

Optical DATV

The screenshot displays the MiniTione DVB software interface, which is used for configuring and monitoring a DVB receiver. The interface is divided into several sections:

- SR (kS) Freq (kHz):** Shows the current Symbol Rate (SR) as 00150 kS and Frequency (Freq) as 00146500 kHz. Below this are buttons for different SR and Freq values.
- Tuner:** Displays LNA gain (2.9 dB) and BaseBand Gain. It includes a Bandwidth slider set to 10 MHz and an Offset of -120kHz.
- Frequency (kHz):** Shows the frequency being asked (146500kHz) and set (146384 kHz). A central display shows the current frequency as 146496 kHz.
- Scan strategy:** Includes options for scan mode (no loop, loop wide, loop narrow, channeled) and a 'Scan' button.
- PIDs:** Lists various PIDs for video and audio, such as 00256 and 00255.
- Web Station ID: 1:** Shows the station name 'MY-CITY' and other details like 'MY-CITY' and 'MY-CITY'.
- Symbolrate (kS):** Shows the current Symbol Rate (SR) set to 150258S.
- IQ:** Displays IQ signal waveforms and a 'Swap' button.
- Web Station ID: 1:** Shows the station name 'MY-CITY' and other details like 'MY-CITY' and 'MY-CITY'.
- dBm:** Shows the Power RF level in dBm, currently at -10 dBm.
- dB:** Shows the MER (Modulation Error Rate) level in dB, currently at 36 dB.
- Constellations:** Displays a constellation diagram for the received signal.
- Video:** Shows video level (14) and FEC (7/8).
- Audio:** Shows audio level and codec (VH264 + MPA).

Background...

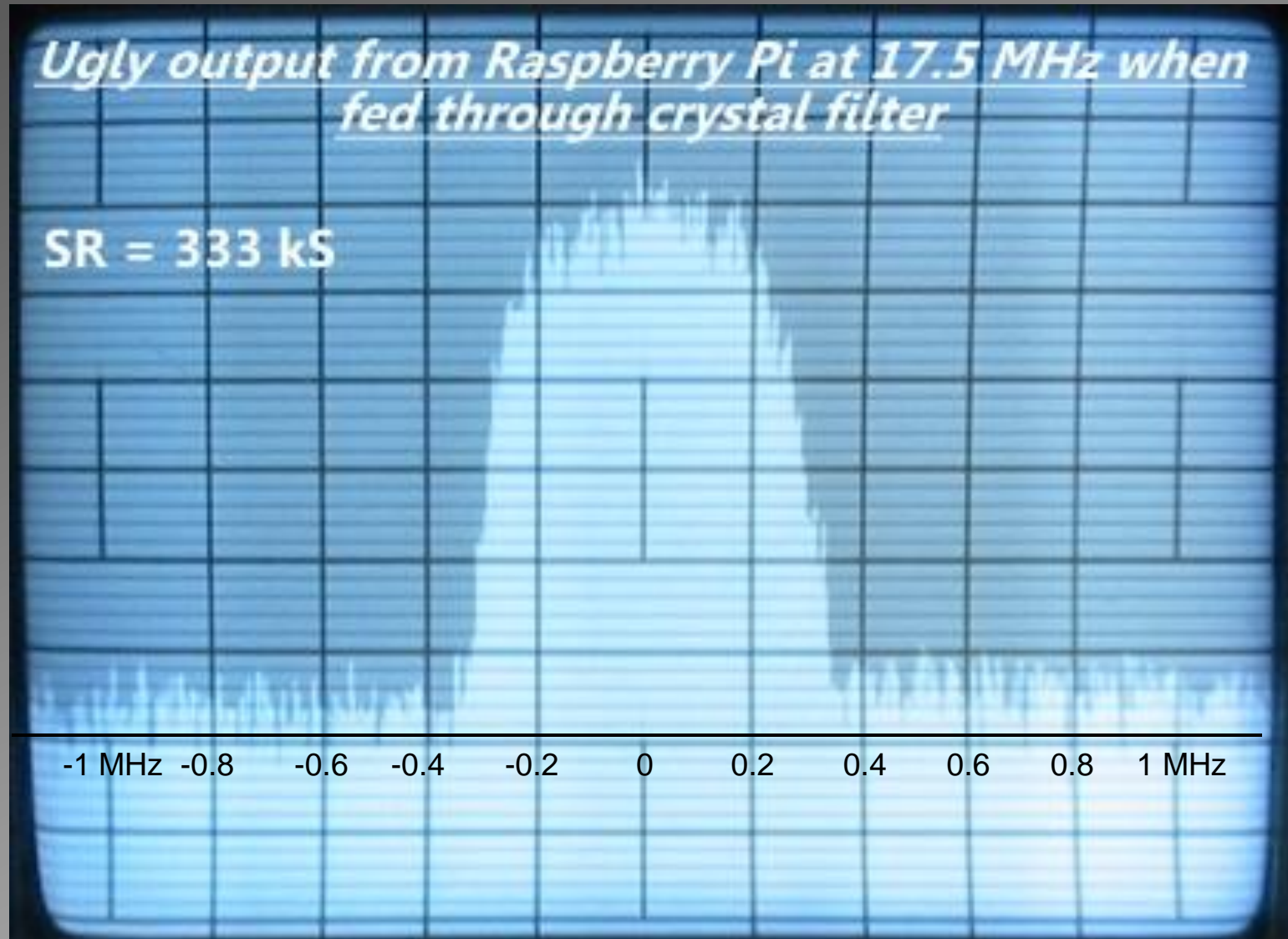


Transmit signal generation

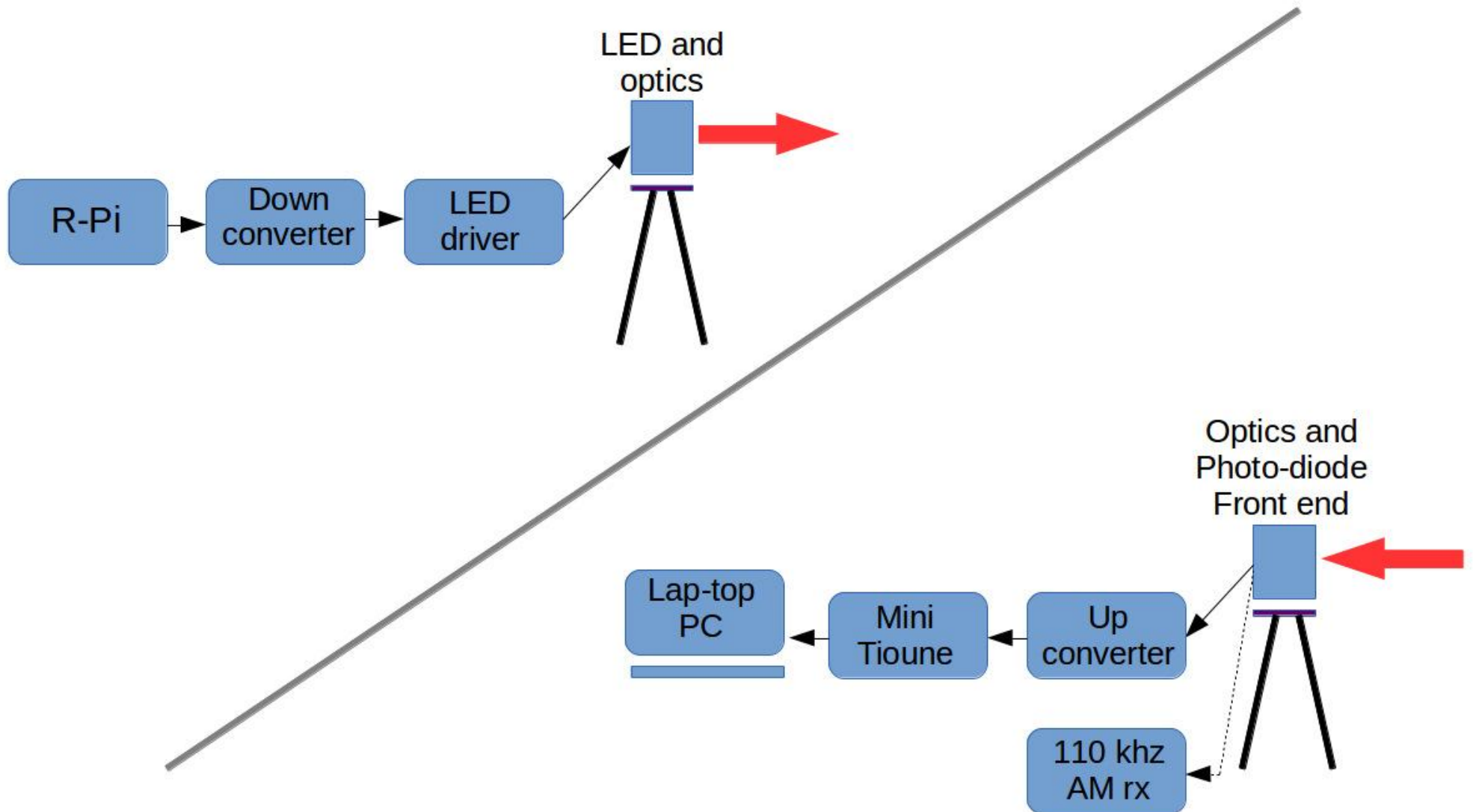
Options:

- a) Update software to output a B/B Transport stream (post error correction coding).
- b) Use existing I/Q outputs and quadrature modulator to produce a quasi-B/B signal.
- c) Down-convert 'ugly' output to produce a quasi-B/B signal.

