as a text message, as well as other miscellaneous messages.

```
Apply to Connection
ETH ↓ yes
```

Ethernet Apply Connection
Changes to the Ethernet settings do not take effect until the Ethernet connection is re-initialized. To do this, turn an encoder data knob to apply changed Ethernet parameters to the connection. Note that an active physical "Link" must first be established. Re-power the sequencer to do this if necessary.

MIDI to CV Converter

The Tetra MAPS sequencer has an internal MIDI to Control Voltage (MCV) converter that drives the four analog Control Voltage (CV) output ports. The MCV receives data from MIDI IN and internally, from triggered sequences. MCV parameters are global to all sequencer Sets. The following menu pages detail the MCV's configuration.

```
MIDI BaseChan Trans
MCV ↓  09     -12
```
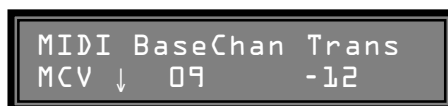
MIDI BaseChan
This MIDI channel is the base channel offset for the MIDI to CV converter. The MCV's MIDI receive channels may be mapped to any MIDI channel space from 1 to 16. The preset channel offset(s) in the selected *CVout* configuration are added to the *BaseChan* base channel number, yielding the actual MCV receive channel(s). This enables the MCV to receive sequences with the equivalent sequencer *MidChan(s)* or external MIDI IN messages on the same channel(s). See *CVout Configuration* and chapter *MIDI Use – MIDI Channels* for more on MIDI channel mapping.

MIDI IN to CV Conversion using BaseChan
The sequencer's MCV unit may be used as a stand-alone MIDI to CV converter, where MIDI input directly controls the CV and Gate outputs. To do this, set *BaseChan* to the MIDI input channel number you wish to use. Also, either turn off or, set the bank *TRIGGER Channels* to MIDI channels that do not conflict with the MIDI IN channels you wish to drive the MCV.

MIDI Trans
The MIDI to CV converter's note pitches are transposed by this parameter.

```
CVout    mono 1 vel 2
MCV ↓    mod 3 exp 4
```

CVout Configuration
This menu page configures the CV and Gate output port function according to the following table:

CV 1	CV 2	CV 3	CV 4
mono Note	Note Velocity	Modulation Controller	Expression Controller
mono Note	Note Velocity	mono Note, ch+1	Note Velocity, ch+1
dual Note	dual Note, ch+1	Modulation Controller	Expression Controller
duo Note 1	duo Note 2	Modulation Controller	Expression Controller
duo Note 1	duo Note 2	Note Velocity 1	Note Velocity 2
dual Note	dual Note, ch+1	duo Note 1	duo Note 2
triple Note	triple Note, ch+1	triple Note, ch+2	Modulation Controller
trio Note 1	trio Note 2	trio Note 3	Modulation Controller
trio Note 1	trio Note 2	trio Note 3	mono Note, ch+1

quad Note	quad Note, ch+1	quad Note, ch+2	quad Note, ch+3
quartet (poly) Note 1	quartet Note 2	quartet Note 3	quartet Note 4
quartet (over-) Note 1	quartet Note 2	quartet Note 3	quartet Note 4
Modulation Controller	Expression Controller	Breath Controller	Volume Controller
Expression Controller	Expression, ch+1	Expression, ch+2	Expression, ch+3
Volume Controller	Volume, ch+1	Volume, ch+2	Volume, ch+3
Modulation Controller	Expression Controller	Modulation, ch+1	Expression, ch+1

The default receive MIDI channel for the CV outputs is the *BaseChan* number. Outputs appended with "ch+" receive on the MIDI channel offset number added to the base *BaseChan* number. For example, the last configuration "Modulation Controller", receives modulation and expression controllers on MIDI channels *BaseChan* for CV 1, 2 and *BaseChan* +1 for CV 3 and 4.

When more than four notes are played in polyphony, the *quartet (polyphonic)* configuration replaces older CV notes according to the *MODE Trigger* and *Note* rules. *Quartet (over-flow)* sends extra MIDI notes to MIDI THRU.

```
CVscale 1    2     3
MCV ↓ V/Oc V/Oc V/Oc
```

CVscale
Sequencer CV outputs 1, 2 and 3 may be scaled to either Volts per Octave or Volts per Hertz.

