Stefan Daschek / @noniq

How to decode AFSK data

(Commodore 64 edition)

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How to decode AFSK data

(Commodore 64 edition)


commodore
1541
TELEFUNKEN


noris DATA
Art.-Nr. 5175
VC 20, C 64, C 128
noris DATA Datenrekorder DR 1535
RECORD
PLAY
REWIND
F.FWD
STOP/ EJT
PAUSE
COUNTER
SAVE

DATASSETTE


noris DATA
Datenrekorder DR 1535
RECORD
PLAY
REWIND
F.FWD
STOP/ EJT
PAUSE
COUNTER
SAVE
FULL AUTO

DATASSETTE


A
N.R.
IN
OUT
TDK
High Bias 70µs EQ
SA
90

noris DATA
Datenrekorder DR 1535
RECORD
PLAY
REWIND
F.FWD
STOP/ EJT
PAUSE
COUNTER
SAVE
FULL AUTO
for Commodore
VC 20, C 64, C
3W
2
2W
3W
2
3W
2
3W
2W

DATASSETTE


A
N.R.
IN
OUT
90


Moon Buggy
Commodore 64
ANIROG
ANIROG
FROGRUN!
Commodore 64
ANIROG
Commodore 64
KONG
ANIROG
Commodore 64
SKRAMBLE
ANIROG
Space Pilot
COMMODORE 64
ANIROG
MOON
BUGGY
COMMODORE 64
ANIROG
ICE
HUNTER
COMMODORE 64
HEXPERT
Commodore 64
ANIROG
Dark
Dungeons
£1.99p
Commodore 64
ANIROG
ANIROG
Battle
through Time
COMMODORE 64

DATASSETTE


A
N.R.
IN
OUT
90


Moon Buggy
Commodore 64
ANIROG
ANIROG
FROGRUN!
Commodore 64
ANIROG
Commodore 64
KONG
ANIROG
Commodore 64
SKRAMBLE
ANIROG
Space Pilot
COMMODORE 64
ANIROG
MOON
BUGGY
COMMODORE 64
ANIROG
ICE
HUNTER
COMMODORE 64
HEXPERT
Commodore 64
ANIROG
Dark
Dungeons
£1.99p
Commodore 64
ANIROG
ANIROG
Battle
through Time
COMMODORE 64