At $SR = 333 \text{ kS/s}$, the output from the crystal filter would be ideal for up-converting to 2m...



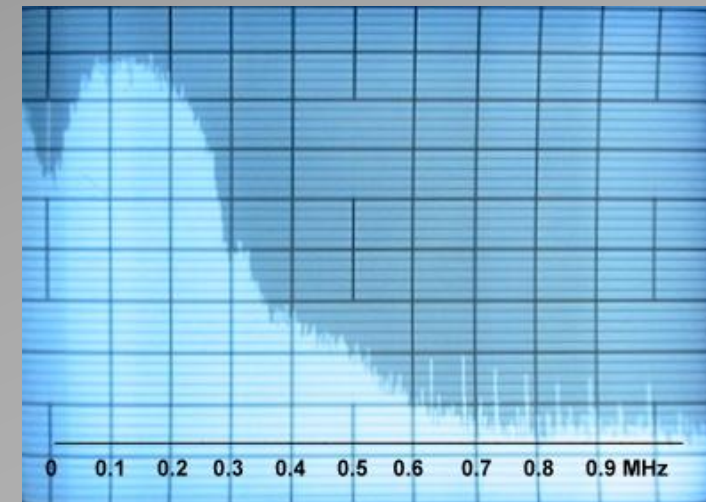
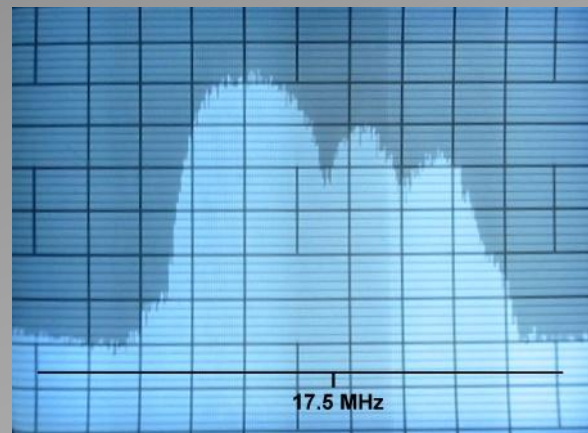
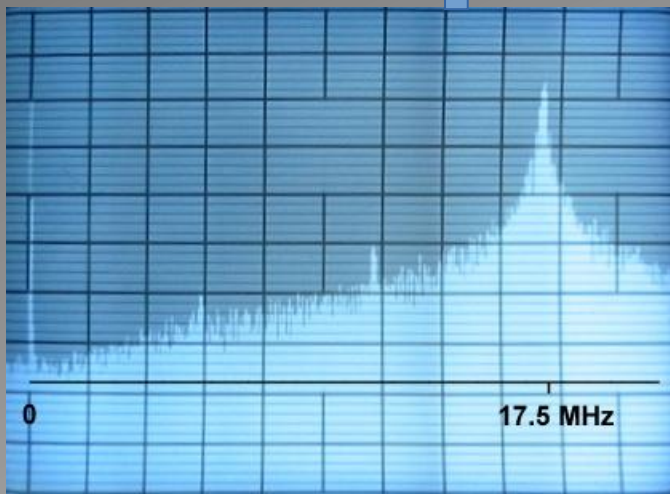
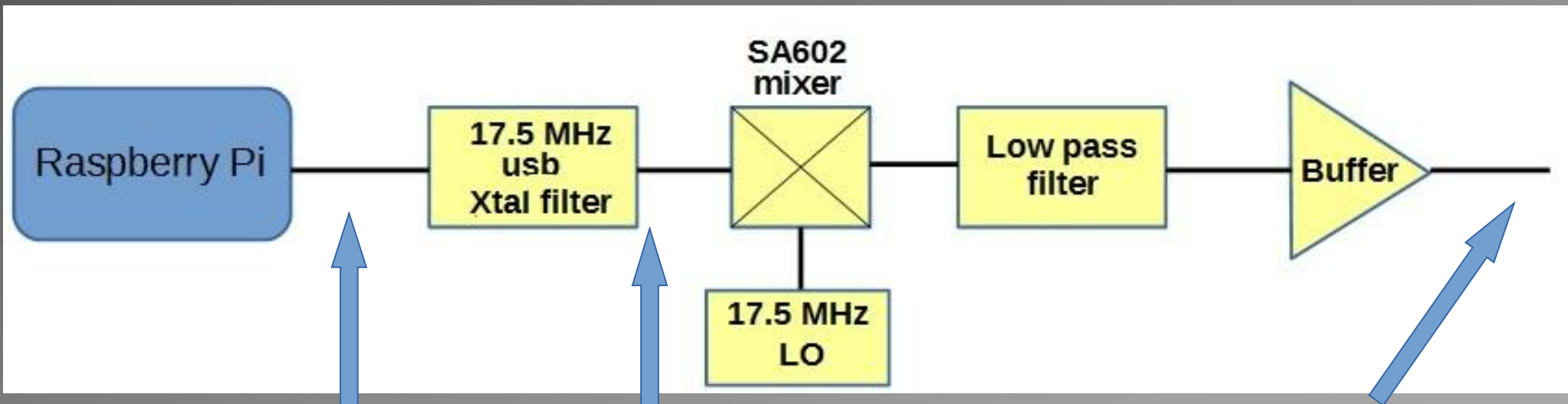
Overall set-up