Most analog synths have exponential oscillators that require a volts per octave control voltage. The hertz per volt scaling allows analog synths with linear oscillators to be driven by the sequencer's MCV. Vintage Korg and Yamaha synths typically require a hertz per volt control voltage.

```
MODE  Trigger Note
MCV ↓ retrig  last
```

MODE Trigger
MCV Mode parameters govern dynamic note allocation to the CV ports.

Retrigger (*retrig*) is a legato control applied to monophonic CV ports. (CV port mono/poly assignment is determined by the *CVout* configuration.)

When retrigger is on, the last note played on a monophonic channel, that replaces a note already playing, retriggers the gate output. When retrigger is off (*noretrig*), the last note played does not retrigger and the gate remains on.

When the CV port is configured for polyphonic note assignment, retrigger functions as "recycle." With no recycle (*noretrig*), the last note received is assigned to the next port available in sequential order. With recycle on (*retrig*), the last note is assigned to any port which is playing, or has already played the same note; otherwise note assignment follows "no recycle" rules. When all ports are used, the last note steals from the lowest priority one.

MODE Note
Note modes *low*, *high* and *last* determine note priority.

The lowest, highest, or last note played takes priority over other notes playing, according to the note mode. Therefore last note mode is a time priority and low and high note modes are position priority. Notes that are cancelled by a higher priority note are stored in a buffer up to 8 notes deep. When the higher priority note is released, the displaced note is re-played again, without a gate retrigger.

When the CV port is polyphonic and single note pitch-bend is on, MIDI pitch bend will only bend the highest priority note, as determined by the note mode. (See *PITCH BendMode*)

```
SLEW  Rate    Scale
MCV ↓  12     exp
```

SLEW Rate
This is the slew rate given to CV ports.

This slew rate is in effect for received MIDI IN messages. Instantaneous sequencer step slew rate values assigned to a CV note port, over-ride this slew rate value. A CV note port slew rate may also be changed by a MIDI IN portamento time controller message.

SLEW Scale
Slew response may be exponential or linear. In an exponential response, the pitch-glide **time** between any two notes is constant. In a linear response, the pitch-glide **rate** between any two notes is constant.

```
PITCH Bend   BendMode
MCV ↓  8     polybend
```

PITCH Bend
Pitch bend refers to pitch bend width. This sets the MIDI pitch bend depth in semi-tones, 1 to 12. The total pitch bend range encompasses positive and negative bend. For example: 12 = +/- one octave pitch bend maximum.

PITCH BendMode
Pitch bend mode applies to polyphonic CV ports.

polybend applies MIDI pitch bend normally, to all notes playing.

single pitch bend mode applies MIDI pitch bend only to the highest priority note playing. The note priority is determined by the *MODE Note low*, *high*, or *last*. Once pitch bend has returned to zero again, the note being bent is released from pitch bend control. **Thus, a single note within a chord may be pitch bent.**

```
CURVE Type
MCV ↓ HardShelf
```

CURVE Type
This selects the curve translation applied to CV velocity and controller outputs. One of 16 pre-defined curves may be selected. Note that the curves may be inverted and scaled by the *Invert* and *Scale* parameters. The following curves are illustrated in appendix C.

Linear, Switch
16 Step, 32 Step, 64 Step
SoftExp, MedExp, HardExp
SoftLog, MedLog, HardLog
Soft-Scrv, Hard-Scrv
SoftShelf, HardShelf, Cosine

```
CURVE Invert  Scale
MCV ↓ no        5volt
```

CURVE Invert
Curve Invert, inverts the selected translation curve as applied to CV velocity and controller outputs.
When curve invert is off, the curve output is normal (as viewed in appendix C) and when curve invert is
on, the curve output is inverted. Inversion is useful for inverting the logical output of a (MIDI) controller
value. This allows you to create "cross-fading" control voltages, for example.

