
 EMAX MIDI and RS-422 specs
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 Valid for EMAX Software Rev. 3.0
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QUICK REFERENCE EMAX MIDI IMPLEMENTATION CHART:

X = item implemented
 - = item not implemented

| MIDI command | Transmitted? | Received? | Comments |
|-----------------------|--------------|-----------|----------------------------------|
| Note off | X | X | keys# 21 thru 108 (A-1 thru C7) |
| Note on | X | X | keys# 21 thru 108 (A-1 thru C7) |
| Poly key pressure | - | - | |
| Control Change | X | X | controllers# 0 thru 31 |
| Program Change | X | X | program# (preset#) 0 thru 99 |
| Channel Pressure | X | X | |
| Pitch Wheel | X | X | |
| Sustain footswitch | X | X | controller# 64 |
| Local control on/off | - | X | |
| All notes off | - | X | |
| Omni mode off/on | - | - | ignores mode, turn all notes off |
| Mono mode | - | - | ignores mode, turn all notes off |
| Poly mode | - | - | ignores mode, turn all notes off |
| Song position pointer | - | - | |
| Song select | X | X | |
| Tune request | - | - | |
| Timing clock | X | X | |
| Start sequence | X | X | |
| Continue sequence | - | - | |
| Stop sequence | X | X | |
| Active sensing | - | - | |
| System reset | - | - | |
| System exclusives | X | X | refer to documentation |

f7 EOX

=>A voice number of 127 (7f) denotes an empty voice.

=>While these voice numbers do not match the voice numbers the EMAX displays on the LCD when selecting voices, there is a one-to-one correspondence between the two sets of numbers.

=>EMAX will only do this upon receiving a request (exclusive #05).

```

.....
Send Secondary Voice Map      f0      system exclusive
                              18      E-mu id
                              02      EMAX id
                              36      exclusive #36
                              ss      secondary voice# for key# (00)
                              ss      secondary voice# for key# (01)
                              ..      secondary voice# keys# (02-86)
                              ss      secondary voice# for key# (87)
                              f7      EOX

```

=>A voice number of 127 (7f) denotes an empty voice.

=>While these voice numbers do not match the voice numbers the EMAX displays on the LCD when selecting voices, there is a one-to-one correspondence between the two sets of numbers.

=>EMAX will only do this upon receiving a request (exclusive #06).

```

.....
Send One Sample Fast         f0      system exclusive
                              18      E-mu id
                              02      EMAX id
                              37      exclusive #37
                              kk      key # (0 to 87)
                              0L      level (0=primary, 1=secondary)
                              LL      length (bits 0-6)
                              LL      length (bits 7-13)
                              LL      length (bits 14-18)
                              f7      EOX

```

=>EMAX then switches internally to 500 kbaud.

=>EMAX waits for receive to send ACK (see MMA exclusives) at 500khz:

=>if no ACK comes within the timeout period, (programmable by using exclusive #21) EMAX displays error and aborts.

=>EMAX starts high speed transfer by sending MMA-type data packet at 500 kbaud:

=>Sound data in the data packet is sent as 12 bit SIGNED linear data.

=>Data packet (see MMA Data Packet) contains 120 bytes packed like this:

```

byte 0: bbaaaaaa           aaaaaa = 6 ls bits of data word 0
byte 1: ccccbbbb           bbbbbb = 6 ms bits of data word 0
byte 2: ddddddcc           cccccc = 6 ls bits of data word 1
                              ddddd = 6 ms bits of data word 1
byte 3: ffeeeeeee          eeeeee = 6 ls bits of data word 2
                              --etc--
byte 119: zzzzzzyy         zzzzzz = 6 ms bits of data word 79

```

=>Note that bit 7 is used in these packets, unlike standard MMA format.

=>EMAX then waits for an ACK, as per MMA protocol:

=>if no response comes within a few seconds, EMAX sends CANCEL, aborts.

=>if NAK or transmission error, EMAX retransmits packet. EMAX will try re-sending 5 times before giving up and sending CANCEL.

=>if CANCEL, EMAX displays "Cancelled by Receiver" and aborts.

