

TENDERFOOT ELECTRONICS

QQ2 - QUAD QUANTIZER MANUAL

REV1 - 2023/9/6

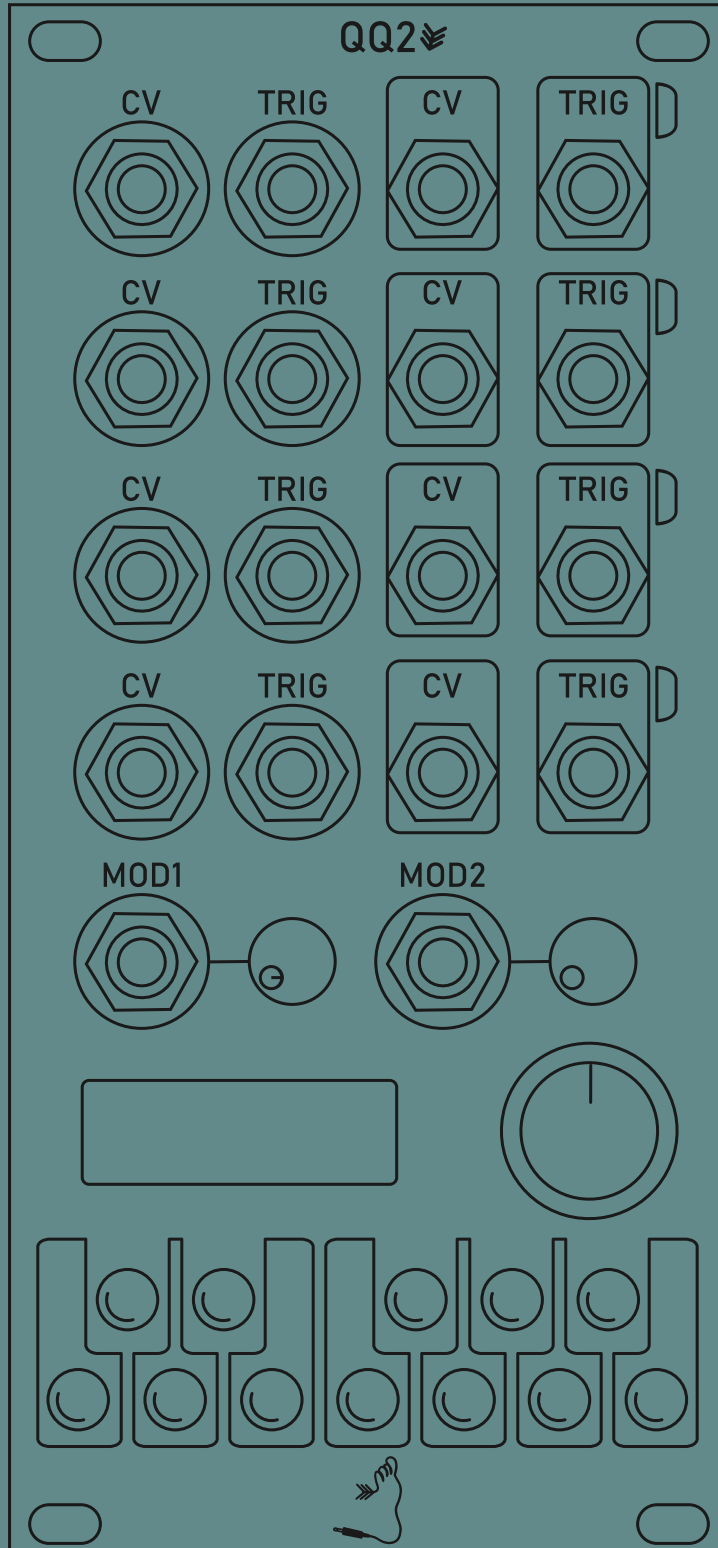


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INTRODUCTION

QQ2 is a 4-channel CV quantizer for processing variable voltages between -3V and +7V and outputting 1V/oct CV set to an assigned scale.

SPECIFICATIONS:

HP = 12

Depth = 33mm

CURRENT DRAW:

+12V = 143mA

+5V = 0mA

-12V = 25mA

REQUIREMENTS

In order to use the QQ2, ensure the case you are installing it into uses a eurorack specification power supply and has enough available current to supply the module.

When connecting the power cable, align the red stripe of the cable with the indicated -12V marker on the back of the module.