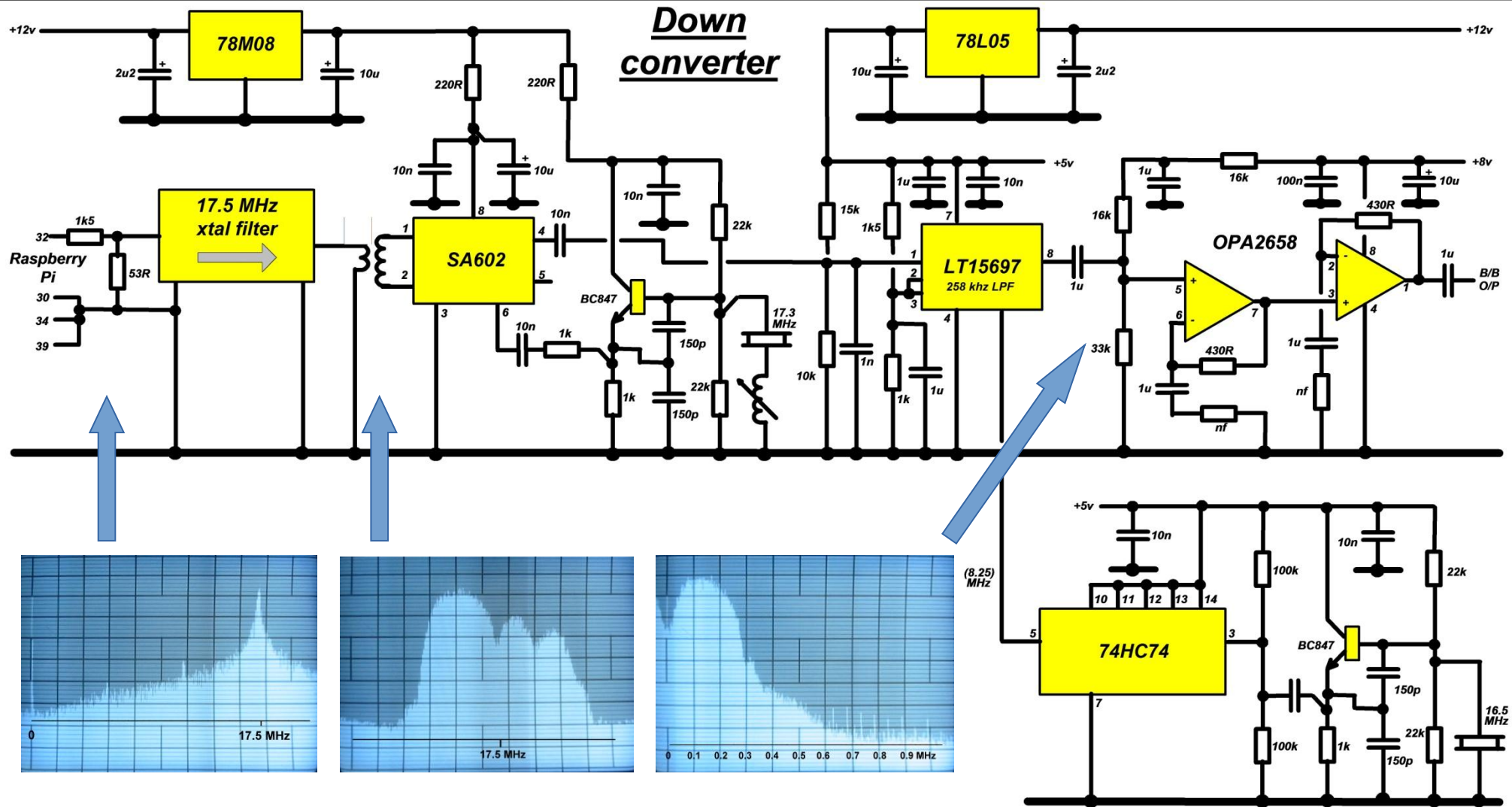
Transmit exciter



Transmit signal generation



Transmit signal generation - schematic

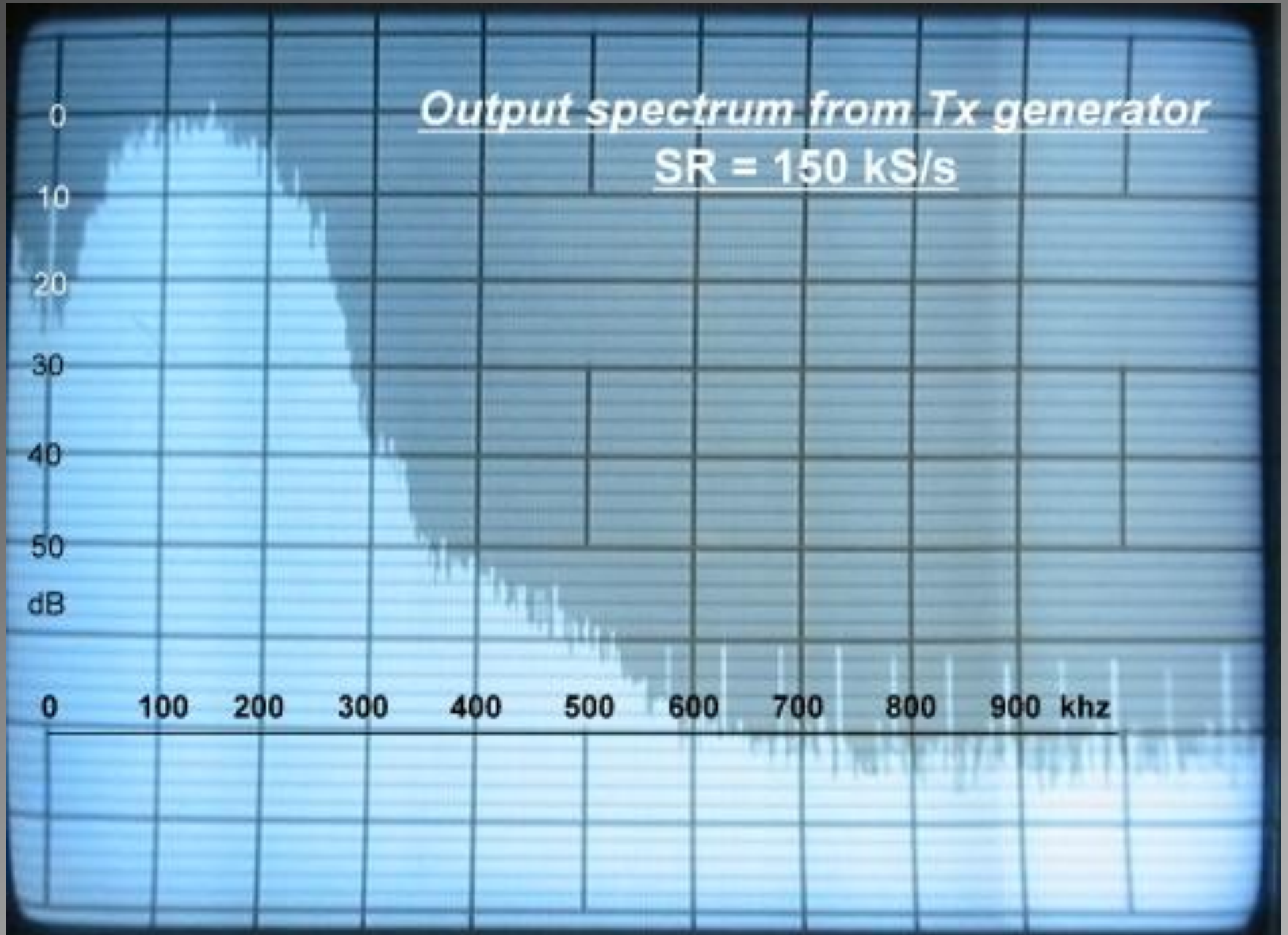


Output spectrum from Tx generator

SR = 150 kS/s

0
10
20
30
40
50
dB

0 100 200 300 400 500 600 700 800 900 khz



Two of the more common red LEDs:

Goldon Dragon series

LR W5AM, LA W5AM, LY W5AM

1.4 Watts



Vorläufige Daten / Preliminary Data

Besondere Merkmale

- **Gehäusertyp:** weißes SMD-Gehäuse, farbloser klarer Silikon - Verguss, klare Silikonlinse
- **Typischer Lichtfluss:** 53 lm (rot); 60 lm (amber); 48 lm (gelb)
- **Besonderheit des Bauteils:** hocheffiziente Lichtquelle bei geringem Platzbedarf
- **Wellenlänge:** 625 nm (rot), 617 nm (amber), 590 nm (gelb)
- **Abstrahlwinkel:** 170°
- **Technologie:** Dünnschicht InGaAlP
- **optischer Wirkungsgrad:** 59 lm/W (rot), 67 lm/W (amber), 53 lm/W (gelb)
- **Gruppierungsparameter:** Lichtstrom, Wellenlänge
- **Verarbeitungsmethode:** für alle SMT-Bestücktechniken geeignet
- **Lötmethode:** Reflow Löten
- **Vorbehandlung:** nach JEDEC Level 4
- **Gurtung:** 24-mm Gurt mit 800/Rolle, ø180 mm
- **ESD-Festigkeit:** ESD-sicher bis 2 kV nach JESD22-A114-D

Anwendungen

- Verkehrssignale
- Hinterleuchtung (Werbebeleuchtung, Allgemeinbeleuchtung)
- Ersatz von Kleinst-Glühlampen
- Tragbare Beleuchtung z. B. am Fahrrad
- Dekorative Lichtleiter-Anwendungen
- Signal- und Symbolleuchten zur Orientierung
- Markierungsbeleuchtung (z.B. Stufen, Fluchtwege, u.ä.)
- Fassadenbeleuchtung im Innen- und

Features

- **package:** white SMD package, colorless clear silicone resin, clear silicone lens
- **typical Luminous Flux:** 53 lm (red); 60 lm (amber); 48 lm (yellow)
- **feature of the device:** high efficient lightsource at low space
- **wavelength:** 625 nm (red), 617 nm (amber), 590 nm (yellow)
- **viewing angle:** 170°
- **technology:** Thinfilm InGaAlP
- **optical efficiency:** 59 lm/W (red), 67 lm/W (amber), 53 lm/W (yellow)
- **grouping parameter:** luminous flux, wavelength
- **assembly methods:** suitable for all SMT assembly methods
- **soldering methods:** Reflow soldering
- **preconditioning:** acc. to JEDEC Level 4
- **taping:** 24-mm tape with 800/reel, ø180 mm
- **ESD-withstand voltage:** up to 2 kV acc. to JESD22-A114-D

Applications

- traffic signaling
- backlighting (illuminated advertising, general lighting)
- substitution of micro incandescent lamps
- portable light source (e. g. bicycle)
- decorative and entertainment lighting (incl. fiber optic illumination)
- signal and symbol luminaire for orientation
- marker lights (e.g. steps, exit ways, etc.)
- indoor and outdoor commercial and residential architectural lighting