=>if WAIT, EMAX resets its timeout counter (a few seconds). If receiver needs more time, it must keep sending WAITs.

=>if ACK, EMAX increments packet number and transmits next packet.

=>Maximum packet number is 127, as per MMA protocol. Packet numbers wraparound and continue from 0 after that.

=>Receiver must handshake the last packet (respond with ACK).

=>After completion of transfer, EMAX automatically switches back to 31.25 kbaud.

=>The "length" in the header refers to # of 12-bit data words, (80 per

7e
0c midi base channel (0 to 15)
7d
pp packet number
f7 EOX

.....
Wait (WAIT)

f0 system exclusive
7e
0c midi base channel (0 to 15)
7c
pp packet number
f7 EOX

.....

00

=>EMAX ignores the midi mode change, but it does execute "all notes off".

=>Ignored by EMAX if the front panel midi option "Notes,Wheels" is set to "no".

.....
Poly Mode (all notes off) bn n = MIDI channel no. (0 to 15)

7f (127)

00

=>EMAX ignores the midi mode change, but it does execute "all notes off".

=>Ignored by EMAX if the front panel midi option "Notes,Wheels" is set to "no".

.....
Preset Change cn n = MIDI channel no. (0 to 15)

pp pp = preset number (0 to 99)

=>Always received. "Preset Change On/Off" from the front panel has no effect.

.....
Channel Pressure dn n = MIDI channel no. (0 to 15)

pp pp = pressure value (0 to 127)

=>Ignored by EMAX if the front panel midi option "Notes,Wheels" is set to "no".

.....
Pitch Wheel en n = MIDI channel no. (0 to 15)

xx xx = don't care

ww ww = wheel value (0 to 127)

=>Ignored by EMAX if the front panel midi option "Notes,Wheels" is set to "no".

=>Range selectable via front panel "pitch bend range" (0 to +- 4 semitones).

.....
Song Position Pointer f2

xx xx = don't care

xx xx = don't care

=>EMAX does NOT respond to position information, but it does reset all internal sequencer wheels in case they were left hanging by an external controller.

.....
Song Select f3

ss ss = sequence # (0 to 99)

=>Receiving this selects a new sequence on the EMAX.

.....
Timing Clock f8

.....
Sequencer Start fa

.....
Sequencer Stop fc

.....

02 EMAX id
06 exclusive #06
f7 EOX

=>Upon receiving this, EMAX dos a Send Secondary Voice Map (exclusive #36).

.....
Request to Send One Sample Fast f0 system exclusive
 18 E-mu id
 02 EMAX id
 07 exclusive #07
 kk key # (0 to 87)
 0L level (0=primary, 1=secondary)
 f7 EOX

=>Upon receiving this, EMAX dos a Send One Sample Fast (exclusive #37).

=>Uses current preset.

.....
Request to Send Ready f0 system exclusive
 18 E-mu id
 02 EMAX id
 08 exclusive #08
 f7 EOX

=>Upon receiving this, EMAX dos a Send Ready (exclusive #38).

=>Provided as a means for an external device to find out if EMAX is present.

.....

1: secondary

2: both

LL lo key # (0 to 87)

hh hi key # (0 to 87)

f7 EOX

=>This command duplicates front panel function.

=>EMAX does no checks to see if data bytes are within legal range or not.

=>Uses current preset.

=>After finishing task, EMAX sends READY message.

.....

```
Execute Crossfade Change    f0      system exclusive
                           18      E-mu id
                           02      EMAX id
                           14      exclusive #14
                           LL      lo key # (0 to 87)
                           hh      hi key # (0 to 87)
                           0d      direction:
                                   0: primary hard
                                   1: secondary hard
                           0m      crossfade mode:
                                   0: off
                                   1: velocity fade
                                   2: velocity switch
                                   3: positional
                                   4: realtime fade
                                   5: realtime switch
                           f7      EOX
```

=>This command duplicates front panel function.

=>EMAX does no checks to see if data bytes are within legal range or not.

=>Uses current preset.

=>After finishing task, EMAX sends READY message.