PANEL LAYOUT

CV INPUTS

EACH CHANNEL IS ARRANGED FROM LEFT TO RIGHT ACROSS THE PANEL OF THE QQ2.

THE FIRST JACK IS THE CV INPUT, WHICH CAN ACCEPT ANY VOLTAGE BETWEEN -3V and +7V TO BE QUANTIZED. VOLTAGES OUTSIDE OF THIS RANGE WILL NOT CAUSE DAMAGE, THEY JUST WON'T BE PROCESSED.

TRIGGER INPUTS

WHEN NO CABLE IS INSERTED INTO THE TRIGGER INPUT, THE CHANNEL WILL CONTINUALLY QUANTIZE THE CV INPUT IF IN QUANTIZER MODE. WHEN A CABLE IS INSERTED INTO THE TRIGGER INPUT, THIS WILL IMMEDIATELY CEASE, AND THE CV INPUT WILL ONLY BE READ WHEN A TRIGGER SIGNAL IS PRESENT AT THE INPUT.

A HIGH GATE SIGNAL WILL BE RECOGNIZED AS A SINGLE TRIGGER, UNTIL IT IS OVER 5 SECONDS IN LENGTH, AT WHICH POINT THE CHANNEL WILL BEGIN TO CONTINUALLY QUANTIZE THE CV INPUT AGAIN. THIS IS DUE TO NORMALLING OF A LOGIC HIGH SIGNAL TO THE SWITCH OF THE TRIGGER IN JACKS IN ORDER TO QUICKLY TEST THE PRESENCE OF A PATCH CABLE.

OLED SCREEN

THE QQ2 USES A 128x32 OLED SCREEN TO ALLOW QUICK AND EASY EDITING OF THE QUANTIZER AND MOD CHANNELS, AS WELL AS DEEPER LEVEL SETTINGS SUCH AS CALIBRATION AND FIRMWARE UPDATING OVER WIFI.



ILLUMINATED SCALE BUTTONS

IN ADDITION TO BUILT-IN SCALES THAT ARE SELECTABLE VIA THE OLED, NOTES CAN BE QUICKLY SELECTED, EDITED AND DISPLAYED VIA THE ILLUMINATED TACTILE SWITCHES.

CV OUTPUTS

THE QUANTIZED OUTPUT EMERGES AT THE CV OUTPUT OF EACH CHANNEL. THE RANGE OF VOLTAGES IS -3V TO +7V. THIS GIVES THE OUTPUT A RESOLUTION OF AROUND 0.0025V

TRIGGER OUTPUTS

WHENEVER A NEW VOLTAGE IS OUTPUT AT THE CV OUTPUT, OR WHENEVER A TRIGGER IS DETECTED AT THE TRIGGER INPUT, THE TRIGGER OUTPUT OF THE QUANTIZER CHANNEL WILL OUTPUT A 7.5V TRIGGER SIGNAL WITH A DURATION OF 8ms.

THIS CAN BE USED TO TRIGGER AN ENVELOPE GENERATOR OR ANY OTHER EVENT IN YOUR MODULAR SYSTEM.

MOD INPUTS

THE QQ2 HAS 2 MODULATION INPUTS TO MODULATE CERTAIN ASSIGNABLE PARAMETERS OF THE QUANTIZER. THE JACKS ARE NORMALLED TO A VOLTAGE REFERENCE, ALLOWING THE ASSOCIATED ATTENUATOR DIALS TO BE USED TO ADJUST THE ASSIGNED PARAMETERS. WHEN A CABLE IS PATCHED IN, THE DIAL WILL ATTENUATE THE SIGNAL. THE CV INPUT LIMITS OF MOD1 AND MOD2 ARE -5V/+5V, VALUES OUTSIDE OF THIS WILL NOT BE READ, BUT WILL NOT CAUSE DAMAGE.

ENCODER

THE ROTARY ENCODER IS USED TO NAVIGATE THE USER INTERFACE ON THE OLED SCREEN. THE DIAL CAN BE PRESSED INWARD AS THE ENTER/ACCEPT BUTTON.

USER INTERFACE - TURN ENCODER

MAIN SCREEN

CHANNEL ASSIGNMENT

THE QQ2 ALLOWS FOR UP TO 4 SCALES ('ABCD') TO BE EDITED AT ONCE, WITH THE 4 SEPARATE QUANTIZER CHANNELS BEING ASSIGNABLE TO ANY ONE OF THE CURRENTLY AVAILABLE SCALES.

