

Is everything listed here?

No. This is just a subset of the messages I have cataloged. It takes some time to enter them here and format them.

Update: The data here is only valid for a single Unitor8 of a specific version. I don't recommend using this page for anything other than some minor understanding of the protocol involved.

Do any of the messages have a checksum?

I have not found any checksums in the messages so far.

What types of messages does it receive?

I have found two types of messages:

1. A message to a device controlling Unitor features.
 1. These are messages are characterized by the first 5 bytes `F0 00 20 31 64`
 2. `00 20 31` is the [midi manufacturer ID for Emagic](#)
 3. `64` is most likely an identifier specifying that it is a Unitor 8
 4. These messages all deal with setting that a specific to the Unitor, such as LED brightness, port mapping, message filters

 2. A message to a device controlling timing features
 1. These messages are characterized by the first 4 bytes `F0 00 00 33`
 2. `00 00 33` is the midi manufacturer ID for S&S Research
 3. These messages all deal with the type and format of the clock that is generated
-

How to change the messages to talk to Unitors that are chained together

`F0 00 20 31 64 10 00 7F 00 F7`

Right now this is just a guess, but I suspect that byte 7 is used to direct a message to Unitor further into the chain.

Since it seems to be zero in all of the messages so far and I am talking the first and only Unitor in my chain.

UPDATE: This is 100% correct

The format of this byte is `00bbb000B` where Box Number (bbb) = 0 - 7

Unitor8 Midi Data

Some are in the format 0rbbbgggB ;b: Box number, r=1:ROM, r=0:EEPROM
;g: Device 000=Unitor8, 001=AMT8

Scan for a Unitor

F0 00 20 31 64 03 00 7F F7

F0 00 20 31 64 03 00 7F F7 sent
F0 00 20 31 64 04 00 40 F7 received

F0 00 20 31 64 0B 00 00 F7 sent
F0 00 20 31 64 7B 00 00 32 30 32 F7 received (32 30 32 is ASCII firmware
version 202 = 2.0.2)

F0 00 20 31 64 0B 00 40 F7 sent
F0 00 20 31 64 7B 00 40 32 30 32 F7 received (32 30 32 is ASCII firmware
version 202 = 2.0.2)

F0 00 20 31 64 0B 00 08 F7 sent (ping for chained unitor 1?)
F0 00 20 31 64 0B 00 10 F7 sent (ping for chained unitor 2?)
F0 00 20 31 64 0B 00 18 F7 sent (ping for chained unitor 3?)
F0 00 20 31 64 0B 00 20 F7 sent (ping for chained unitor 4?)
F0 00 20 31 64 0B 00 28 F7 sent (ping for chained unitor 5?)
F0 00 20 31 64 0B 00 30 F7 sent (ping for chained unitor 6?)
F0 00 20 31 64 0B 00 38 F7 sent (ping for chained unitor 7?)

F0 00 20 31 64 12 00 00 00 F7 sent (request patch 1)
F0 00 20 31 64 7A 00 00 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 1)
F0 00 20 31 64 12 00 00 01 F7 sent (request patch 2)
F0 00 20 31 64 7A 00 00 01 00 00 01 00 01 00 01 00 01 00 01 00 01
00 01 F7 received (this is patch 2)
F0 00 20 31 64 12 00 00 02 F7 sent (request patch 3)
F0 00 20 31 64 7A 00 00 02 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 3)
F0 00 20 31 64 12 00 00 03 F7 sent (request patch 4)
F0 00 20 31 64 7A 00 00 03 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 4)
F0 00 20 31 64 12 00 00 04 F7 sent (request patch 5)
F0 00 20 31 64 7A 00 00 04 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 5)
F0 00 20 31 64 12 00 00 05 F7 sent (request patch 6)
F0 00 20 31 64 7A 00 00 05 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 6)
F0 00 20 31 64 12 00 00 06 F7 sent (request patch 7)
F0 00 20 31 64 7A 00 00 06 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 7)
F0 00 20 31 64 12 00 00 07 F7
F0 00 20 31 64 7A 00 00 07 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 8)
F0 00 20 31 64 12 00 00 08 F7
F0 00 20 31 64 7A 00 00 08 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F