.....

```
Execute Create Preset     f0      system exclusive
                           18      E-mu id
                           02      EMAX id
                           15      exclusive #15
                           pp      preset # (0 to 99)
                           f7      EOX
```

=>This command duplicates front panel function.

=>EMAX does no checks to see if data bytes are within legal range or not.

=>If preset already exists, it will be overwritten.

=>After finishing task, EMAX sends READY message.

.....

```
Execute Erase Preset     f0      system exclusive
                           18      E-mu id
                           02      EMAX id
                           16      exclusive #16
                           pp      preset # (0 to 99)
                           f7      EOX
```

=>This command duplicates front panel function.

=>EMAX does no checks to see if data bytes are within legal range or not.

=>After finishing task, EMAX sends READY message.

.....

```
Execute Copy Preset      f0      system exclusive
                           18      E-mu id
                           02      EMAX id
                           17      exclusive #17
                           pp      from preset # (0 to 99)
                           pp      to preset # (0 to 99)
                           f7      EOX
```

=>This command duplicates front panel function.
=>EMAX does no checks to see if data bytes are within legal range or not.
=>EMAX will not allow the "to preset" to be the current preset.
=>After finishing task, EMAX sends READY message.

```

.....
Accept New Sample Fast      f0      system exclusive
                           18      E-mu id
                           02      EMAX id
                           18      exclusive #18
                           LL      low key # (0 to 87)
                           hh      hi key # (0 to 87)
                           0L      level (0=primary, 1=secondary)
                           0s      sample rate (0 to 7)
                                0: 10.000khz
                                1: 15.625khz
                                2: 20.000khz
                                3: 22.050khz
                                4: 27.778khz
                                5: 31.250khz
                                6: 41.667khz
                                7: 44.100khz
                           LL      length (bits 0-6)
                           LL      length (bits 7-13)
                           LL      length (bits 14-18)
                           f7      EOF

```

=>EMAX now switches internally to 500 kbaud.
=>EMAX waits at least 100msec to allow sender to switch baud rates.
=>EMAX then checks if dump will fit:
 if it won't fit: EMAX sends CANCEL and returns to 31.25 kbaud.
 if it will fit: EMAX sends ACK and continues.
=>Sender starts high speed transfer by sending MMA-type data packet at 500kbaud:
=>The sound data in the data packet is sent as 12 bit linear data.
=>Data packet (see MMA Data Packet) contains 120 bytes packed like this:

| | |
|--------------------|------------------------------------|
| byte 0: bbaaaaaa | aaaaaa = 6 ls bits of data word 0 |
| byte 1: ccccbbbb | bbbbbb = 6 ms bits of data word 0 |
| byte 2: ddddddcc | cccccc = 6 ls bits of data word 1 |
| | dddddd = 6 ms bits of data word 1 |
| byte 3: ffeeeeeee | eeeeee = 6 ls bits of data word 2 |
| --etc-- | |
| byte 119: zzzzzzyy | zzzzzz = 6 ms bits of data word 79 |

=>Note that bit 7 is used in these packets, unlike standard MMA format.
=>Sender then waits for an ACK, as per MMA protocol:
=>if EMAX detected transmission error, it sends NAK, expects re-send.
 EMAX will tolerate 5 re-sends before sending CANCEL and aborting.
=>if packet received correctly, EMAX sends ACK, expects next packet.
=>EMAX will handshake the last packet.
=>After completion of transfer, EMAX automatically switches back to 31.25 kbaud.
=>Receiver must wait at least 5 msec after receipt of EMAX's ACK of the last packet before sending another command to EMAX (at 31.25 kbaud).
=>EMAX sets loop start points at the first byte, loop end points at the last byte, and sets all loops off. To change these, use exclusive #1c, "Change Sample Info".
=>The "length" in the header refers to # of 12-bit data bytes, (80 per packet) not to the actual number of bytes in the packet, which is 120.
=>EMAX does no checks to see if data bytes are within legal range or not.
=>EMAX makes the sample's "original key" = hi key.
=>For internal reasons, EMAX replaces the first two and the last two bytes of the sample dump with zeroes. Sender should also pad the ends with two zeroes and not use these bytes when looping sounds.
=>Uses current preset.

```

.....
Replace New Sample Fast      f0      system exclusive
                             18      E-mu id
                             02      EMAX id
                             19      exclusive #19
                             kk      key # (0 to 87)
                             0L      level (0=primary, 1=secondary)
                             f7      EOF