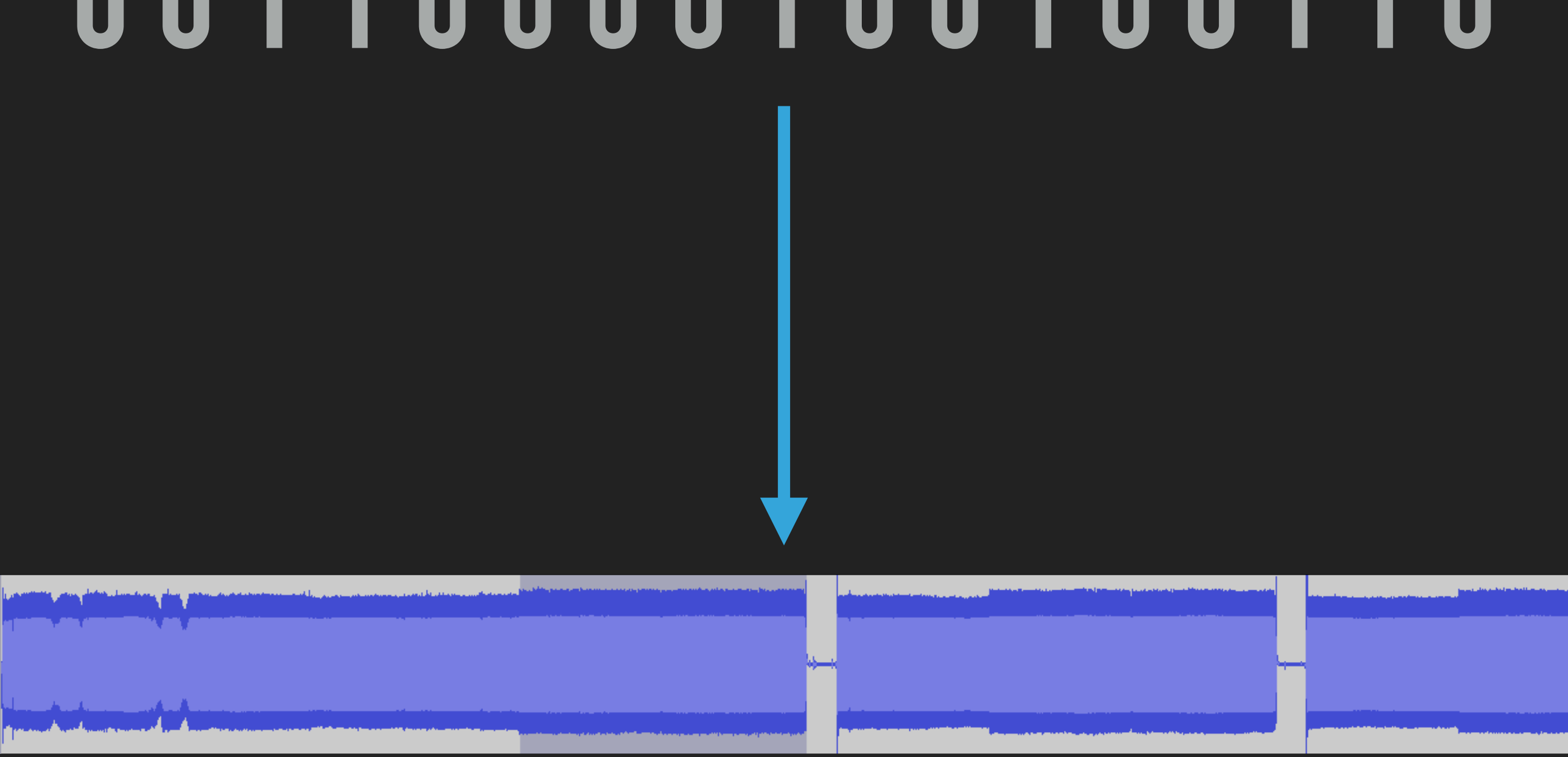

READY.
OPEN 1,1,1,"SEQDATA"
PRESS RECORD & PLAY ON TAPE
OK
READY.
PRINT#1,"FOOBAR BARFOO"
READY.
CLOSE 1
READY.
LIST
10 OPEN 1,1,0,"SEQDATA"
20 INPUT#1,A$
30 PRINT "FOUND DATA:"
40 PRINT A$
50 CLOSE 1
READY.
RUN
PRESS PLAY ON TAPE
TELEFUNKEN
FULL AUTO STOP
noris DATA Datenrekorder DR 1535


READY.
OPEN 1,1,1,"SEQDATA"
PRESS RECORD & PLAY ON TAPE
OK
READY.
PRINT#1,"FOOBAR BARFOO"
READY.
CLOSE 1
READY.
LIST
10 OPEN 1,1,0,"SEQDATA"
20 INPUT#1,A$
30 PRINT "FOUND DATA:"
40 PRINT A$
50 CLOSE 1
READY.
RUN
PRESS PLAY ON TAPE
TELEFUNKEN
noris Datenrekorder DR 1535