2009-06-19

1

Phlatlight series



PT-54-TE Product Datasheet

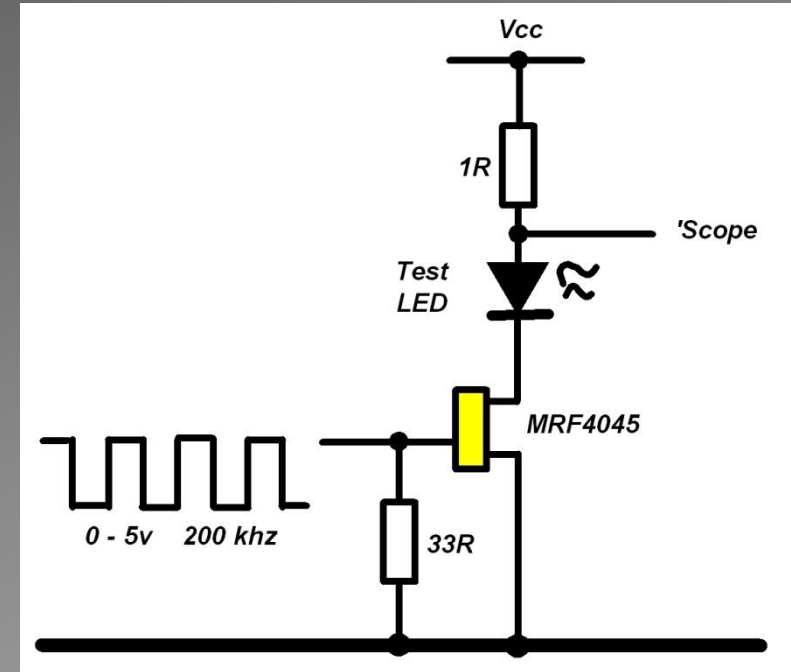
24 Watts

Optical & Electrical Characteristics

General Characteristics	Symbol	Red-Amber (Common Cathode)	Green	Blue	Unit
Emitting Area		5.4	5.4	5.4	mm ²
Emitting Area Dimensions		2.7 x 2.0	2.7x 2.0	2.7x 2.0	mmxmm
Characteristics at Reference Test Drive Current I_f ^{1,2}					
Reference Duty Cycle ³		25	50	25	%
Test Peak Drive Current ^{1,4}	typ I_p	13.5	13.5	13.5	A
Peak Luminous Flux ^{1,5}	typ Φ_v	1485	2250	400	lm
Peak Radiometric Flux ^{1,2}	typ Φ_r	5.3	4.8	9.0	W
Dominant Wavelength	min λ_{dom}	609	516	450	nm
	typ λ_d	613	525	460	nm
	max λ_{dom}	620	540	468	nm
FWHM- Spectral bandwidth at 50% of Φ_v	typ	19	34	20	nm
Chromaticity Coordinates ^{6,7}	typ x	0.676	0.167	0.147	
	typ y	0.323	0.704	0.033	
Forward Voltage	min V_{fmin}	2.7	3.5	3.0	V
	typ V_f	3.0	5.2	3.7	V
	max V_{fmax}	3.7	5.9	4.5	V
Dynamic Resistance	typ	0.05	0.08	0.05	Ω
Device Thermal Characteristics					
Thermal Coefficient of Photometric Flux	typ	-1.0	-0.2	-0	% / °C
Thermal Coefficient of Radiometric Flux	typ	-0.65	-0.2	-0.2	% / °C
Forward Voltage Temperature Coefficient	typ	-2.0	-3.3	-3	mV / °C
Characteristics at Reference Continuous Drive Current I_f (continuous wave) ¹					
Reference Drive Current	typ I_f	8.1	8.1	8.1	A
Luminous Flux	typ Φ_v	830	1590	290	lm
Radiometric Flux	typ Φ_r	3.0	3.2	5.9	W
Dominant Wavelength	typ λ_d	613	528	461	nm
FWHM- Spectral bandwidth at 50% of Φ_v	typ	18	36	21	nm
Chromaticity Coordinates ^{6,7}	typ x	0.675	0.177	0.144	nm
	typ y	0.324	0.713	0.034	nm
Forward Voltage	typ V_f	2.7	4.7	3.3	V

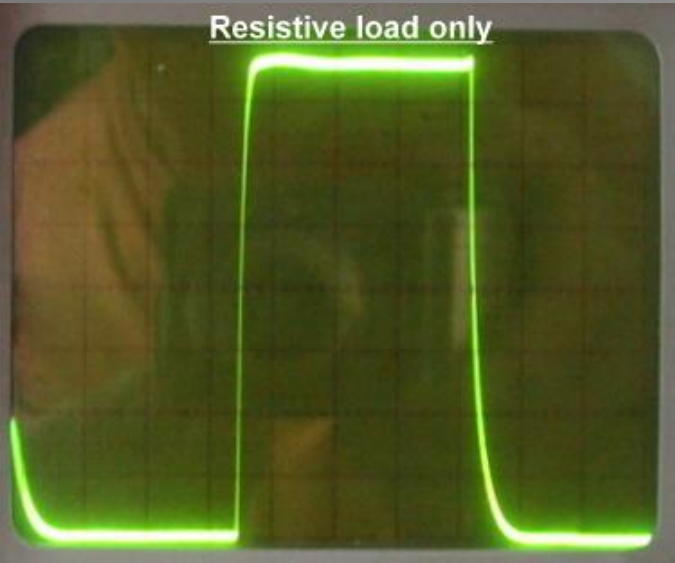
LED step change response

$I = 2A$ peak f drive = 200 khz

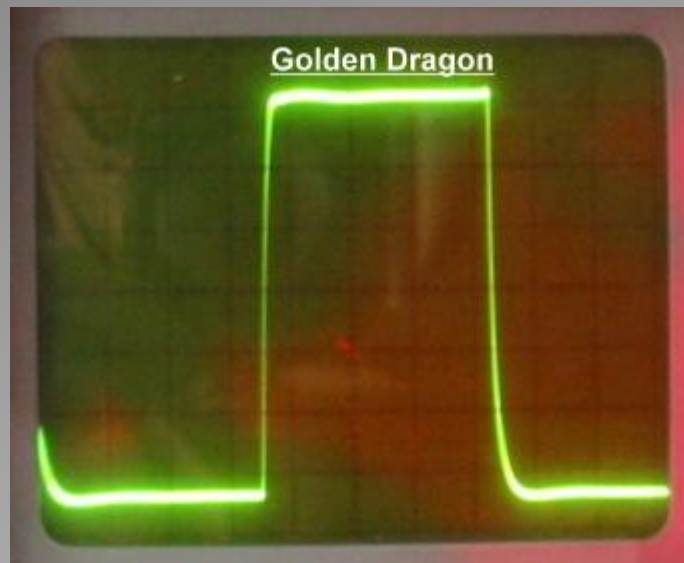


Current waveform for test set-up reference and Golden Dragon and Phlatlight LED samples