THE ARROW INDICATORS SHOW WHICH OF THE NUMBERED QUANTIZER CHANNELS ARE CURRENTLY ASSIGNED TO THE SELECTED SCALE. IN THIS EXAMPLE, ALL 4 QUANTIZER CHANNELS ARE ASSIGNED TO AND THEREFORE SHARE SCALE 'A'

SCALE NAME

DISPLAYS THE NAME OF THE IN-BUILT SCALE CURRENTLY BEING HIGHLIGHTED AND EDITED

CURRENT KEY

DISPLAYS THE KEY OF THE IN-BUILT SCALE CURRENTLY BEING HIGHLIGHTED AND EDITED



CURRENT SCALE

DISPLAYS WHICH OF THE SCALE SLOTS IS CURRENTLY HIGHLIGHTED AND BEING EDITED. TURNING THE ENCODER WILL SWITCH BETWEEN THESE SLOTS LABELED 'A', 'B', 'C', 'D'. IN THIS EXAMPLE 'A' IS SELECTED.

PRESSING DOWN THE ENCODER BUTTON AT THIS POINT WILL ALLOW THE EDITING OF THE KEY, SCALE PRESET AND CHANNEL ASSIGNMENT OF SCALE 'A'.

AVAILABLE PRE-PROGRAMMED SCALES (ver 1.04) - SHOWN IN KEY C

- | | |
|--------------------------|----------------------|
| 1 - BLANK | 26 - HAWAIIAN |
| 2 - CHROMATIC | 27 - HINDU |
| 3 - MAJOR | 28 - HIRJOSHI |
| 4 - NATURAL MINOR | 29 - HUNGARIAN MINOR |
| 5 - HARMONIC MINOR | 30 - IBERIAN |
| 6 - MELODIC MINOR | 31 - IWATO |
| 7 - MAJOR PENTATONIC | 32 - JAPANESE |
| 8 - MINOR PENTATONIC | 33 - LYDIAN b7 |
| 9 - DORIAN | 34 - MAGAM |
| 10 - PHRYGIAN | 35 - NEAPOLITAN |
| 11 - LYDIAN | 36 - OCTATONIC |
| 12 - MIXOLYDIAN | 37 - OKINAWAN |
| 13 - LOCRIAN | 38 - ORIENTAL |
| 14 - ALGERIAN | 39 - PROMETHEUS |
| 15 - ARABIAN | 40 - ROMANIAN MINOR |
| 16 - AUGMENTED | 41 - SPANISH GYPSY |
| 17 - BALINESE | 42 - SUPER LOCRIAN |
| 18 - BYZANTINE | 43 - WHOLETONE |
| 19 - CHINESE | 44 - YO |
| 20 - DIMINISHED | |
| 21 - DOMINANT DIMINISHED | |
| 22 - EGYPTIAN | |
| 23 - EIGHT TONE SPANISH | |
| 24 - ENIGMATIC | |
| 25 - GEEZ | |

HOLD ENCODER BUTTON 3/4 SECOND

MOD SCREEN

MOD 1 CHANNEL ASSIGNMENT
IN THE SAME WAY THAT EACH QUANTIZER CHANNEL CAN BE LINKED TO THE 4 SEPARATE SCALES, EACH MOD CONTROL CAN BE ASSIGNED TO ANY OF THE 4 QUANTIZER CHANNELS.

ASSIGNED MOD PARAMETER
DISPLAYS THE NAME OF THE PARAMETER THAT THE SELECTED MOD CHANNEL CONTROLS.

MOD 2 CHANNEL ASSIGNMENT

MOD PARAMETERS
AS OF FIRMWARE VER. 1.04, THE AVAILABLE MOD PARAMETERS ARE:

Transp PRE - TRANSPOSES THE INCOMING CV BEFORE BEING QUANTIZED, ALLOWING FOR INVERSIONS OF THE CURRENT SCALE

Transp POST - TRANSPOSES THE OUTPUT OF THE ASSIGNED QUANTIZER CHANNEL BY SEMITONE INCREMENTS AFTER QUANTIZATION, ALLOWING FOR KEY CHANGES

OCTAVE - SHIFTS THE OUTPUT OF THE SELECTED QUANTIZER CHANNELS UP OR DOWN ONE OCTAVE AT A TIME

SCALE ASSIGNMENT - ALLOWS THE USE OF CV OR THE MOD DIALS TO SWITCH BETWEEN THE 4 SCALES ('ABCD'). AT 0V CV AND UNDER, THE ASSIGNED CHANNELS WILL FOLLOW SCALE 'A'.