U.S.Robotics
Sportster
14,400 FAX MODEM

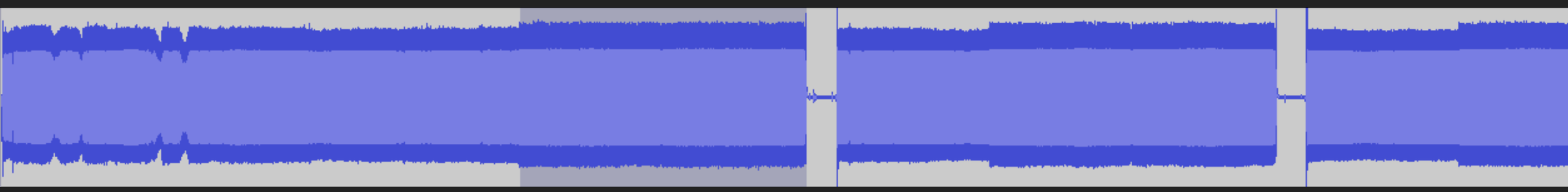

SAMSUNG
Skew Free
Inkjet Fax

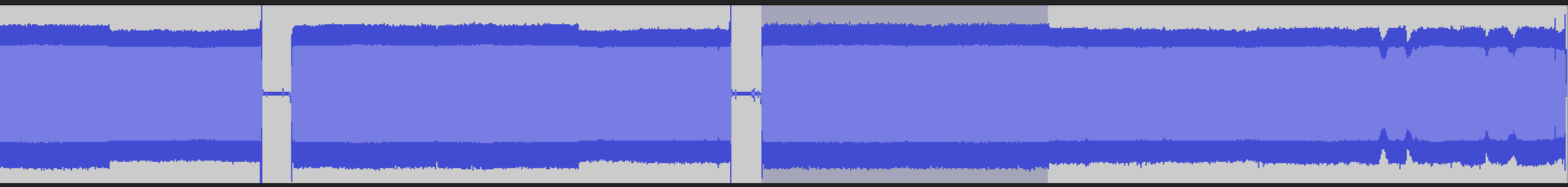
0 0 1 1 0 0 0 0 1 0 0 1 0 0 1 1 0

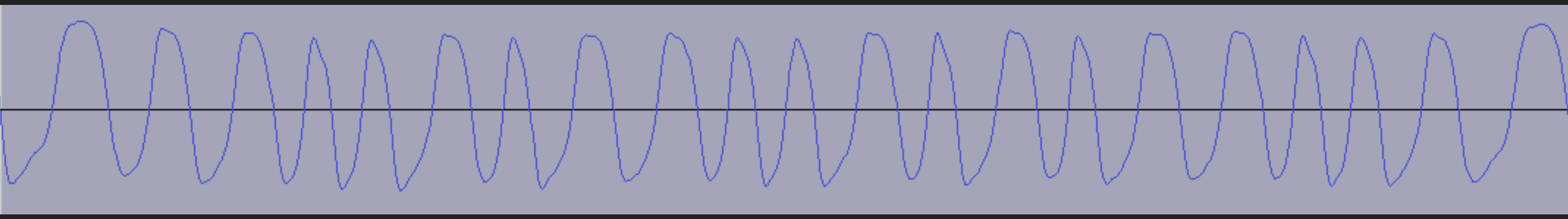


0 0 1 1 0 0 0 0 1 0 0 1 0 0 1 1 0

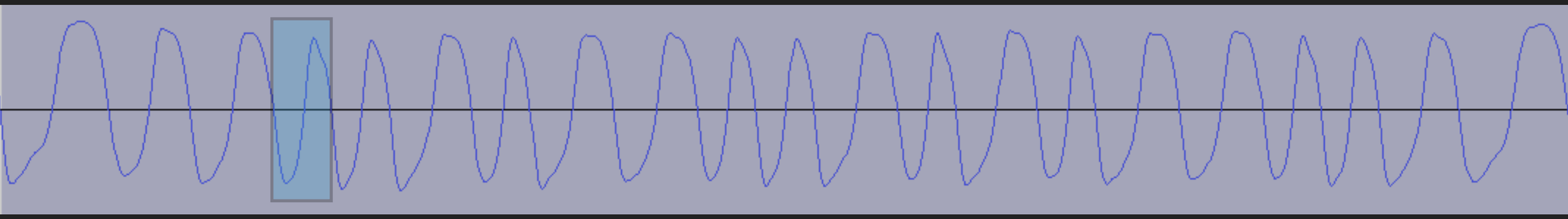
Audio frequency-shift keying (AFSK)