```

=>EMAX now switches internally to 500 kbaud.
=>EMAX waits at least 100msec, then sends ACK command (see MMA exclusives).
=>EMAX then proceeds as Accept New Sample Fast (exclusive #18).
=>EMAX replaces sound data, leaving intact all loop and length information.
=>Uses current preset.

```

.....
Change Voice Parameter      f0      system exclusive
                             18      E-mu id
                             02      EMAX id
                             1a      exclusive #1a
                             LL      low key (0 to 87)
                             hh      hi key (0 to 87)
                             0L      level (0=pri, 1=sec, 2=both)
                             pp      voice parameter # (see list)
                             vv      voice parameter value
                             f7      EOF

```

=>Uses current preset.
=>if key and level refer to a null voice, EMAX doesn't change anything.
=>EMAX does no checks to see if parameter bytes are within legal range.
=>After finishing task, EMAX sends READY message.

```

.....
Change Preset Parameter    f0      system exclusive
                             18      E-mu id
                             02      EMAX id
                             1b      exclusive #1b
                             pp      preset# (0 to 99, or 127 for
                                     current preset)
                             pp      preset parameter # (see list)
                             vv      preset parameter value
                             f7      EOF

```

=>EMAX does no checks to see if parameter bytes are within legal range.
=>After finishing task, EMAX sends READY message.

```

.....
Change Sample Info        f0      system exclusive
                             18      E-mu id
                             02      EMAX id
                             1c      exclusive #1c
                             kk      key # (0 to 87)
                             0L      level (0=primary, 1=secondary)
                             0s      sample rate (0 to 7)
                             ss      sustain loop start (bits 0-6)
                             ss      sustain loop start (bits 7-13)
                             ss      sustain loop start (bits 14-18)
                             ee      sustain loop end (bits 0-6)
                             ee      sustain loop end (bits 7-13)
                             ee      sustain loop end (bits 14-18)
                             ss      release loop start (bits 0-6)
                             ss      release loop start (bits 7-13)
                             ss      release loop start (bits 14-18)
                             ee      release loop end (bits 0-6)
                             ee      release loop end (bits 7-13)
                             ee      release loop end (bits 14-18)

```

0f loop & direction flags
 bit0: loop on
 bit1: loop in release
 bit2: backwards

f7 EOX

=>if key and level refer to a null voice, EMAX doesn't change anything.
 =>EMAX does no checks to see if parameter bytes are within legal range or not.
 =>Be aware that if sample rate is changed, the key assignments may no longer be valid due to transpose limitations. EMAX will not correct for this.
 =>After finishing task, EMAX sends READY message.

.....
 Erase All f0 system exclusive
 18 E-mu id
 02 EMAX id
 1d exclusive #1d
 f7 EOX

=>Erases all presets, sequences, sounds. Same as front panel option in "Master".
 =>After finishing task, EMAX sends READY message.

.....
 Change Current Preset f0 system exclusive
 18 E-mu id
 02 EMAX id
 1e exclusive #1e
 pp preset # (0 to 99)
 f7 EOX

=>Same as MIDI change preset, but bypasses omni/poly, midi on checks.
 =>If preset doesn't exist, nothing happens: current preset doesn't change.
 =>After finishing task, EMAX sends READY message.

.....
 Shorten Sample f0 system exclusive
 18 E-mu id
 02 EMAX id
 1f exclusive #1f
 kk key # (0 to 87)
 0L level (0=primary, 1=secondary)
 LL # bytes (bits 0-6)
 LL # bytes (bits 7-13)
 LL # bytes (bits 14-18)
 f7 EOX

=>Uses current preset.
 =>The # of bytes specified is the # of bytes to shorten the sample by.
 =>if key and level refer to a null voice, EMAX doesn't shorten anything.
 =>EMAX assumes sample is at least as long as # of bytes to be shortened by.
 =>Loop end points are set to end of sample if shortened beyond original points.
 =>After finishing task, EMAX sends READY message.

