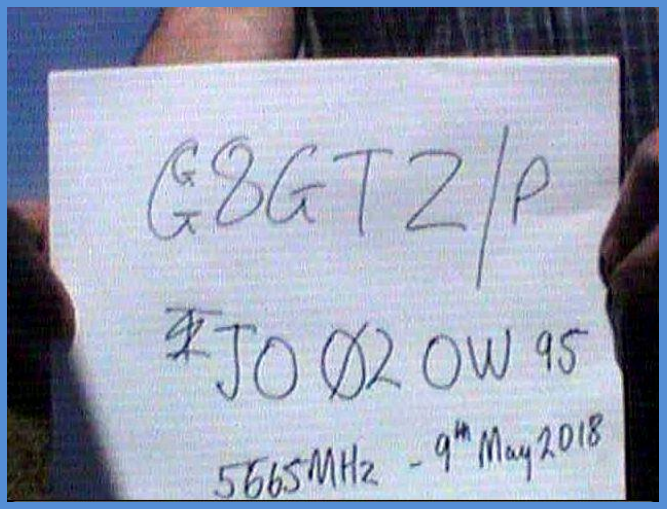
Seeing from A to B

5.6 GHz FPV ATV

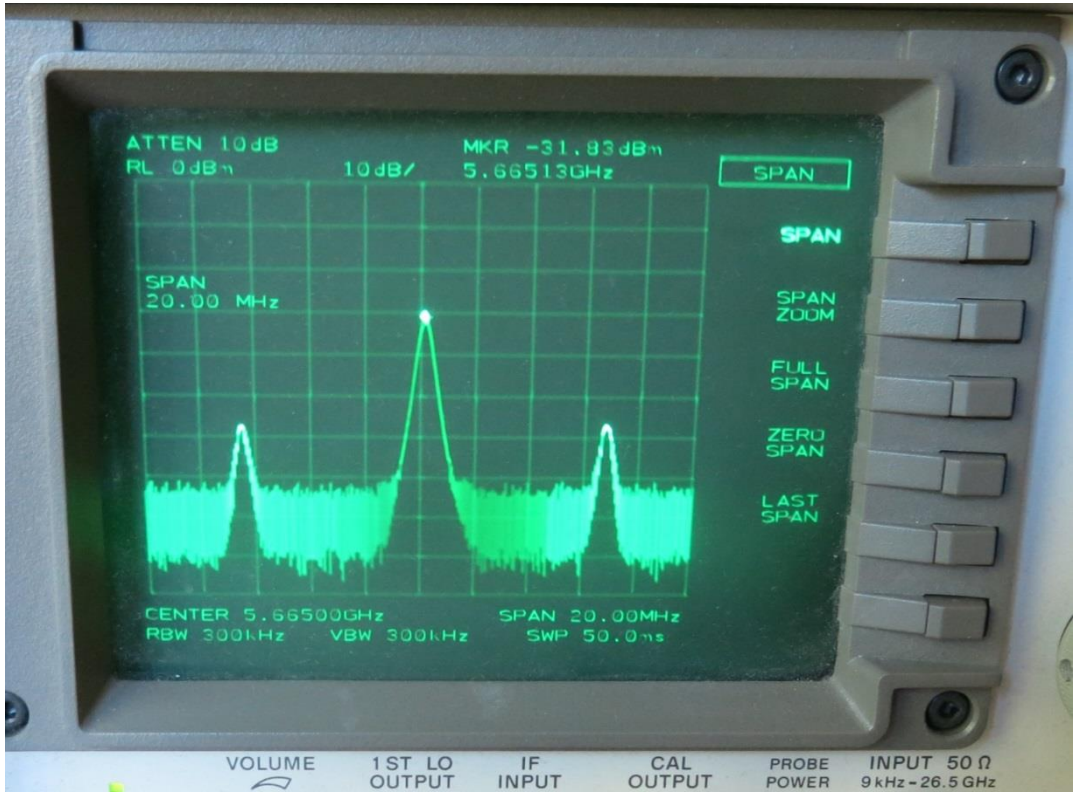


Barry Chambers G8AGN

5.6GHz FPV ATV

Activity centred on 5665 MHz (in E to S segment)