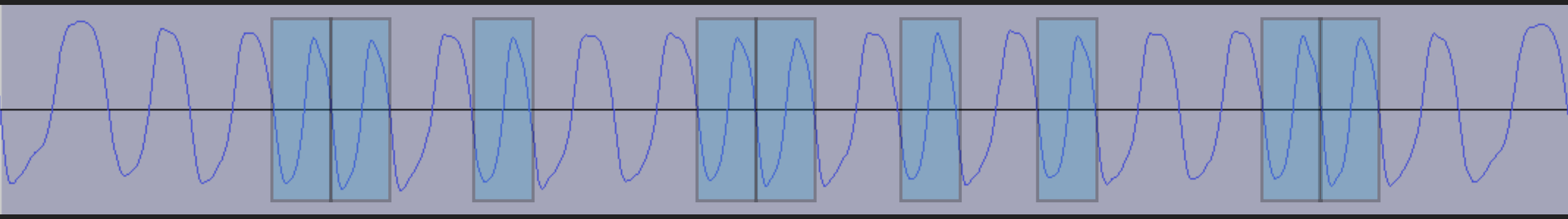


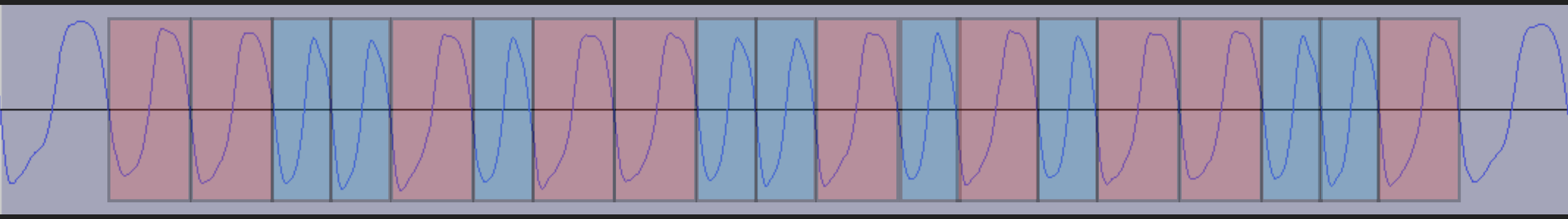


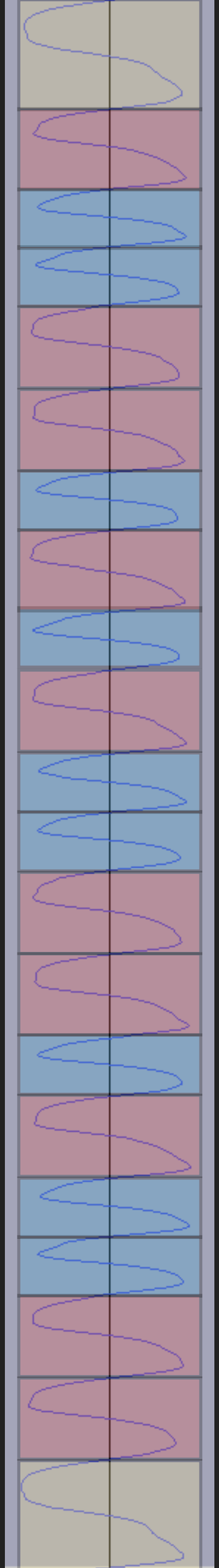


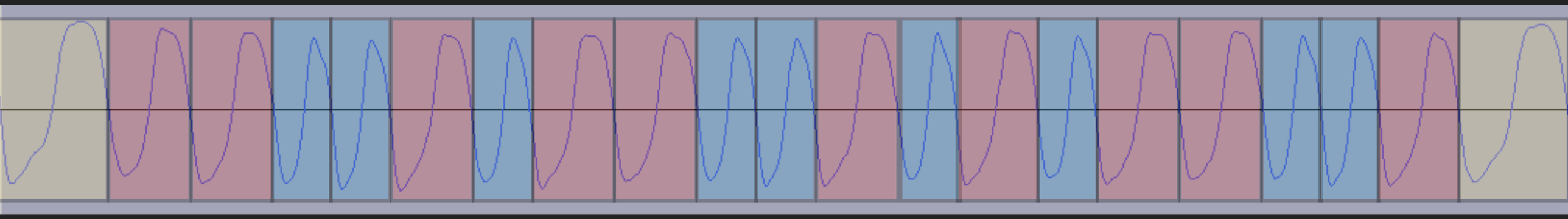
Pulse