Unitor8 Midi Data

```
07 0F F7 received (this is patch 9)
F0 00 20 31 64 12 00 00 09 F7
F0 00 20 31 64 7A 00 00 09 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 10)
F0 00 20 31 64 12 00 00 0A F7
F0 00 20 31 64 7A 00 00 0A 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 11)
F0 00 20 31 64 12 00 00 0B F7
F0 00 20 31 64 7A 00 00 0B 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 12)
F0 00 20 31 64 12 00 00 0C F7
F0 00 20 31 64 7A 00 00 0C 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 13)
F0 00 20 31 64 12 00 00 0D F7
F0 00 20 31 64 7A 00 00 0D 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 14)
F0 00 20 31 64 12 00 00 0E F7
F0 00 20 31 64 7A 00 00 0E 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 15)
F0 00 20 31 64 12 00 00 0F F7
F0 00 20 31 64 7A 00 00 0F 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 16)
F0 00 20 31 64 12 00 00 10 F7
...
F0 00 20 31 64 12 00 00 1F F7
F0 00 20 31 64 7A 00 00 1F 00 0F 0D 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F
07 0F F7 received (this is patch 32)

F0 00 20 31 64 14 00 00 01 00 3F F7 - request sent computer mode

F0 00 20 31 64 79 00 00 01 00 3F 02 04 02 04 02 - received 140 bytes
04 02 04 02 04 02 04 02 04 02 04 02 04 02 04 02 - computer mode setup
04 02 04 02 04 02 04 02 04 02 04 00 00 0F 0F 02
00 00 01 00 0C 03 0F 00 0C 00 0E 00 03 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 06 00 05 00
08 00 01 04 08 06 0A 00 09 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

F0 00 20 31 64 14 00 00 02 00 3F F7 - request sent patch mode setup

F0 00 20 31 64 79 00 00 02 00 3F 02 04 02 04 02 - received 140 bytes
04 02 04 02 04 02 04 02 04 02 04 02 04 02 04 02 - patch mode setup
04 02 04 02 04 02 04 02 04 02 04 00 08 0F 0F 02
00 00 01 00 0C 03 0F 00 0C 00 0E 00 03 04 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 03 00 05 00
08 00 01 04 08 06 0A 00 09 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

Unitor8 Midi Data

```
F0 00 20 31 64 14 00 00 03 00 40 F7 - request tip & ring setup

F0 00 20 31 64 79 00 00 43 00 40 00 01 00 01 00 - received 142 bytes
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00 - Click Tip & Ring setup
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 F7

F0 00 20 31 64 14 00 00 00 00 1F F7

F0 00 20 31 64 79 00 00 00 00 1F 0C 08 01 04 0A - received 76 bytes
0A 0F 05 04 07 0F 05 04 08 04 00 01 00 04 03 04
04 04 05 04 06 04 01 04 02 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 F7

F0 00 20 31 64 0F 00 7F F7 - sent and from what I can tell it never
causes a response
```

Click Input Tip

```
F0 00 20 31 64 0D 00 00 40 1E
00 1F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 switch phase 1
00 07 00 00 00 00 00 00 00 00 00 00 00 00 00 00 switch phase 2
00 07 00 00 00 00 00 00 00 00 00 00 00 00 00 00 switch phase 3
00 07 00 00 00 00 00 00 00 00 00 00 00 00 00 00 switch phase 4
F7
```

75 (\$4B) bytes

Blue - SysEx device ID

Orange - action?

Purple - 0x60 0x00 = Tip analog, second byte is the hold time 0x00 to 0x7F

- 0x40 0x1E = Tip footswitch

- 0x00 0x00 = Ring setup

Magenta - mode of phase + # of bytes (stored additively / OR'd together)

18 = Patch Up

10 = Patch Down

08 = Panic

00 = MIDI 0 # of bytes

01 = MIDI 1 # of bytes

02 = MIDI 2 # of bytes

03 = MIDI 3 # of bytes

Unitor8 Midi Data

- 04 = MIDI 4 # of bytes
- 05 = MIDI 5 # of bytes
- 06 = MIDI 6 # of bytes
- 07 = MIDI 7 # of bytes

Green - Midi message data

Each byte of midi data is stored as two bytes where;
Most significant nibble in the first byte shifted right by 4 bits
Least significant nibble in the second byte

Brown - unused

Click Input Ring