.....
 Lengthen Sample f0 system exclusive
 18 E-mu id
 02 EMAX id
 20 exclusive #20
 kk key # (0 to 87)
 0L level (0=primary, 1=secondary)
 LL # bytes (bits 0-6)
 LL # bytes (bits 7-13)
 LL # bytes (bits 14-18)
 f7 EOX

=>Uses current preset.
 =>The # of bytes specified is the # of bytes to lengthen the sample by.
 =>if key and level refer to a null voice, EMAX doesn't lengthen anything.
 =>EMAX assumes there is enough memory in EMAX to accommodate lengthening.

=>Loop points remain unaffected.

=>After finishing task, EMAX sends READY message.

```

.....
Modify Time Out          f0      system exclusive
                        18      E-mu id
                        02      EMAX id
                        21      exclusive #21
                        tt      timeout in seconds (0 to 127)
                        f7      EOF

```

=>This sets the time EMAX waits for sample dump handshaking before timing out.

=>EMAX defaults to a timeout of 4 seconds.

=>Once changed, value will stay changed until modified by this command or until power is turned off.

=>After finishing task, EMAX sends READY message.

```

.....
Change Misc Info        f0      system exclusive
                        18      E-mu id
                        02      EMAX id
                        22      exclusive #22
                        tt      master tune value (0 to 31),
                                (16) is zero tune offset
                        xx      bit 0: supermode      1=on 0=off
                                bit 1: midi overflow 1=on 0=off
                                bit 2-4: arp clock source:
                                    0: internal
                                    1: midi
                                    2: 24 ppq
                                    3: 48 ppq
                                    4: 96 ppq
                        f7      EOF

```

=>NOTE: due to a bug in EMAX Rev 3.0 software, master tune values of 0 to 15 (-48 cents to -3 cents) don't work properly. This should be fixed next rev.

=>After finishing task, EMAX sends READY message.

.....

| | | |
|------------------------|----|--------------------------------|
| | LL | sample number (Pri/Sec 0 or 1) |
| | f7 | EOX |
| | | |
| Acknowledge (ACK) | f0 | system exclusive |
| | 7e | |
| | 0c | midi base channel (0 to 15) |
| | 7f | |
| | pp | packet number |
| | f7 | EOX |
| | | |
| Not Acknowledged (NAK) | f0 | system exclusive |
| | 7e | |
| | 0c | midi base channel (0 to 15) |
| | 7e | |
| | pp | packet number |
| | f7 | EOX |
| | | |
| Cancel Dump (CANCEL) | f0 | system exclusive |
| | 7e | |
| | 0c | midi base channel (0 to 15) |
| | 7d | |
| | pp | packet number |
| | f7 | EOX |
| | | |
| Wait (WAIT) | f0 | system exclusive |
| | 7e | |
| | 0c | midi base channel (0 to 15) |
| | 7c | |
| | pp | packet number |
| | f7 | EOX |
| | | |

Voice Parameter List: (for use with exclusives #00 and #30)