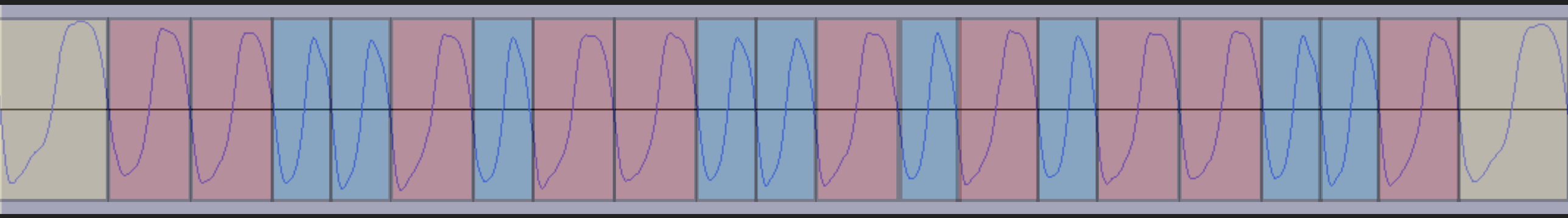




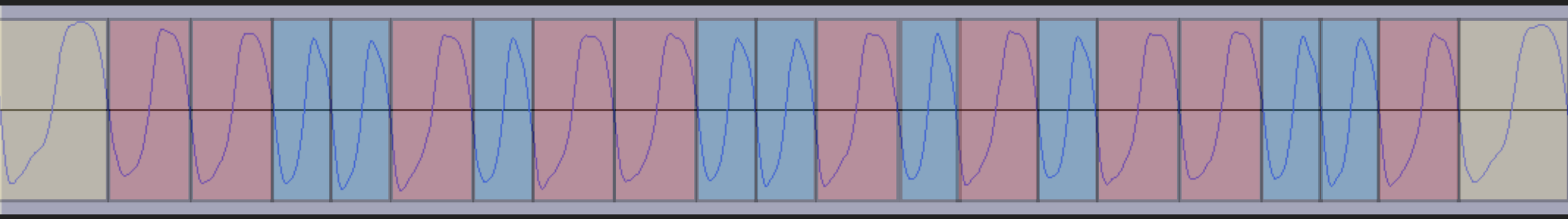




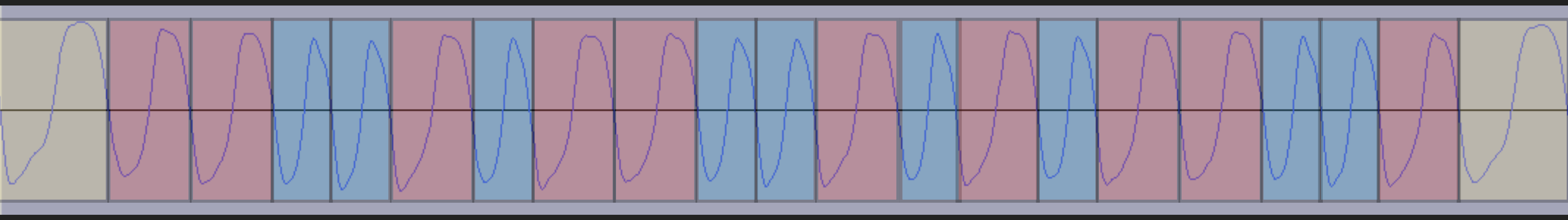
L M M S S M S M M S S M S M S M M S S M L