```
F0 00 20 31 64 0D 00 00 00 00
00 1F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 switch phase 1
00 07 00 00 00 00 00 00 00 00 00 00 00 00 00 00 switch phase 2
00 07 00 00 00 00 00 00 00 00 00 00 00 00 00 00 switch phase 3
00 07 00 00 00 00 00 00 00 00 00 00 00 00 00 00 switch phase 4
F7
```

Blue - SysEx device ID

Orange - action?

- Purple - 0x60 0x00 = Tip analog, second byte is the hold time 0x00 to 0x7F
- 0x40 0x1E = Tip footswitch
- 0x00 0x00 = Ring setup

Magenta - mode of phase + # of bytes (stored additively / OR'd together)

- 18 = Patch Up
- 10 = Patch Down
- 08 = Panic
- 00 = MIDI 0 # of bytes
- 01 = MIDI 1 # of bytes
- 02 = MIDI 2 # of bytes
- 03 = MIDI 3 # of bytes
- 04 = MIDI 4 # of bytes
- 05 = MIDI 5 # of bytes
- 06 = MIDI 6 # of bytes
- 07 = MIDI 7 # of bytes

Green - Midi message data

Each byte of midi data is stored as two bytes where;
Most significant nibble in the first byte shifted right by 4 bits
Least significant nibble in the second byte

Brown - unused

Sat Computer Mode

Unitor8 Midi Data

Set Computer mode

F0 00 20 31 64 0F 00 7F F7

Blue - SysEx device ID

Orange - action?

Select a patch / Set patch mode

F0 00 20 31 64 10 00 7F 00 F7

F0 00 20 31 64 10 00 7F 02 F7 Select Patch 3

F0 00 20 31 64 10 00 7F 1F F7 Select Patch 32

Blue - SysEx device ID

Orange - action?

Green - patch number

Configure the 32 Patches

F0 00 20 31 64 11 00 00 00 0F 0E 0F 0D 0F 0B
0F 07 0E 0F 0D 0F 0B 0F 07 0F F7

NOTE: for some reason sound diver sends a patch select after every one of these configuration messages.

Patch 1 - Initialized

F0 00 20 31 64 11 00 00 00 0F 0E 0F 0D 0F 0B
0F 07 0E 0F 0D 0F 0B 0F 07 0F F7

Patch 1 - input 1 to all outputs - everything else off

F0 00 20 31 64 11 00 00 00 00 01 00 01 00 01
00 01 00 01 00 01 00 01 00 01 F7

F0 00 20 31 64 11 00 00 01 00 00 01 00 01 00 01
00 01 00 01 00 01 00 01 00 01 F7

Byte Function

9 Patch# 0x00-0x1F (0-32)

The byte pairs are output settings

Bytes Function

11 - 12 Output 1

13 - 14 Output 2

15 - 16 Output 3

17 - 18 Output 4

19 - 20 Output 5

21 - 22 Output 6

23 - 24 Output 7

25 - 26 Output 8

00 01 - Input from port 1

Unitor8 Midi Data

00 02 - Input from port 2
00 04 - Input from port 3
00 08 - Input from port 4
01 00 - Input from port 5
02 00 - Input from port 6
04 00 - Input from port 7
08 00 - Input from port 8

Request patch

F0 00 20 31 64 12 00 00 00 F7

Blue - patch number 0x00 to 0x1F

response:

F0 00 20 31 64 7A 00 00 00 0F 0E 0F 0D 0F 0B 0F 07 0E 0F 0D 0F 0B 0F 07 0F F7

Byte Function

9 Patch# 0x00-0x1F (0-32)

The byte pairs are output settings

Bytes Function

11 - 12 **Output 1**
13 - 14 *Output 2*
15 - 16 **Output 3**
17 - 18 *Output 4*
19 - 20 **Output 5**
21 - 22 *Output 6*
23 - 24 **Output 7**
25 - 26 *Output 8*

The following bits are OR'd together to connect an input to an output

00 01 - Input from port 1
00 02 - Input from port 2
00 04 - Input from port 3
00 08 - Input from port 4
01 00 - Input from port 5
02 00 - Input from port 6
04 00 - Input from port 7
08 00 - Input from port 8

Same format message as [configuring a patch](#)

RS/IO LED Brightness

F0 00 20 31 64 13 00 00 00 08 00 00 00 F7

Blue - SysEx device ID

Orange - action?

Unitor8 Midi Data

Magenta - LED

07 00 IO LED

08 00 RS LED

Green - LED Brightness

00 00 OFF

00 01 Brightness 1

00 02 Brightness 2

00 04 Brightness 3

00 08 Brightness 4

01 00 Brightness 5

02 00 Brightness 6

04 00 Brightness 7

08 00 Brightness 8

Global LED Brightness

F0 00 20 31 64 13 00 00 00 00 1F 0C 08 01 04 0A
0A 0F 05 04 07 0F 05 04 08 00 00 00 00 04 03 04
04 04 05 04 06 04 01 04 02 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 F7

F0 00 20 31 64 13 00 00 00 00 1F 0C 08 01 04 0A
0A 0F 05 04 07 0F 05 04 08 00 08 00 00 04 03 04
04 04 05 04 06 04 01 04 02 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 F7

F0 00 20 31 64 13 00 00 00 00 1F 0C 08 01 04 0A
0A 0F 05 04 07 0F 05 04 08 00 00 00 08 04 03 04
04 04 05 04 06 04 01 04 02 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 F7

Red - IO LED Brightness

Brown - RS LED Brightness

- LED Brightness

00 00 OFF

00 01 Brightness 1

00 02 Brightness 2

00 04 Brightness 3

00 08 Brightness 4

01 00 Brightness 5

02 00 Brightness 6

04 00 Brightness 7

08 00 Brightness 8

Both LED settings are sent at once with this message

Configure Patch Mode