| Parameter# | Parameter | # of bits | Value Range (Decimal) |
|------------|-----------------|-----------|------------------------------|
| ----- | ----- | ----- | ----- |
| 0 | VCA Attack | 5 | 0 to 31 |
| 1 | VCA Hold | 5 | 0 to 31 |
| 2 | VCA Decay | 5 | 0 to 31 |
| 3 | VCA Sustain | 5 | 0 to 31 |
| 4 | VCA Release | 5 | 0 to 31 |
| 5 | LFO Rate | 7 | 1 to 120 |
| 6 | LFO Delay | 7 | 0 to 99 |
| 7 | LFO Variation | 4 | 0 to 15 |
| 8 | Vibrato | 4 | 0 to 15 |
| 9 | Tuning | 5 | 0 to 31 (-16 to 15 to user) |
| 10 | Vel to Fc | 4 | 0 to 15 |
| 11 | Vel to FAttack | 4 | 0 to 15 |
| 12 | Vel to Pan | 4 | 0 to 15 |
| 13 | Tremolo | 4 | 0 to 15 |
| 14 | Vel to Level | 4 | 0 to 15 |
| 15 | Vel to Pitch | 4 | 0 to 15 |
| 16 | Vel to Attack | 4 | 0 to 15 |
| 17 | Rt Pitch enable | 1 | 0 to 1 (1 = enabled) |
| 18 | Rt Fc enable | 1 | 0 to 1 |
| 19 | Rt Level enable | 1 | 0 to 1 |
| 20 | Rt Vibr enable | 1 | 0 to 1 |
| 21 | Rt Fvibr enable | 1 | 0 to 1 |
| 22 | Rt Trem enable | 1 | 0 to 1 |
| 23 | Rt Att enable | 1 | 0 to 1 |
| 24 | Rt Pan enable | 1 | 0 to 1 |
| 25 | --not used-- | | |
| 26 | --not used-- | | |
| 27 | --not used-- | | |
| 28 | Original Key | 6 | 0 to 87 |
| 29 | Lo Channel | 3 | 0 to 7 |
| 30 | Hi Channel | 3 | 0 to 7 |
| 31 | Filter Cutoff | 7 | 0 to 120 |
| 32 | Filter Q | 7 | 0 to 99 |
| 33 | Env Amount | 7 | 0 to 100 (-50 to 50 to user) |
| 34 | --not used-- | | |
| 35 | --not used-- | | |
| 36 | --not used-- | | |
| 37 | --not used-- | | |
| 38 | --not used-- | | |
| 39 | VCF Attack | 5 | 0 to 31 |
| 40 | VCF Hold | 5 | 0 to 31 |
| 41 | VCF Decay | 5 | 0 to 31 |
| 42 | VCF Sustain | 5 | 0 to 31 |
| 43 | VCF Release | 5 | 0 to 31 |
| 44 | Velocity to Q | 4 | 0 to 15 |
| 45 | Solo | 1 | 0 to 1 |
| 46 | Nontranspose | 1 | 0 to 1 |
| 47 | Kybd Tracking | 4 | 0 to 15 |
| 48 | Pan | 4 | 1 to 15 (8 = center) |
| 49 | LFO to Pan | 4 | 0 to 15 |
| 50 | LFO to Fc | 4 | 0 to 15 |
| 51 | Delay | 6 | 0 to 63 |
| 52 | Attenuation | 5 | 0 to 31 |
| 53 | Chorus | 1 | 0 to 1 |
| 54 | Character #0 | 6 | 0 to 63 |
| 55 | Character #1 | 6 | 0 to 63 |

| | | | |
|----|--------------|---|---------|
| 56 | Character #2 | 6 | 0 to 63 |
| 57 | Character #3 | 6 | 0 to 63 |
| 58 | Character #4 | 6 | 0 to 63 |
| 59 | Character #5 | 6 | 0 to 63 |

Note: Characters #0 to #5 are not used by EMAX at all, and can be used by interfacing programs to name individual voices. To be compatible with each other, programs should add 32 to the 0 to 63 number to make an ASCII range of 32 to 95.

.....

Preset Parameter List: (for use with exclusives #01 and #31)

| Parameter# | Parameter | # of bits | Value Range (Decimal) |
|------------|------------------------|-----------|----------------------------|
| 0 | Preset Name 1st letter | 7 | ASCII (=0 if preset empty) |
| 1 | --not used-- | | |
| 2 | 2nd letter | 7 | ASCII |
| 3 | --not used-- | | |
| 4 | 3rd letter | 7 | ASCII |
| 5 | --not used-- | | |
| 6 | 4th letter | 7 | ASCII |
| 7 | --not used-- | | |
| 8 | 5th letter | 7 | ASCII |
| 9 | --not used-- | | |
| 10 | 6th letter | 7 | ASCII |
| 11 | --not used-- | | |
| 12 | 7th letter | 7 | ASCII |
| 13 | --not used-- | | |
| 14 | 8th letter | 7 | ASCII |
| 15 | --not used-- | | |
| 16 | 9th letter | 7 | ASCII |
| 17 | --not used-- | | |
| 18 | 10th letter | 7 | ASCII |
| 19 | --not used-- | | |
| 20 | 11th letter | 7 | ASCII |
| 21 | --not used-- | | |
| 22 | 12th letter | 7 | ASCII |
| 23 | --not used-- | | |
| 24 | Left Wheel Dest | 4 | 0 to 9 |
| 25 | Right Wheel Dest | 4 | 0 to 9 |
| 26 | Pressure Dest | 4 | 0 to 9 |
| 27 | Pedal Dest | 4 | 0 to 9 |
| 28 | MIDI Controller A Dest | 4 | 0 to 9 |
| 29 | MIDI Controller B Dest | 4 | 0 to 9 |