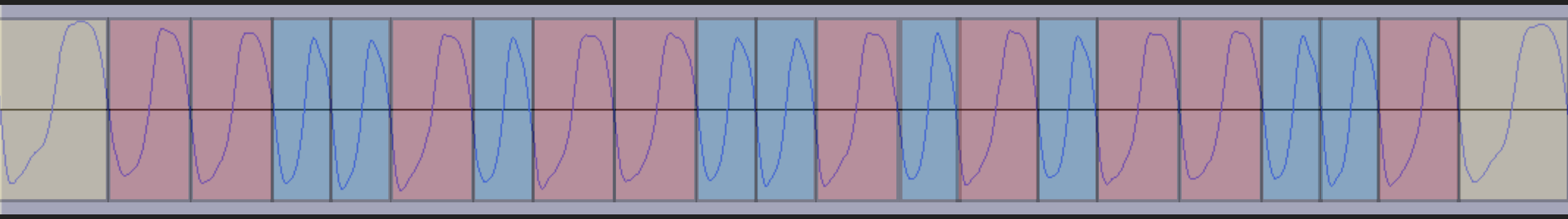
L M M S S M S M M S S M S M S M M S S M L



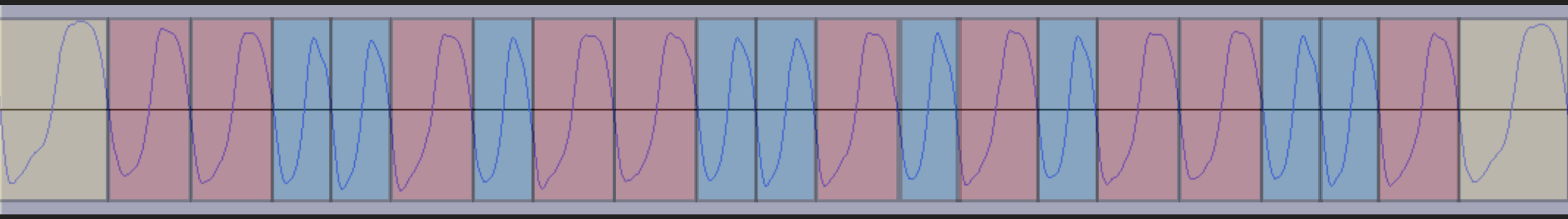
L	M	M	S	S	M	S	M	M	S	S	M	S	M	S	M	M	S	S	M	L
START OF BYTE																				START BYTE



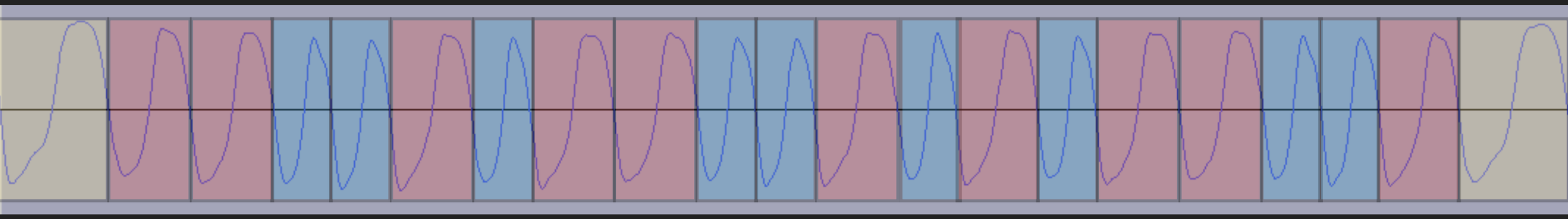
L	M	M	S	S	M	S	M	M	S	S	M	S	M	S	M	M	S	S	M	L
START OF BYTE	1				1								1						START BYTE	