CURVE Scale
CV velocity and controller full-scale output are in the range 0 to 5 volts. The curve output is scaled by half
when set to *2.5volt*; output is from 0 to 2.5 volts.

```
CVin Track Function
GBL ↓  8    volume
```

CVin Modulation
The CV IN port provides an analog input modulation source. This may be an external expression foot
pedal or a control voltage input. MIDI IN Foot controller messages (CCN 4) are also directed to this input.

Track is the *CVin* bank track number modulation destination. This directs the input to the corresponding
bank track. In the case of a MIDI Foot controller message, The MIDI channel is taken as the bank track
number (0 to 7).

The *Function* determines the sequence step parameter or other function to be modified by this input.
Refer to *Bank – MODULATE Track Function* for the list of options. MIDI IN Foot controller is also
assigned to modulate the selected *Function*.

```
CLOCK Source
GBL ↓ internal 96ppq
```

CLOCK Source
Clock source is the tempo source for the sequencer. There are four clock source options.

Select *internal* clock when using the sequencer by itself or as a master clock to sync other external
devices.

When the sequencer is running, it outputs MIDI clocks on MIDI OUT and analog clock pulses on the CLOCK OUT and DIN SYNC (MIDI OUT2) jacks. MIDI clocks are defined as 24 pulses per quarter-note (ppq). The analog CLOCK OUT rate is set in the *Output Rate* menu page.

Select *external* to slave the sequencer to an external clock source. *external 24ppq* and *external 4ppq* are the two rates at which external analog clock pulses are received from the CLOCK IN jack. *external midi* is MIDI clock received from MIDI IN at 24ppq. Note that lower ppqs have less time resolution, reducing note duration resolution.

```
CLOCK Output Rate
GBL ↓ 24ppq
```

CLOCK Output
The sequencer CLOCK OUT outputs a train of clock pulses at the rate of the sequencer's tempo. *1ppq*, *2ppq*, *4ppq* and *24ppq* (pulses per quarter-note) clock rates may be selected.

Global Data

Global Data refers to the management of sequencer data generated by the user. **Sequencer changes will be lost unless they are saved before turning the sequencer off.** To do this go to the *Save All* menu page and select *yes*.

```
DATA  Copy Seq A:s
GBL ↓ to B:s    yes
```

Copy Sequence
One sequence may be copied to another within the current Set. The top line *Copy Seq* is the source sequence in effect upon entering programming mode. Once the desired *Copy to* sequence is selected, the *yes* data encoder makes the sequence copy.

```
DATA  Copy Bank A
GBL ↓ to B       yes
```

Copy Bank
A sequence bank may be copied to another bank within the current Set. The top line *Copy Bank* is the source bank in effect upon entering programming mode. Once the desired *Copy to* bank is selected, the *yes* data encoder makes the bank copy.

All sequence bank data and sequence program parameters are copied. Note this action cannot be undone, except by restoring all sequence data using *Restore All* as per the last save. Copied banks and sequences are temporary until saved.

```
DATA  Send / Receive
GBL ↓ Set:A   All
```

Send / Receive

The Tetra MAPS sequencer uploads and downloads user data using (non real-time universal) system exclusive MIDI file dump messages. Turn data encoders 4 or 6 to send the current Set data as MIDI file dump messages on MIDI OUT1. Turn encoder 8 to send the entire sequencer data set. **Warning: Sending *All* is a very large and slow data transfer.**

MIDI file dump receive is enabled while in this menu page. The sequencer can receive a data pack in the same format as was sent. (See *MIDI File Dump*) The sequencer's current Set receives the Set data transmitted into the sequencer. **Note that Set data received into Set A may result in the loss of some global data parameters. However, the sequencer must be in Set A, to properly receive a full sequencer data set.** Received data is lost on power off unless it is saved.

```
DATA  Restore All
GBL ↓ yes
```

Restore
Restore All returns the sequencer's data to its previously saved values. Turn data encoder *yes* to restore sequencer data.

This may be used as an "undo" feature. See *Factory Data Reset* to restore the entire sequencer to its factory configured defaults.

```
DATA  Save All
GBL ↑ yes
```

Save
Save all of the sequencer's data. Global data and all Sets of banks and sequences are saved.