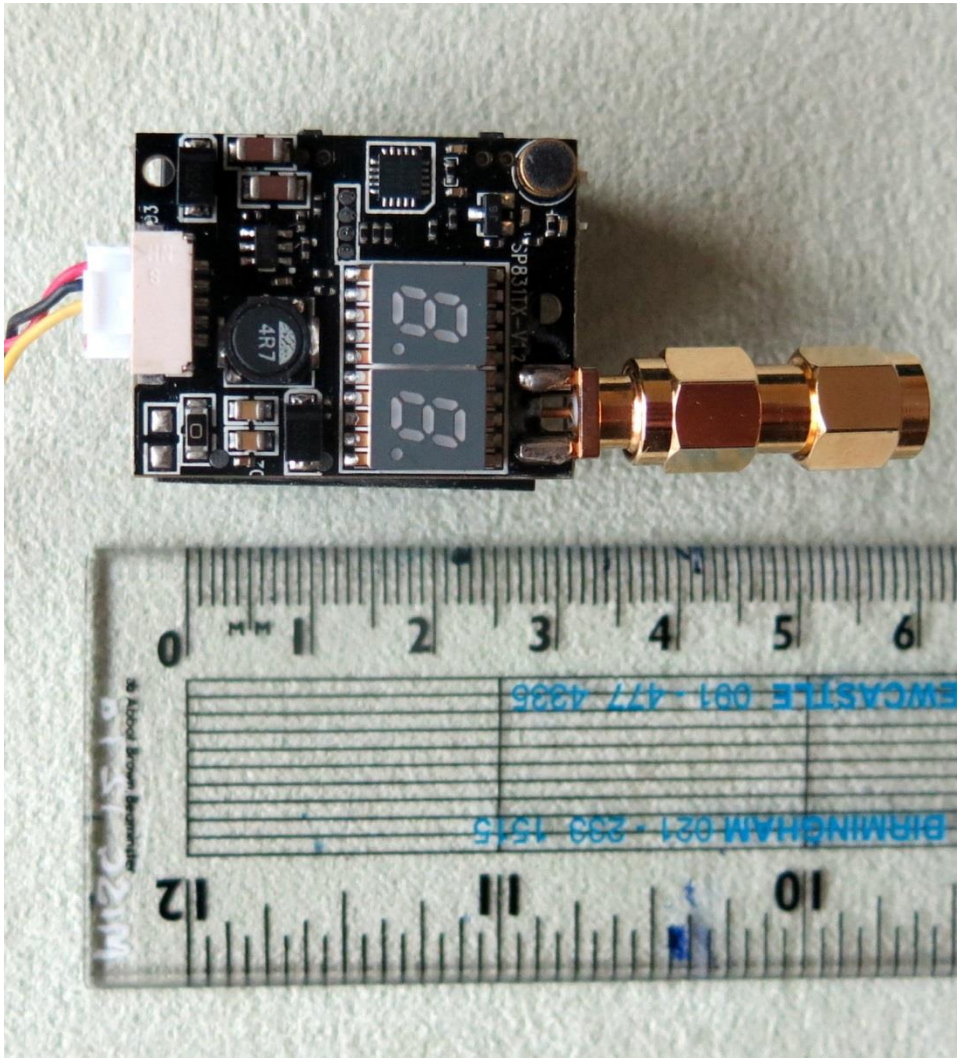
Wideband FM. Typically 18MHz bandwidth PAL



Modulated carrier

Vision and 6.5 MHz audio sub - carriers (no modulation)

Typical Tx module (nominal 600 mW)