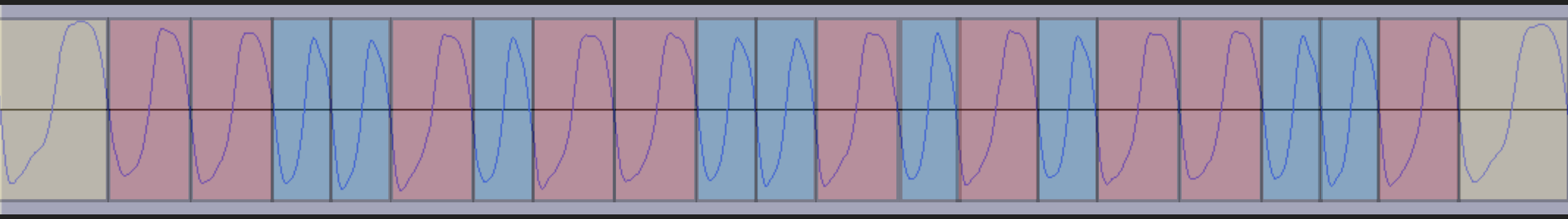
L	M	M	S	S	M	S	M	M	S	S	M	S	M	S	M	M	S	S	M	L
START OF BYTE	1		0	0		1		0	0		0		1		0					START BYTE



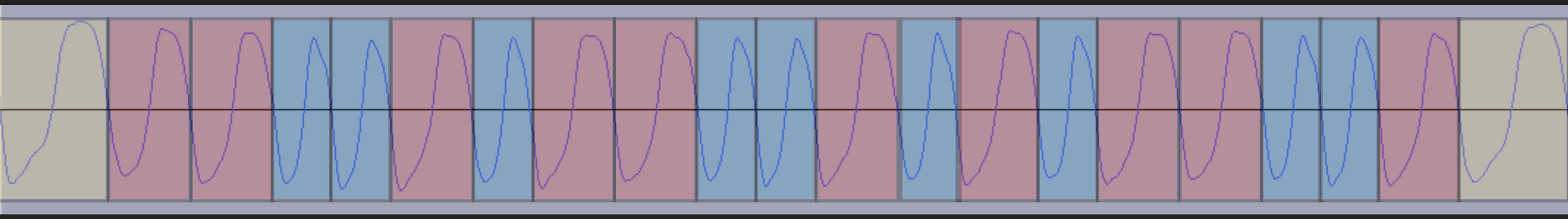
	L	M	M	S	S	M	S	M	M	S	S	M	S	M	S	M	M	S	S	M	L
START OF BYTE	1		0		0		1		0		0		0		1		0				START BYTE
		1		2		3		4		5		6		7		8		9			



L	M	M	S	S	M	S	M	M	S	S	M	S	M	S	M	M	S	S	M	L
START OF BYTE	1		0	0		1		0	0		0		1		0					START BYTE
															PARITY					



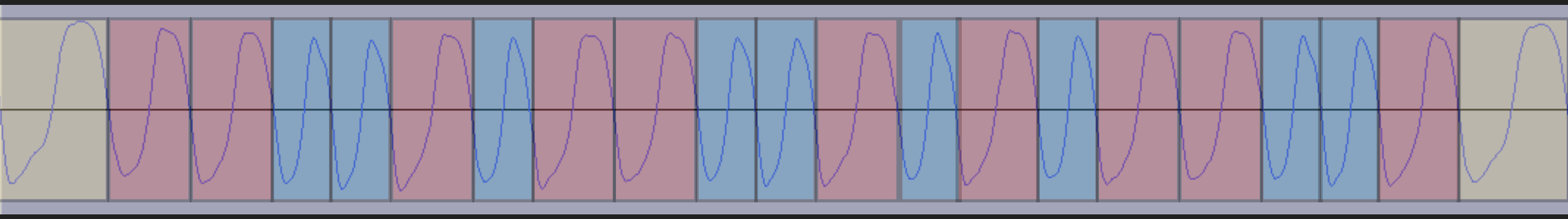
L	M	M	S	S	M	S	M	M	S	S	M	S	M	S	M	M	S	S	M	L
START OF BYTE	1		0	0		1		0	0		0		1		0	START BYTE
													MSB		PARITY	