MIDI File Dump

The Tetra MAPS sequencer is able to exchange its data via non real-time universal system exclusive MIDI file dump messages.

A device or computer program that supports this standard is required to do this. Two Signal Arts sequencers can exchange their data with each other directly.

When sending data to the sequencer, your computer system exclusive MIDI utility should be set to delay 50ms between MIDI sysex packet transmissions.

To up-load user data into the sequencer, the sequencer must be in the program menu page *DATA Send / Receive*. Received data is lost on power off unless it is saved.

Factory Data Reset

The entire sequencer user data may be reset to factory defaults (factory reset) by holding **PROG** while the sequencer boots up at power on. This data reset is temporary until it is explicitly saved. Use *Save All* to do so.

APPENDIX

A   OS Upgrade Procedure

The Signal Arts sequencer Operating System (OS) is user upgradeable by MIDI file dump. All that is required is the OS file, a device or computer with a MIDI port and a program that supports the MIDI sysex file dump standard.

WARNING This procedure MAY over-write sequencer user data. Please refer to the OS revision documentation included with the OS file for details.

1. Turn the sequencer off. Connect the sequencer's MIDI IN to a computer MIDI output port using a MIDI cable.

2. To enable the sequencer to receive a new Operating System do the following: On power up, press and hold the **STOP** and **TRACK** (**MODE2**) buttons while the "Signal Arts Sequencer" banner is displayed. Quickly release the buttons as soon as the banner stops scrolling and **one** period is displayed. The sequencer displays "Signal Arts Run Level 01" to indicate OS receive mode.

3. An upgrade is done using a computer sequencer or MIDI utility that supports (non-real-time) system exclusive MIDI file dumps. A program such as "MIDIOX" will do this. Under the MIDIOX "sysex" menu, load and send the operating system (standard sysex *.syx) file to the Signal Arts sequencer. The sequencer displays "Load Code ...*" upon the initial reception of a file. A rotating star indicates file transfer in process.

If there is a problem with the upload, it may be due to MIDI timing. The time delay between the MIDI packets may need to be increased on the computer application. There needs to be at least 50ms delay between MIDI packets. Look for a configuration menu where the transmit packet buffer timing can be increased.

4. "Run Load Code…Ok" is displayed upon a successful file transfer. When prompted, "Press STEP to write" by the display, press the **STEP** (**MODE1)** button. Wait about 30 seconds for the OS to program. The sequencer will reboot itself upon completion. Confirm the correct (new) revision number displayed in the start-up display. Please contact the manufacturer if error codes are reported and you are experiencing difficulties with an upgrade.

5. At this time new sequencer factory preset data may have been loaded, depending on the revision of the OS. If this is true then this new data should be saved. Saving all data is done in the programming menu page *DATA Save All*. (See *Programming – DATA*) In this menu page, turn a data encoder until "saving.." is displayed.