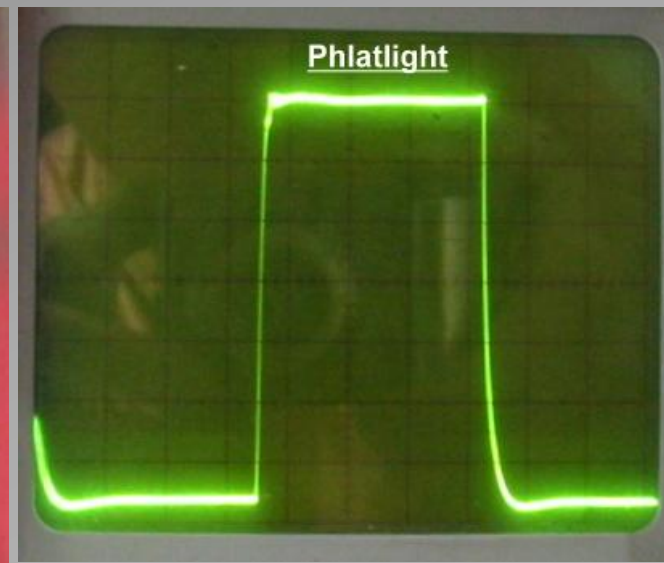
Resistive load only



Golden Dragon



Phlatlight



LED step change response

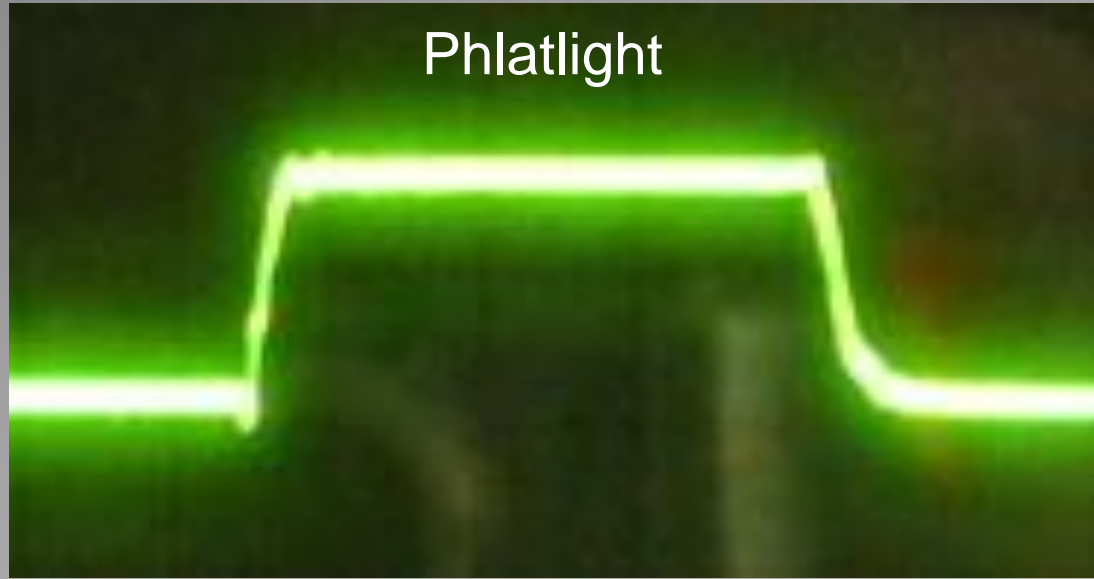
$I = 2A$ peak f drive = 200 khz

Detected optical response

Golden Dragon

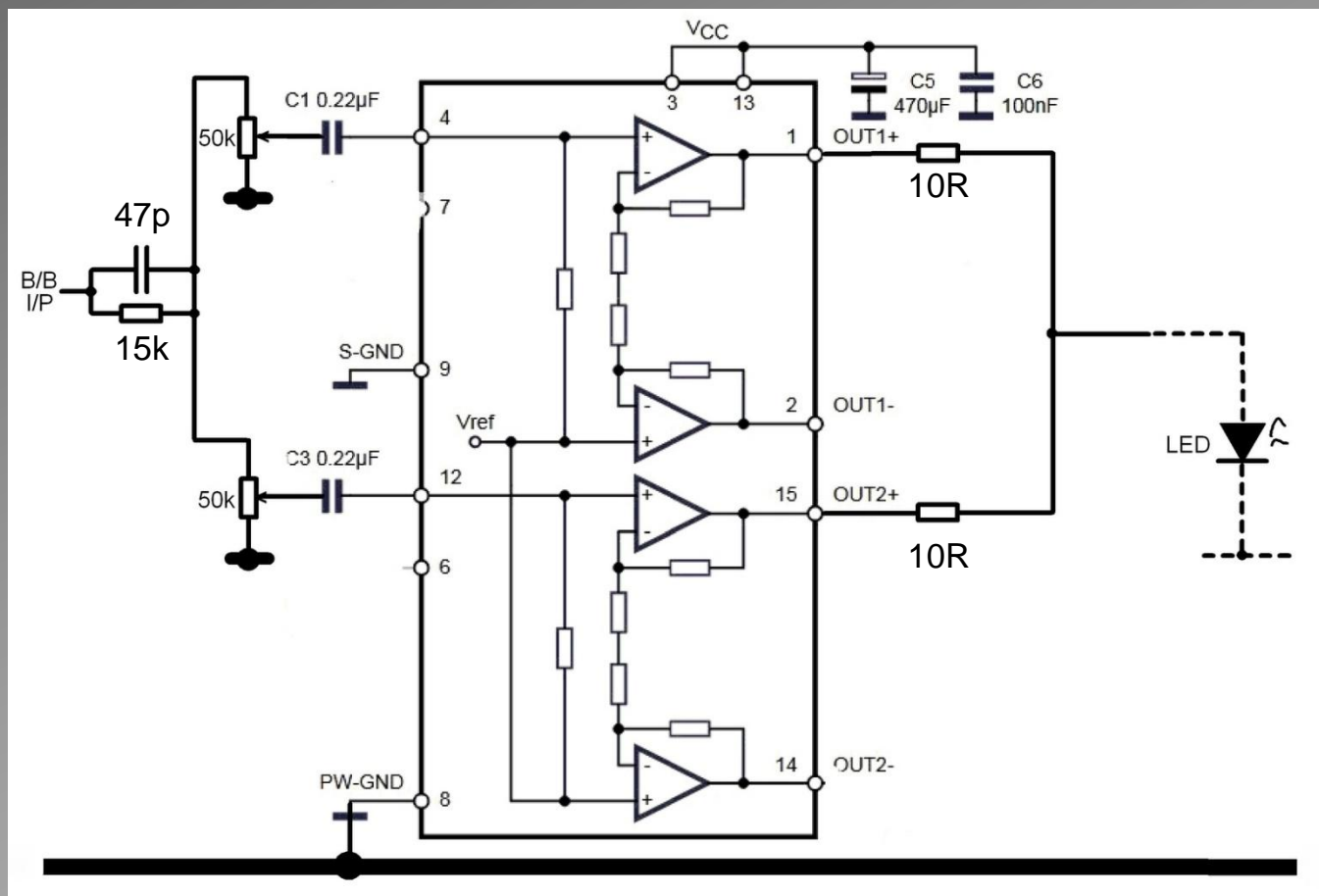


Phlatlight



3W LED driver

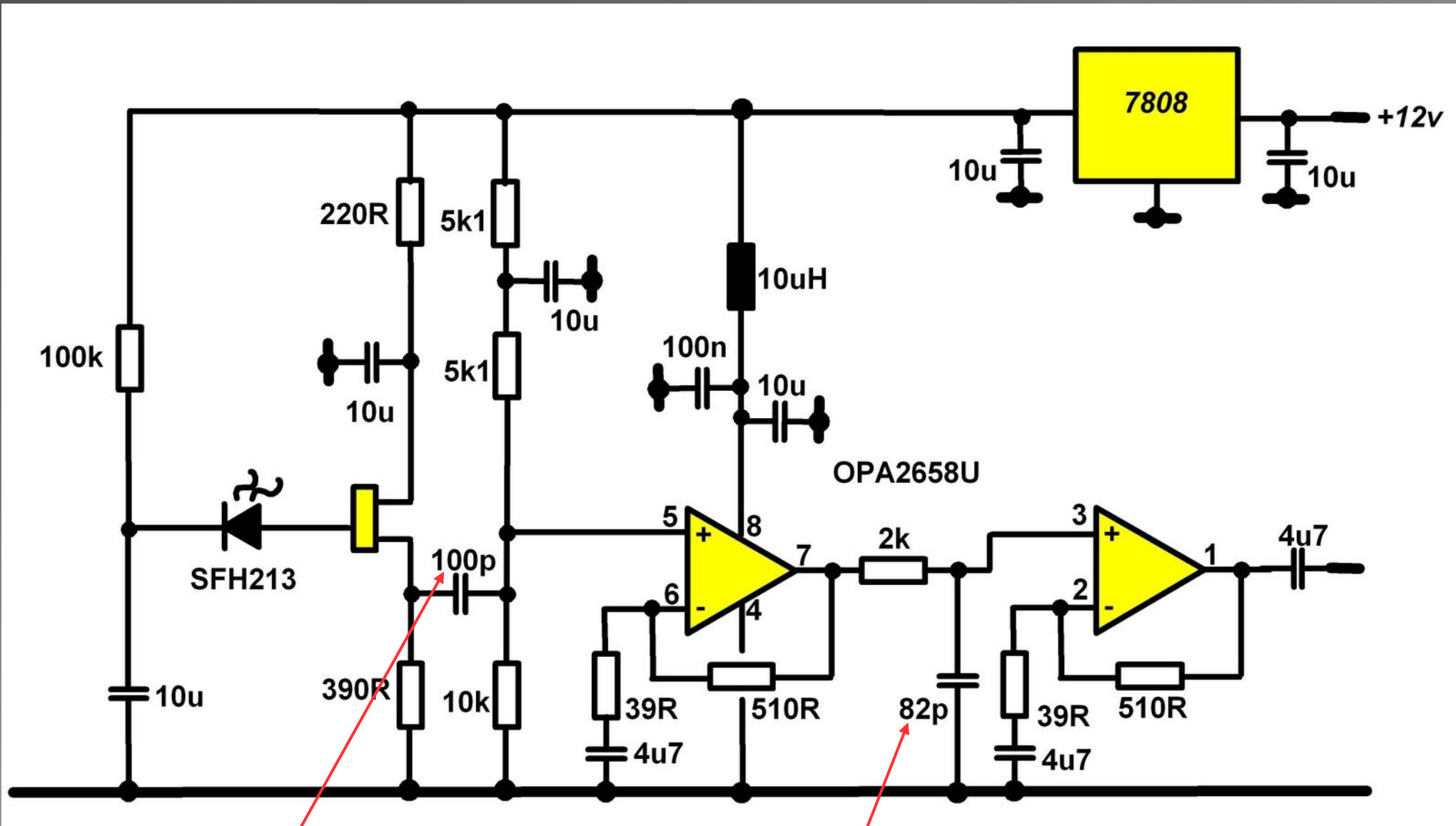
(using low cost TDA7297 ebay pcb)