L	M	M	S	S	M	S	M	M	S	S	M	S	M	S	M	M	S	S	M	L
START OF BYTE	1		0	0		1		0	0		0		1		0					START BYTE
													MSB		PARITY					

1 0 0 0 1 0 0 1

MSB

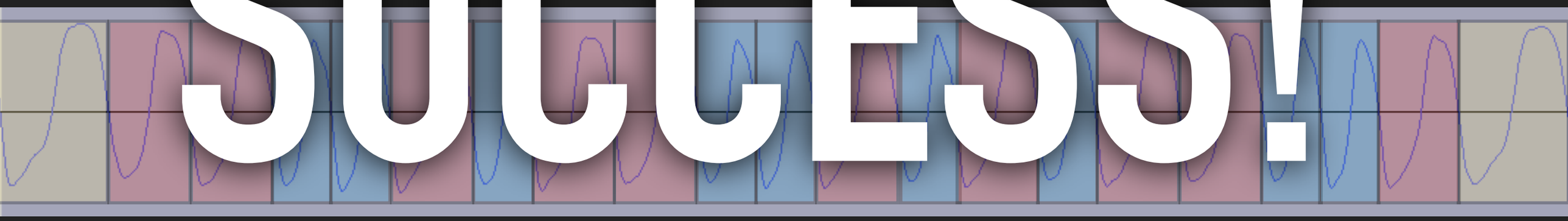


L	M	M	S	S	M	S	M	M	S	S	M	S	M	S	M	M	S	S	M	L
START OF BYTE	1		0	0		1		0	0		0		1		0					START BYTE
													MSB		PARITY					

0 b 1 0 0 0 1 0 0 1 # => 145

MSB

SUCCESS!



L	M	M	S	S	M	S	M	M	S	S	M	S	M	S	M	M	S	S	M	L
START OF BYTE	1		0		0		1		0		0		0		1		0		START BYTE
															MSB		PARITY		

0 b 1 0 0 0 1 0 0 1 # => 145

MSB

```
D: Reading 64k Block
I: Determined short pulse width: 17
I: Pulse width thresholds: {"S"=>18.700000000000003, "M"=>26.180000000000003,
"L"=>35.53}
I: Start parsing block at 2698
D: Reading 64k Block
D: Reading 64k Block
D: Reading 64k Block
D: Reading 64k Block
I: End of leader found at 316440
I: Successfully decoded a data block!
D: Reading 64k Block
D: Reading 64k Block
I: End-of-data marker at 402586
89 88 87 86 85 84 83 82 81 04 3c 03 fc 03 44 41 54 41 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
I: Start parsing block at 402586
I: End of leader found at 404013
I: Successfully decoded a data block!
D: Reading 64k Block
I: End-of-data marker at 490152
09 08 07 06 05 04 03 02 01 04 3c 03 fc 03 44 41 54 41 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
```

```
D: Reading 64k Block
I: Determined short pulse width: 17
I: Pulse width thresholds: {"S"=>18.700000000000003, "M"=>26.180000000000003,
"L"=>35.53}
I: Start parsing block at 2698
D: Reading 64k Block
```

https://github.com/noniq/c64_datassette_decoder

```
20 20 20 20
20 20 20 20
20 20 20 20
20 20 20 20
20 20 20 20
20 20 20 20
20 20 20 20
I: Successfully decoded a data block!
D: Reading 64k Block
I: End-of-data marker at 490152
09 08 07 06 05 04 03 02 01 04 3c 03 fc 03 44 41 54 41 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
```

```
D: Reading 64k Block
I: Determined short pulse width: 17
I: Pulse width thresholds: {"S"=>18.700000000000003, "M"=>26.180000000000003,
"L"=>35.53}
I: Start parsing block at 2698
D: Reading 64k Block
```

https://github.com/noniq/c64_datassette_decoder

THANK YOU!

Stefan Daschek / @noniq

```
20 20 20 20
20 20 20 20
20 20 20 20
20 20 20 20
20 20 20 20
20 20 20 20
I: Successfully decoded a data block!
D: Reading 64k Block
I: End-of-data marker at 490152
09 08 07 06 05 04 03 02 01 04 3c 03 fc 03 44 41 54 41 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
```