B   Scales

Number		Type			
Octave	C C C...				
1	C D E F G A B	Major			
2	C D Eb F G A B	Melodic Minor			
3	C Db Eb F G A B	Neopolitan Major			
4	C Db E F G A B	Rag Arnand Bhairav			
5	C Eb E F G A B				
6	C Db D F G A B				
7	C D Eb F# G A B	Lydian Diminished (Rag Madhuvanti)			
8	C D E F# G A B	Lydian Mode			
9	C D E F G A Bb	Mixolydian Mode			
10	C D Eb F G A Bb	Dorian Mode			
11	C Db Eb F G A Bb				
12	C Db E F G A Bb	Rag Ahir Bhairav			
13	C Eb E F G A Bb	Bebop Minor (Hungarian Blues)			
14	C Db D F G A Bb				
15	C D Eb F# G A Bb	Blues (Rag Madhukant)			
16	C D E F# G A Bb	Overtone			
17	C D E F G Ab Bb	Melodic Major Descending			
18	C D Eb F G Ab Bb	Aeolian Mode			
19	C Db Eb F G Ab Bb	Phrygian Mode			
20	C Db E F G Ab Bb	Rag Basant			
21	C Eb E F G Ab Bb				
22	C Db D F G Ab Bb				
23	C D Eb F# G Ab Bb				
24	C D E F# G Ab Bb	Lydian Minor			
25	C D E F G Ab B	Harmonic Major			
26	C D Eb F G Ab B	Harmonic Minor			
27	C Db Eb F G Ab B	Neopolitan Minor			
28	C Db E F G Ab B	Double Harmonic (Gypsy) Minor			
29	C Eb E F G Ab B	Major Augmented			
30	C Db D F G Ab B	Bhairav That			
31	C D Eb F# G Ab B	Hungarian Minor			
32	C D E F# G Ab B				
33	C D E F G Bb B	Bebop Dominant			
34	C D Eb F G Bb B				
35	C Db Eb F G Bb B				
36	C Db E F G Bb B				
37	C Eb E F G Bb B				
38	C Db D F G Bb B				
39	C D Eb F# G Bb B	Saranga	**Chord Scales**		
40	C D E F# G Bb B				
41	C D E F G Ab A	Bebop Major	51	Major	
42	C D Eb F G Ab A		52	minor	
43	C Db Eb F G Ab A		53	dom7	
44	C Db E F G Ab A		54	minor7	
45	C Eb E F G Ab A		55	o - diminished	
46	C Db D F G Ab A		56	o7 - half-diminished	
47	C D Eb F# G Ab A		57	x - augmented	
48	C D E F# G Ab A		58	b9	
49	C D Eb F Gb Ab A B	Diminished	59	minor b9	
50	C D E F# G# A#	Whole Tone			

C   Curves

LINEAR   SWITCH   16 STEP   32 STEP

64 STEP   SOFT EXP   MEDIUM EXP   HARD EXP

SOFT LOG   MEDIUM LOG   HARD LOG   SOFT S-CURVE

HARD S-CURVE   SOFT SHELF   HARD SHELF   COSINE

D   MIDI Implementation Chart

Function		Transmitted	Recognized	Remarks
Basic Default		1-16	1-16	transmits 32 channels
Channel	Changed	1-16	1-16	on two ports
Mode	Default		Mode 3 or 4	programmable
	Messages	No	No	
Note		0-127	0-127	
Number	Sound Range		12-115	
Velocity	Note On	Yes 9n, V = 1-127	Yes 9n, V = 1-127	
	Note Off	Yes 9n, V = 1-127	No	
After	Keys	No	No	
Touch	Channels	Yes	Yes	*1
Pitch Bend		Yes	Yes	
Control Change		Yes	Yes	0-99
Bank		Yes	Yes	
Select	Actual Number		LSB 0-23	Bank Letters A-X *1
Program		Yes	Yes	
Change	Actual Number		0-7	Seq Number 1-8 *1
All Sounds Off		No	No	
All Notes Off		Yes	Yes	
Reset All Controllers		Yes	Yes	
System Exclusive		Yes	Yes	Non-real-time file dump
System	: Song Pos.	No	No	
Common	: Song Sel.	No	No	
	: Tune	Yes	Yes	2V on all note outputs
System	: Clock	Yes	Yes	transmits MIDI OUT 1&2
Real Time	: Commands	Yes	Yes	
Aux	: Local On/Off	No	No	
Messages	: All Notes Off	Yes 121, 123-127	Yes 121, 123-127	
	: Active Sense	No	No	
	: Reset	No	No	

Notes   *1 Transmits to MIDI THRU

Mode 1 : OMNI ON, POLY   Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY   Mode 4 : OMNI OFF, MONO

E   OSC Implementation

See "TetraMAPSWifi.pdf" document for full implementation

User-Programmable ....Address /NumericSuffix, FormatTag (range)
Receive Message Formats
Single MIDI message packet ..../TriggerAddress, MIDI
Bank Sequence Trigger n ..../TriggerAddress/n, boolean int or float
Bank Track Modulation X track n........................./ModXAddress/n, int or float (0..1)
Bank Track Modulation Y track n........................./ModYAddress/n, int or float (0..1)
Bank Track Modulation XY track n ..../ModXYAddress/n, float, float (0..1)
Text Receive   ..../TextAddress, string
Example Addresses.."/trig%", "/fader/modx/%"