Possible Controller Destinations:

- 0: off
- 1: pitch
- 2: filter freq
- 3: level
- 4: vibrato
- 5: filter vibrato
- 6: tremolo
- 7: attack
- 8: pan
- 9: crossfade

| | | | |
|----|--------------------|---|--------|
| 30 | Footswitch #1 Dest | 4 | 0 to 7 |
| 31 | Footswitch #2 Dest | 4 | 0 to 7 |

Possible Controller Destinations:

- 0: off
- 1: realtime arpeggiator footswitch
- 2: realtime sequencer control
- 3: realtime sustain
- 4: realtime release
- 5: realtime cross-switch
- 6: realtime advance preset
- 7: realtime sample control

| | | | |
|----|-------------------------|---|---------|
| 32 | MIDI Basic Channel | 4 | 0 to 15 |
| 33 | Omni/Poly 1:Omni 0:Poly | 1 | 0 to 1 |
| 34 | MIDI Enabled | 1 | 0 to 1 |

1: All events

```

    0: No notes or wheels
35   Preset Change Enabled   1           0 to 1
36   Local Control On       1           0 to 1
37   Seq Start/Stop Enabled 1           0 to 1
38   MIDI Port 1:Out 0:Thru 1           0 to 1
39   --not used--
40   MIDI Left Wheel Cntrlr 6           0 to 34
41   MIDI Right Wheel Cntrlr 6          0 to 34
42   MIDI Pressure          6           0 to 34
43   MIDI Pedal Controller  6           0 to 34
44   MIDI A input Controller 6          0 to 34
45   MIDI B input Controller 6          0 to 34
      Possible Controllers:
          0:      off
          1 to 32: midi controller #
          33:     pitch wheel
          34:     channel pressure

      Arpeggiator Tempo is 16 bits: 4000 to 24000
46   Arpeggiator Tempo Lo   2           0 to 3
47   Arpeggiator Tempo Mid  7           0 to 127
48   Arpeggiator Tempo Hi   7           0 to 127

49   Arpeggiator Resolution 4           0 to 9
50   Arpeggiator Repeats    3           0 to 7
51   Arpeggiator On/Off     1           0 to 1
52   Arpeggiator Mode       3           0 to 5
      Possible Arpeggiator Modes:
          0: up
          1: down
          2: up/down
          3: forward assignment
          4: backward assignment
          5: random
53   Arpeggiator Latch Mode 2           0 to 2
          0: offlatch
          1: autolatch
          2: extendlatch
54   Cruz Control           1           0 to 1
55   Arpeggiator Glissando  1           0 to 1
56   Arpeggiator Interval   4           0 to 15
57   Arpeggiator Extensions 4           0 to 15
58   Arpeggiator Velocity   7           0 to 127
59   Arpeggiator Hi Key     7           0 to 87
60   Arpeggiator Lo Key     7           0 to 87
61   Pitch Wheel Range      3           1 to 4
          0:      invalid
          1: +- 1 semitone
          2: +- 2 semitones
          3: +- 3 semitones
          4: +- 4 semitones
62   --not used--
63   --not used--
64   Velocity Curve         4           0 to 13
65   --not used--
66   --not used--
67   Arpeggiator Harmony1   4           0 to 15
68   Arpeggiator Harmony2   4           0 to 15

```