SELECTED MOD CHANNEL
DISPLAYS WHICH OF THE MOD CHANNELS IS CURRENTLY SELECTED FOR EDITING. IN THIS CASE, MOD 1 IS HIGHLIGHTED.



HOLD ENCODER BUTTON 1.5 SECONDS

CHANNEL SETTINGS

CHANNEL SETTINGS

TURN ENCODER AND PRESS IN THE ENCODER BUTTON TO SELECT WHICH CHANNEL TO EDIT



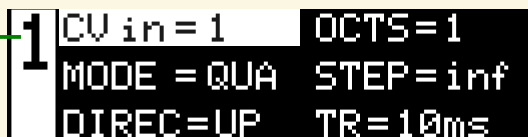
THIS MENU GIVES YOU MORE IN-DEPTH CONTROL OF CERTAIN ASPECTS OF EACH INDIVIDUAL CHANNEL ON THE MODULE

PRESS ENCODER ON CHANNEL

CHANNEL INDICATOR

SHOWS WHICH CHANNEL YOU ARE EDITING

CHANNEL SETTINGS



MENU OPTIONS

CV in = THIS ALLOWS YOU TO CHOOSE WHICH CV INPUT JACK THE QUANTIZER CHANNEL IS FOLLOWING. BY DEFAULT, EACH CHANNEL FOLLOWS IT'S OWN CV INPUT JACK, IE. CH1 = CV1; CH2 = CV2; CH3 = CV3; CH4 = CV4. THIS MAKES IT POSSIBLE FOR ALL 4 QUANTIZER CHANNELS TO FOLLOW A SINGLE INPUT JACK.

MODE = THIS IS FOR SELECTING BETWEEN THE STANDARD QUANTIZATION MODE AND THE ARPEGGIATOR MODE.

- QUANTIZER > THIS IS THE STANDARD MODE FOR EACH CHANNEL FROM THE FACTORY. CV SENT INTO THE CV INPUT WILL BE MEASURED, PROCESSED AND A QUANTIZED VERSION WILL BE SENT TO THE OUTPUT OF THE CHANNEL.
- ARPEGGIATOR > IN THE ARPEGGIATOR MODE, SENDING A TRIGGER TO THE TRIGGER INPUT OF THE CHANNEL WILL PROGRESS THE ARPEGGIATOR TO THE NEXT STEP. IT IS NOT NECESSARY TO PATCH ANYTHING TO THE CV INPUT JACK.

DIREC = SETS THE DIRECTION OF PLAY WHEN IN THE ARPEGGIATOR MODE.
AVAILABLE CHOICES ARE:

- UP > THE ARPEGGIO STARTS AT THE BOTTOM, AND INCREMENTS UPWARD THROUGH THE SELECTED SCALE UNTIL THE HIGHEST NOTE IS REACHED. AT WHICH POINT THE SEQUENCE IS RESET TO THE LOWEST NOTE.
- DOWN > THE ARPEGGIO STARTS AT THE TOP, AND PROGRESSES DOWNWARD THROUGH THE SELECTED SCALE UNTIL THE LOWEST NOTE IS REACHED. AT WHICH POINT THE SEQUENCE IS RESET TO THE HIGHEST NOTE.
- UP / DOWN > THE ARPEGGIO STARTS AT THE BOTTOM, INCREMENTS UPWARD, AND UPON REACHING THE UPPER LIMIT, REVERSES DIRECTION BACK DOWN THROUGH THE SCALE. THE NOTES AT BOTH LIMITS OF THE SCALE ARE REPEATED UPON DIRECTION REVERSAL.
- PING PONG > THE SAME AS UP/DOWN BUT WITHOUT THE REPETITION OF THE FIRST AND FINAL NOTES OF THE SEQUENCE UPON DIRECTION REVERSAL..
- RANDOM > UPON EVERY TRIGGER, A RANDOM NOTE WITHIN THE SCALE AND OTHER PARAMETERS SET WILL BE CHOSEN.