Transmit Message Formats
Sequence single MIDI message packet ..../SequencerAddress, MIDI
Sequence Step n note value ..../ValueAddress/n, float 0..1
Text Send ..../TextAddress, string
Example Addresses.."/fader/step/%", "/lbl/mssg"

F   Specifications

Inputs and Outputs
Control Voltage ....4 CV outs, 4 Gate outs, 1 CV in
MIDI ....in, out 1, out 2 or through
LAN...OSC Ethernet (RJ45)
Analog Drum DIN Sync 24.................................clock and trigger out (MIDI OUT2 DIN plug)
Analog Clock Sync...in (TRS ring) and out (TRS tip)
External Foot Pedal ....input (TRS tip doubles for CV in)

Power Connections
Power..9VDC @ 300mA, center pin pos've (adapter as supplied)
Power Consumption ....5 Watts
"Modcan"...pins 1,2,3 = +15VDC, n/c, GND
"Doepfer"...pins 1,2 = +12VDC
                                                                              pins 3,4,5,6,7,8 = GND; pins 9,10 n/c
Voltage Ranges
Controller Output Voltage ....0 .. +2.5V / +5V
Linear Note Output Voltage ....0 .. +5.3V
Exponential Note Output Voltage ....0.125 .. +4V
Pitch Bend Max Range ....± 1V
Gate Output Voltage...0 .. +5V
Control Voltage Input...0 .. +5V

Dimensions
Graphic Display ....2 X 20 character, lit LCD
Euro-rack Dimensions ....8.5 X 5.25 X 3 inches

G   Manufacturer Support

Signal Arts Technologies ....
Email..info@signalarts.ca
Web ....signalarts.ca

H   Signal Arts Technologies Limited Warranty

The Signal Arts Sequencer is warrantied against functionally defective material or workmanship for a period of one year from date of purchase. This warranty applies to the original purchaser. In the event of product failure, and to conform to this written warranty, please take the following action:

1. Please be certain that the product hardware is actually defective. Contact the product dealer or manufacturer if there are any questions, to avoid unnecessary inconvenience.

2. If the product dealer is not able to resolve the problem return the product to Signal Arts. If the product has been installed as a circuit or module into an existing product, return the product to the dealer or manufacturer who made the installation.

3. Carefully package the product with its power adapter. Do not pack any other items. Clearly indicate that the item is being shipped for repair purposes on customs declarations, "Canadian made goods return for repair." Mark the declared value as 0 dollars and the insured value as the purchase price. Return it freight prepaid, along with:
   - a.)   A copy of your dated proof of purchase. (Please keep a copy for yourself.)
   - b.)   A written statement about the nature of the problem.
   - c.)   Your name, address, phone number and email.
       Send it to:
           Signal Arts
           Toronto, ON Canada

It is recommended that the package be insured against loss or damage in transit, for which Signal Arts cannot be responsible.

You may register your purchase warranty on-line or by emailing the sequencer serial number to Signal Arts Technologies. The model / serial number is on the rear of the sequencer front panel.

EXCLUSIONS
Signal Arts Technologies' liability for the incidental and consequential damages, as well as any liability from the breach of any implied warranty arising by operation of law is expressly excluded.

Un-authorized use of any power supply causing damage, other than the power adapter provided or recommended by Signal Arts for this product voids this warranty.

Damage to the product resulting from tampering, accident, abuse, negligence, unauthorized repairs or alterations, unapproved attachments or other causes unrelated to problems with material or workmanship are not covered by this warranty. Physical damage or imperfection to the surface of the product, including cracks, paint blemishes or scratches on the outside casing or LCD bezel and lens. Damage caused by accident, fire, power changes, other hazards, or acts of God.

Signal Arts Technologies warrants to the customer that the sequencer software will perform in substantial conformance to the program specification. Signal Arts Technologies makes no warranty or representation that the operation of the software will be uninterrupted or error free, or that all defects in the software will be corrected.

This warranty becomes void if any serial numbers are defaced or removed. Signal Arts Technologies makes no other warranty of any kind whatever, expressed or implied.