Receiver up-converter



Receive head unit



LF roll-off

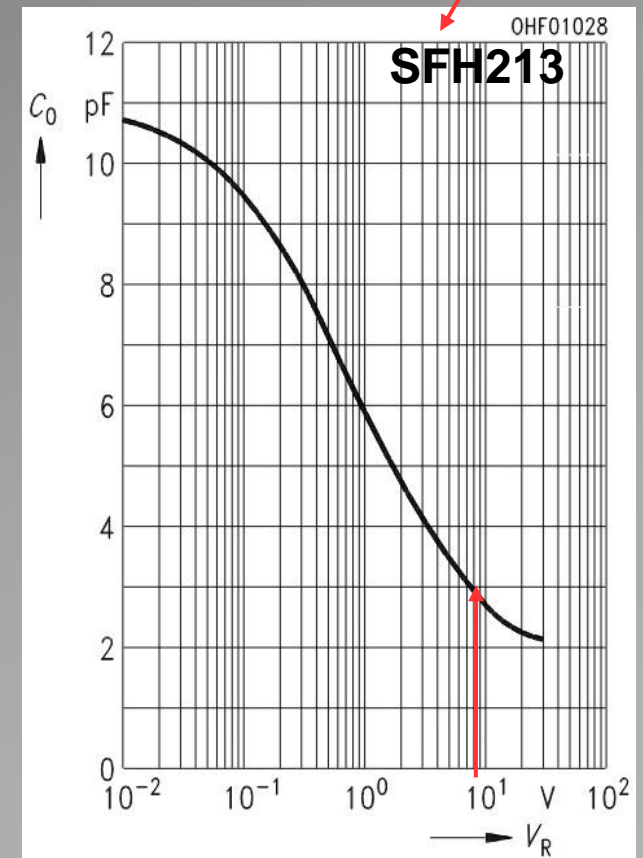
HF roll-off

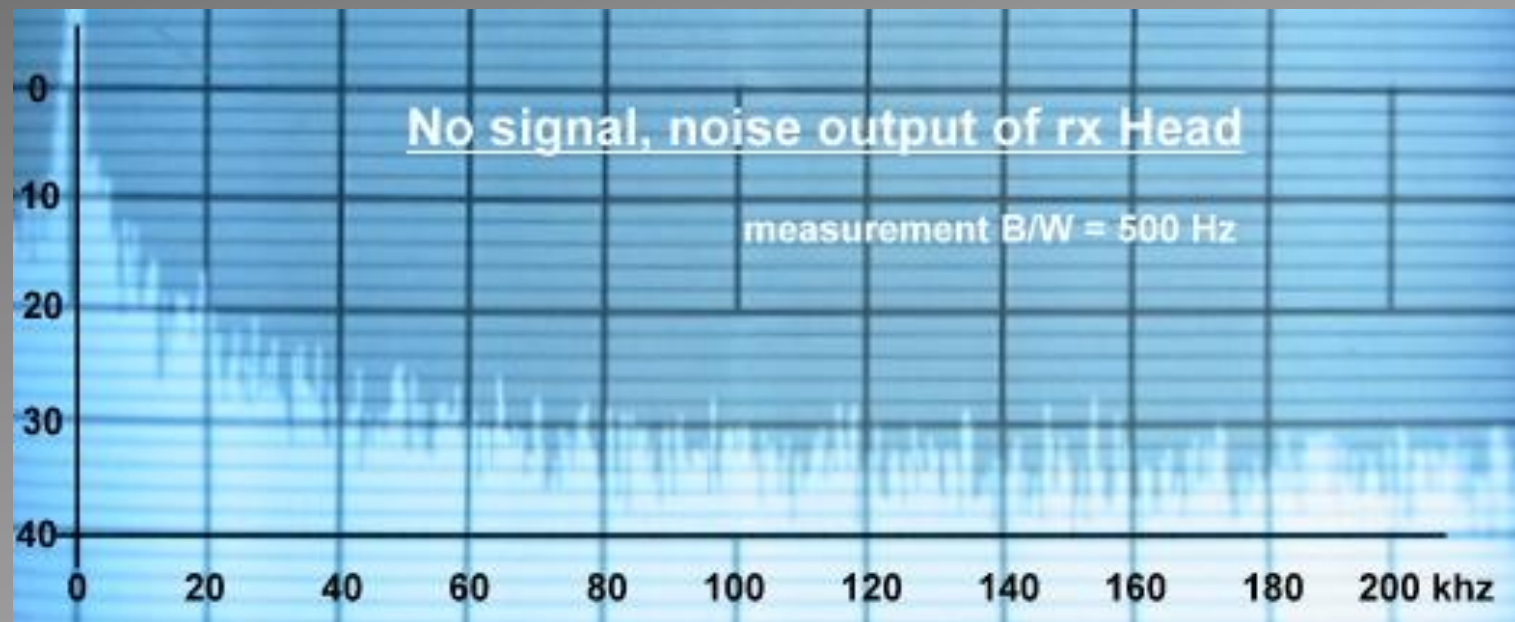
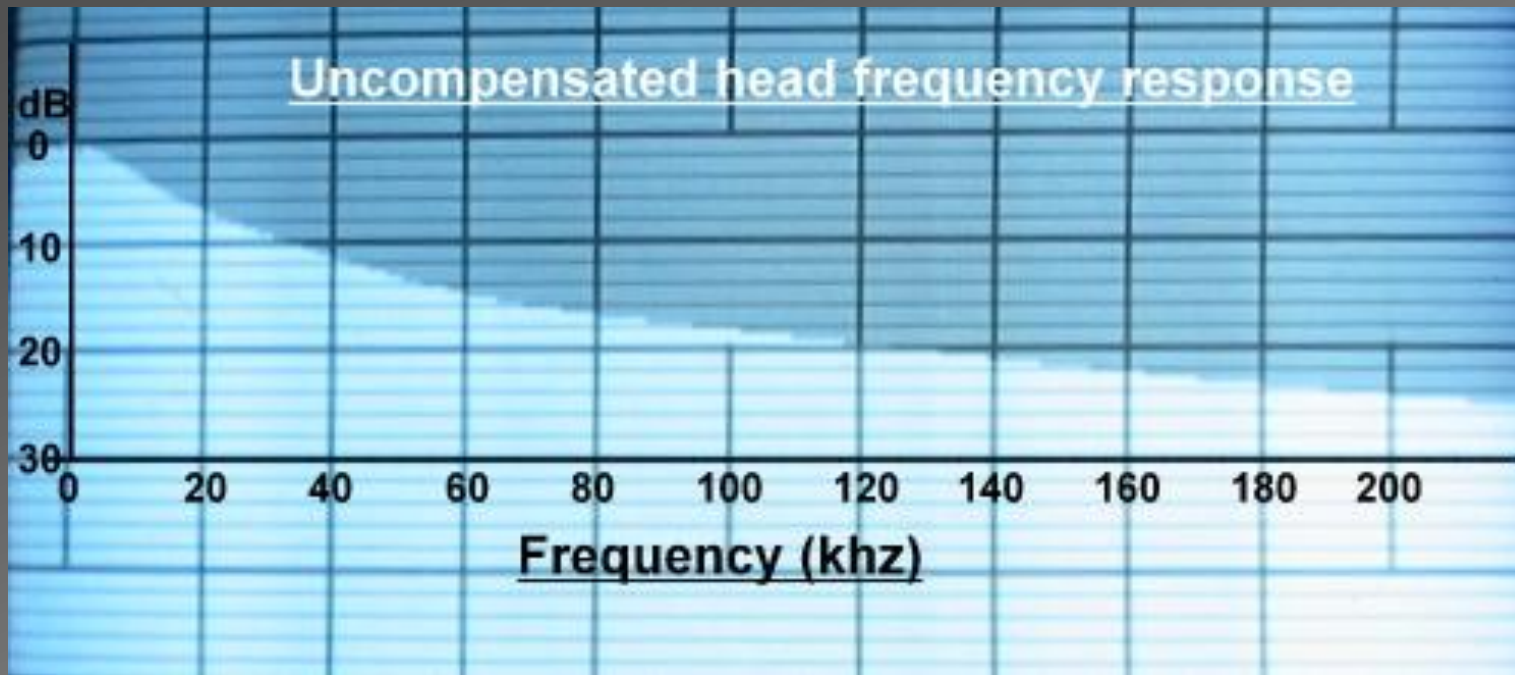