```
F0 00 20 31 64 13 00 00 02 00 3F 02 04 02 04 02
04 02 04 02 04 02 04 02 04 02 04 02 04 02 04 02
04 02 04 02 04 02 04 02 04 02 04 00 00 0F 0F 02
05 00 01 00 0C 03 0F 00 0C 00 0E 00 03 04 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 03 00 05 00
08 00 01 04 08 06 0A 00 09 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

I need to track down what situation send this full message. I suspect this is a Patches Mode dump, with msg filters etc.

Setup patch phange (Patch Mode)

```
F0 00 20 31 64 13 00 00 02 11 00 00 0F F7 - sent to setup patch change
```

Green - 0x00 = OFF 0x08 = ON

Orange - Input where the program change message will come in on 0x00 to 0x07

Magenta - Channel of program change message 0x00 to 0x0F

NOTE: a patch select message is always sent after the above patch change configuration message.

```
F0 00 20 31 64 10 00 7F 01 F7
```

Request computer mode setup

```
F0 00 20 31 64 14 00 00 01 00 3F F7 - request sent computer mode
```

```
F0 00 20 31 64 79 00 00 01 00 3F 02 04 02 04 02 - received 140 bytes
04 02 04 02 04 02 04 02 04 02 04 02 04 02 04 02 - computer mode setup
04 02 04 02 04 02 04 02 04 02 04 00 00 0F 0F 02
00 00 01 00 0C 03 0F 00 0C 00 0E 00 03 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 06 00 05 00
08 00 01 04 08 06 0A 00 09 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

Request patch mode setup

```
F0 00 20 31 64 14 00 00 02 00 3F F7 - request sent patch mode setup
```

```
F0 00 20 31 64 79 00 00 02 00 3F 02 04 02 04 02 - received 140 bytes
04 02 04 02 04 02 04 02 04 02 04 02 04 02 04 02 - patch mode setup
04 02 04 02 04 02 04 02 04 02 04 00 08 0F 0F 02
00 00 01 00 0C 03 0F 00 0C 00 0E 00 03 04 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 03 00 05 00
```

Unitor8 Midi Data

```
08 00 01 04 08 06 0A 00 09 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 F7
```

Request click tip and ring setup

```
F0 00 20 31 64 14 00 00 03 00 40 F7 - request tip & ring setup

F0 00 20 31 64 79 00 00 43 00 40 00 01 00 01 00 - received 142 bytes
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00 - Click Tip & Ring setup
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00
00 00 00 00 00 00 00 00 00 00 00 00 00 F7
```

Green - analog hold time (bits 7-1) + input type (bit 0)
stored as high nibble and low nibble across 2 bytes

The rest of the data conforms to the [Click Input Tip](#) and [Click Input Ring](#) switch phase midi data.

Computer Mode - Timing

```
F0 00 00 33 02 0D 00 27 01 03 00 3B 2D 00 17 3B 3B 17 01 00 10 F7

F0 00 00 33 02 0D 00 27 01 03 00 3B 2D 00 17 3B 3B 17 01 00 10 F7
F0 00 00 33 02 0D 00 25 01 03 00 3B 2D 00 17 3B 3B 17 01 00 10 F7 - Striping
OFF
```

Blue - SysEx device ID : All timing messages have a device ID that corresponds to S&S Research

byte offset binary

```
8 00100101 Striping OFF
00100111 Striping ON
```