OCTS = SETS HOW MANY OCTAVES THE ARPEGGIATOR WILL RUN ACROSS. THE RANGE IS FROM 1 TO 5.

STEP = SETS THE NUMBER OF STEPS IN THE ARPEGGIATION SEQUENCE BEFORE IT IS RESET TO THE BASE NOTE. THIS OPTION OUTRANKS THE NUMBER OF OCTAVES SELECTED, IE. IN A SCALE OF 7 NOTES AND 2 OCTAVES, IF THE NUMBER OF STEPS IS SET TO 7 OR BELOW, THE SECOND OCTAVE WILL NOT BE REACHED.

TR = SETS THE LENGTH OF THE TRIGGER OUTPUT OF THE CHANNEL. THE SELECTABLE RANGE IS FROM 10ms TO 1 SECOND. WHEN A NEW TRIGGER OCCURS, THE TRIGGER OUTPUT WILL BECOME LOW VERY BRIEFLY, REGARDLESS OF THE TRIGGER LENGTH, ALLOWING MOST OTHER MODULES TO STILL REGISTER THE EVENT.

HOLD ENCODER BUTTON 3 SECONDS

SETTINGS

CALIBRATE

ENTERING THIS MENU ALLOWS THE CALIBRATION OF THE CV INPUT AND OUTPUTS OF EACH CHANNEL, AS WELL AS THE CV INPUTS OF THE MOD CHANNELS



UPDATE

THIS MENU ALLOWS FOR THE SCANNING OF AND CONNECTING TO WIFI NETWORKS FOR THE PURPOSES OF UPDATING THE MODULE'S FIRMWARE.

PRESS ENCODER ON CALIBRATE

CALIBRATION 1

CHANNEL SELECTER

SELECT WHICH CHANNEL OR MOD INPUT YOU WISH TO CALIBRATE



IN / OUT HIGHLIGHTER

USED TO SELECT WHETHER YOU WISH TO CALIBRATE THE CHANNEL INPUT OR OUTPUT.

CALIBRATION 2

REFERENCE INDICATOR

INDICATES WHAT VALUE YOU EITHER NEED TO INPUT TO THE CHANNEL WHEN CALIBRATING AN INPUT, OR ADJUST THE OUTPUT READING TO WHEN CALIBRATING AN OUTPUT



CHANNEL AND IN/OUT INDICATOR

REMINDS YOU WHICH CHANNEL YOU ARE EDITING AND WHETHER IT'S AN INPUT OR OUTPUT

RAW ADC/DAC READING

SHOWS YOU THE LIVE BIT READING OF THE INTERNAL ANALOG TO DIGITAL CONVERTER WHEN CALIBRATING AN INPUT, AND THE DIGITAL TO ANALOG CONVERTER WHEN CALIBRATING AN OUTPUT

PRESS ENCODER ON UPDATE

UPDATE

WIFI SCAN

ENTERING THIS MENU WILL SCAN FOR LOCAL WIFI NETWORKS AND ALLOW YOU TO ENTER YOUR WIFI PASSWORD ALLOWING FOR WIRELESS FIRMWARE UPDATING. THIS WILL RESTART THE MODULE ONCE COMPLETE.



UPDATE NOW

THIS WILL CONNECT TO THE SELECTED WIFI NETWORK USING THE CREDENTIALS ENTERED IN THE "WIFI SCAN" MENU. YOU WILL THEN BE PROMPTED VIA THE OLED SCREEN ON HOW TO COMPLETE THE WIRELESS FIRMWARE UPDATE PROCESS

NOTES FOR CALIBRATION:

MODULES ARE CALIBRATED AT THE FACTORY AND SHOULD NOT NEED TO BE RECALIBRATED. IF YOU DO NEED TO RECALIBRATE, HOWEVER, YOU WILL NEED ACCESS TO A VOLTMETER WITH AT LEAST 4 DIGITS.

NOTES WHEN UPDATING:

DURING THE WIFI UPDATE PROCESS, YOU WILL NEED ACCESS TO A COMPUTER TO TRANSFER THE FIRMWARE FILE TO THE QQ2.

WHILE THE WI-FI IS ACTIVE, THE MODULE CAN DRAW AN ADDITIONAL 100mA OF CURRENT, SO MAKE SURE YOUR MODULAR POWER SUPPLY CAN HANDLE THE EXTRA LOAD.