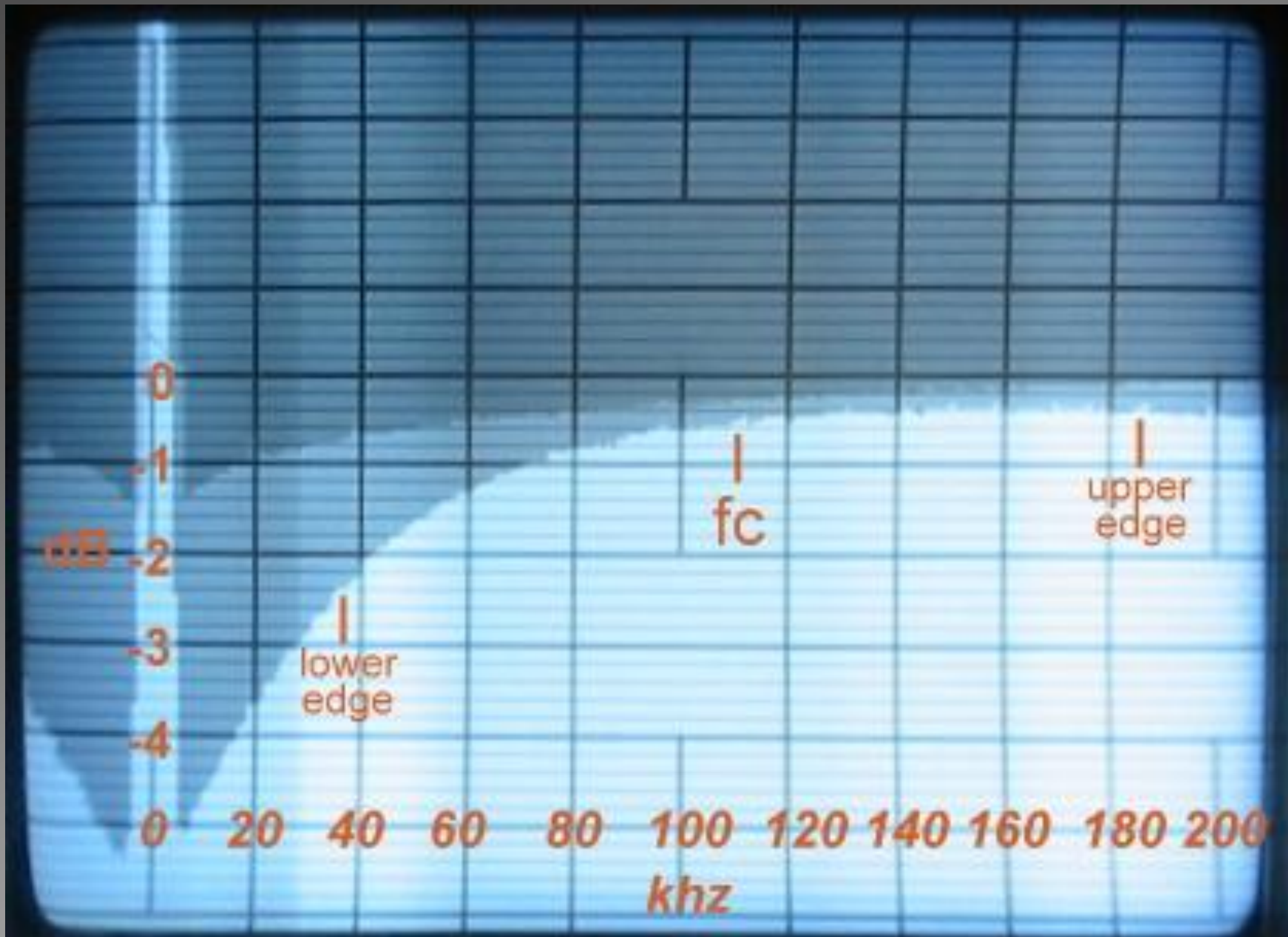
SFH213 capacitance with 8v reverse bias = 3 pF

X_c at 1 khz = 53 M.ohm

And at 100 khz = 530 k







Results across the bench

MINITIOUNE v0.8s - Receiver/Analyser DVB-S/S2 144 MHz to 2450 MHz - SRmini=65 kS/s - for MiniTouner/MiniTouner-Pro

MiniToune DVB *by F6DZP* NIM : Serit FTS-4334L TV mode: DVB-S

SR (kS) Freq (kHz)
00150 00146630
Offset -> 00000000

SR0150	1465p MHz
SR150	2395 MHz
SR250	437 MHz
SR1000	437qe MHz
SR22000	437ve MHz

Low SR DVB mode
FEC 1/2 3/5 2/3 3/4 5/6 1/4 6/7 7/8 1/3 8/9 9/10 2/5


DVB-S DVB-S2 AUTO

Tuner
LNA gain: 13.0 dB
BaseBand Gain 0 dB
 Auto
Bandwidth 10 MHz
Offset -120kHz

Fplug LNB
 A 0V
 B 13V 18V

22kHz
 OFF ON TS_OK

Frequency (kHz)
Freq asked: 146530kHz Freq set: 146414 kHz
Freq -> 146627 kHz



Target dev. 213kHz Deviation: 213 kHz

Copy Freq found

Scan strategy
mode
 no loop 1 search
 loop wide range
 loop narrow wide narrow
 chained

PreLock wide range 12 PostLock narrow range 10
Timer1 8 Timer2 3.0




pll cor 0 auto

Web Station ID:1
G4HJW
Cambridge J002DE Preamp 20 dB
Ant. Dir. East Gain 12 dB
Picture Video QSL Auto Stop
Lg Meg Lg Pic 0000
Web WebEr
Timing 3 sec 00000 0

Scan Width
 +/- 8000 kHz
 +/- 4000 kHz
 +/- 2000 kHz
 +/- 1000 kHz
 +/- 500 kHz
 +/- 250 kHz
 +/- 125 kHz

Symbolrate (kS) Mode
SR set: 150255S A B
Deviation: 1S
SR -> 150 kS/s
Carrier Width: 202 KHz

IQ
Swap: ON
x2
I: 73 Q: 74
Equa Noise



PIDs
Pid from .ini
Rpidatv AutoPID
F6DZP.H264 PID Video 00256
HDlowSR PID audio 00255
France24 Codec
QRZ DX Mpeg2 H264 H265
RaspberryP
Format 4/3 Width: 352
 16/9 Height: 268
 1/1
 auto
Audio MPA AAC AC3
Zoom adapt x1 max
GRAPH

Station Rpidatv
infos: DVB-S
Provider: G4HJW
Codec: VH264 + MPA
photo
Audio level

Info ISS

Carrier Lock 100%
Timing Lock 100%

Power RE dBm -10
MER dB 36

Constellations

Viterbi 2
Vber 100
FEC 7/8
TS TS err 0
Bytes recvd: 10528

Beep Dsave UDP Record
Export Quit

Limit of reliable decode

MINITIOUNE v0.8s - Receiver/Analyser DVB-S/S2 144 MHz to 2450 MHz - SRmini=65 kS/s - for MiniTouner/MiniTouner-Pro

SR (kS) Freq
00150 0014

Offset -> - 000

SR0150 1465
SR150 2395
SR250 437
SR1000 437
SR22000 437

Low SR - DVB
FEC D D A
 1/2 3/5 3/4
 2/3 3/4
 4/5 5/6
 6/7 7/8
 8/8 9/10

Limit of detection signal level

measurement B/W = 500 Hz

0
10
20
dB

0 50 100 150 200 250 300 350 400 450 500
Frequency (kHz)

Serit FTS-4334L

F6DZP TV mode: DVB-S

Scan strategy

mode
 no loop
 loop wide
 loop narrow
 chained

range
 wide
 narrow

1 search

PreLock wide range 13
PostLock narrow range 12

Timer1 8 Timer2 3.0

pll corr 0 auto

PIDs

Pid from .ini

Rpidatv AutoPID
F6DZP-H264 PID Video **00256**
HDlowSR PID audio **00255**
France24
QRZ DX Codec
 Mpeg2
 H264
 H265

RaspberryP

Format
 4/3 Width: 352
 16/9 Height: 288
 1/1
 auto

Audio
 MPA
 AAC
 AC3

Zoom
 adapt
 x1
 maxi

GRAPH

Station Rpidatv
infos: DVB-S
Provider: G4HJW
Codec: VH264 + MPA

photo

Audio level

Info IBS

Web Station ID: 1

G4HJW

MY-CITY
JO02DE Preamp 20 dB

Ant. Dir. East Gain 12 dB

Picture
 Video
 QSL
 Auto
 Stop

Lg Msg
Lg Pic 0000
WebEr
Timing 3 sec 00000 0

Scan Width

- +/- 8000 kHz
- +/- 4000 kHz
- +/- 2000 kHz
- +/- 1000 kHz
- +/- 500 kHz
- +/- 250 kHz
- +/- 125 kHz

Symbolrate (kS)

SR set: 150252S Mode A B
Deviation: 6S
SR -> **150 kS/s**
Carrier Width: 202 KHz

IQ

Swap: ON
x2

I: 42 Q: 37

Equa Noise

CarrierLock 88% SR 100% Full

Power RF -88dBm S/N MER 7 dB

Constellations

Viterbi err 1239 Vber 12%

FEC 7/8

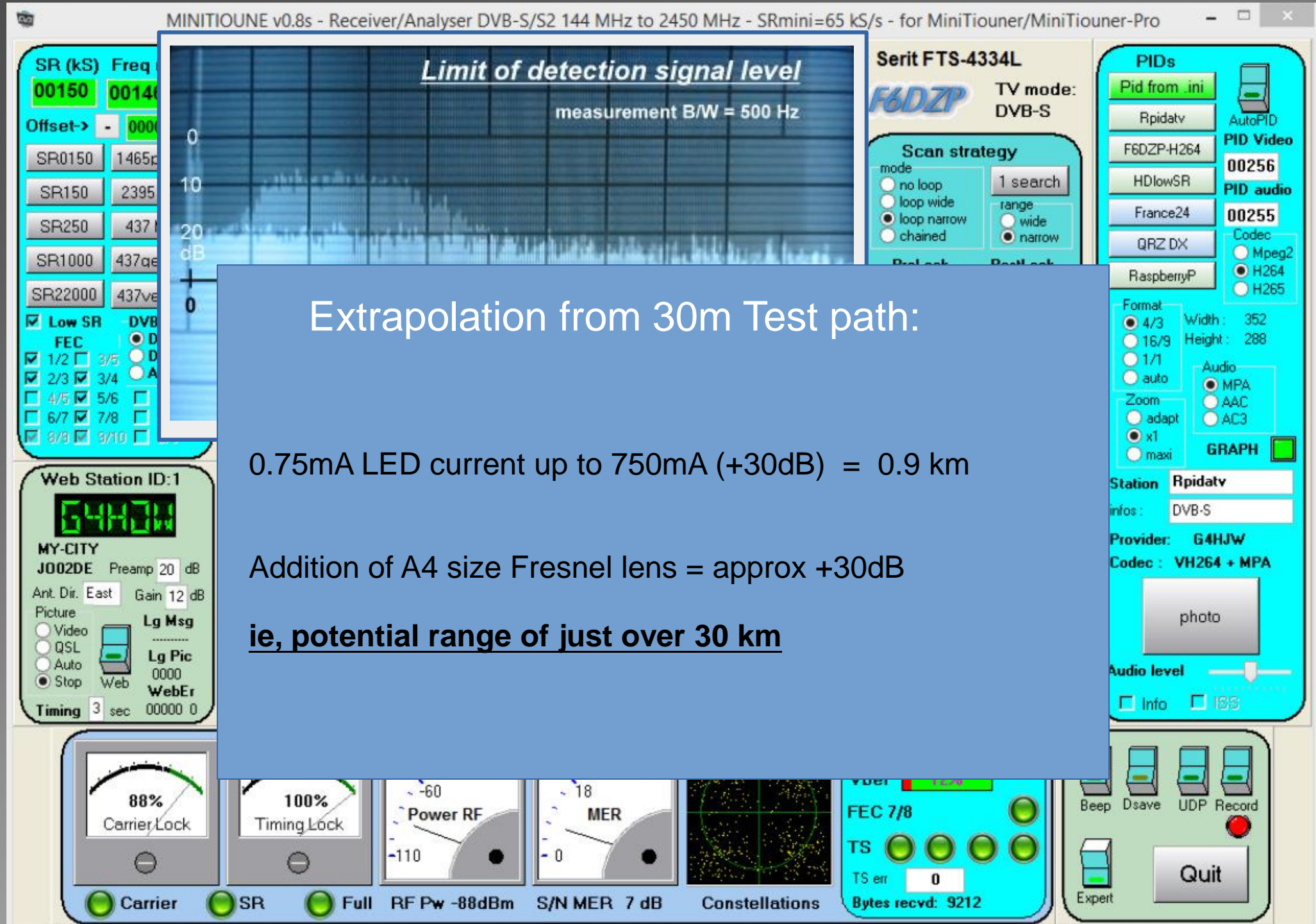
TS TS err 0 Bytes recvd: 9212

Beep Dsave UDP Record

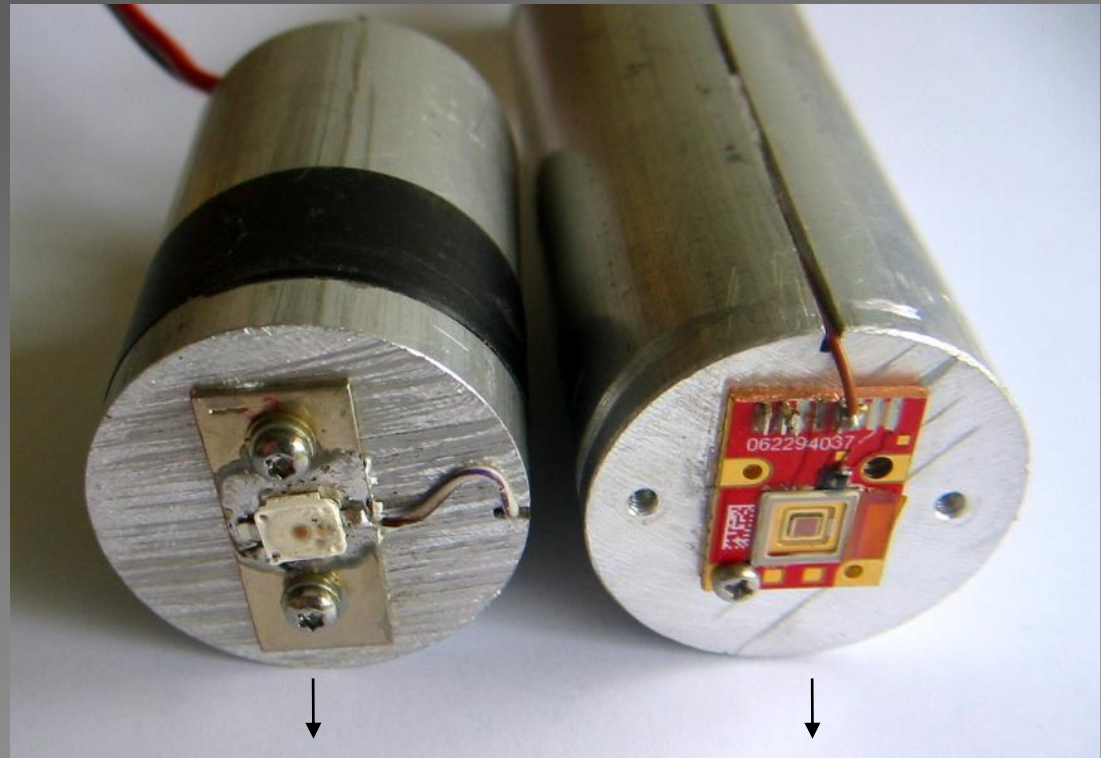
Expert

Quit

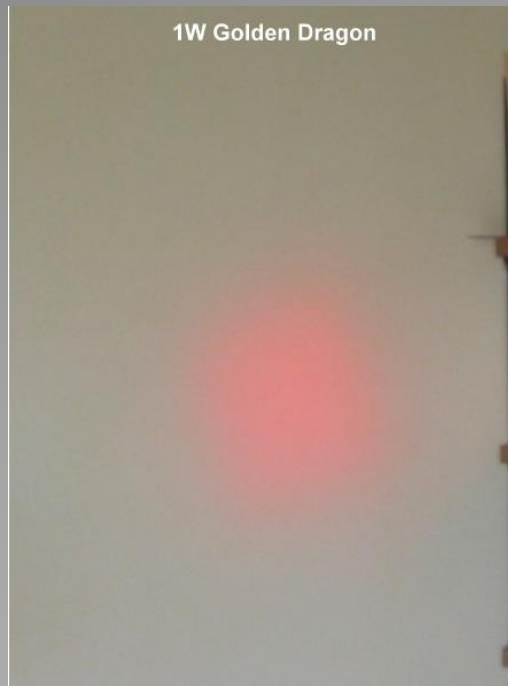
Limit of reliable decode



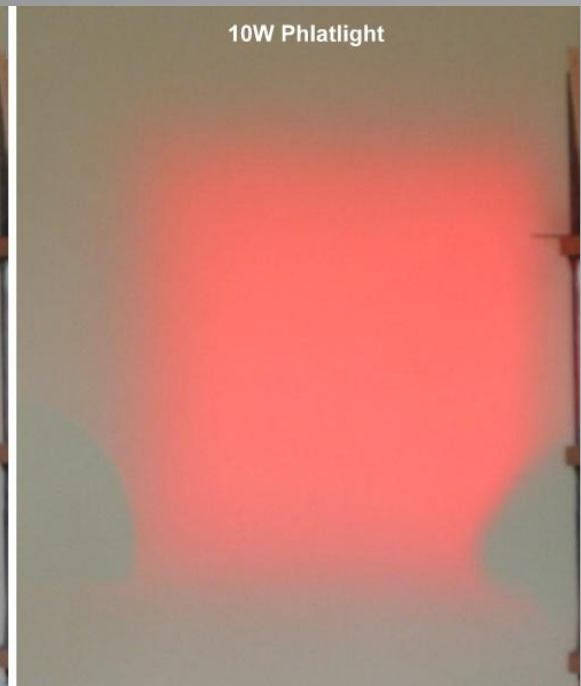
Effect of larger Die size



1W Golden Dragon



10W Phlatlight



*End
of
presentation*

*So where to go
from here?*