Synthesised source

LEDs show channel number
33 or E3 = 5665 MHz

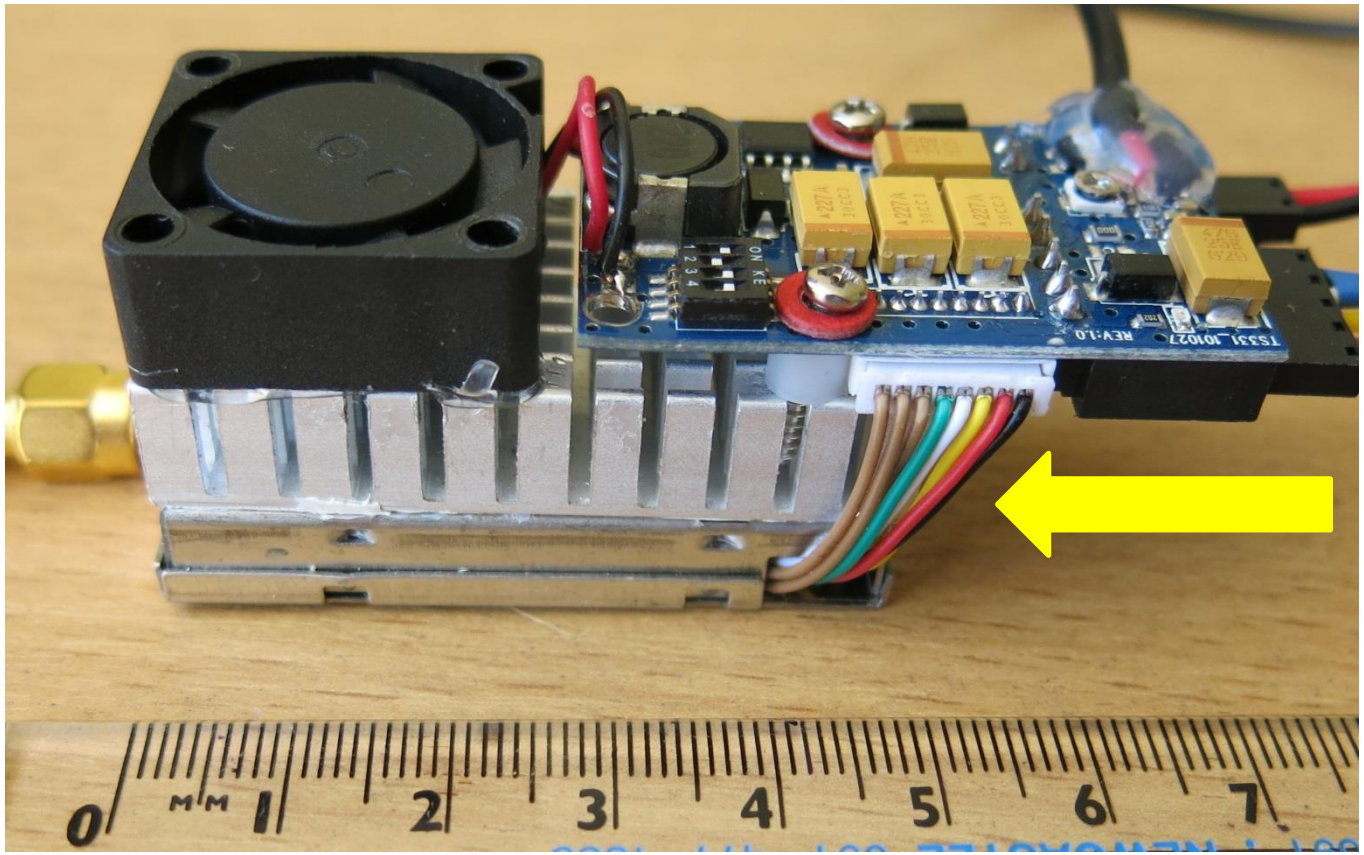
Runs from 12 V (SMPS)

Needs a heat sink (not fitted as standard)

Reverse polarity SMA RF connector

Built-in microphone

More Tx power - 1

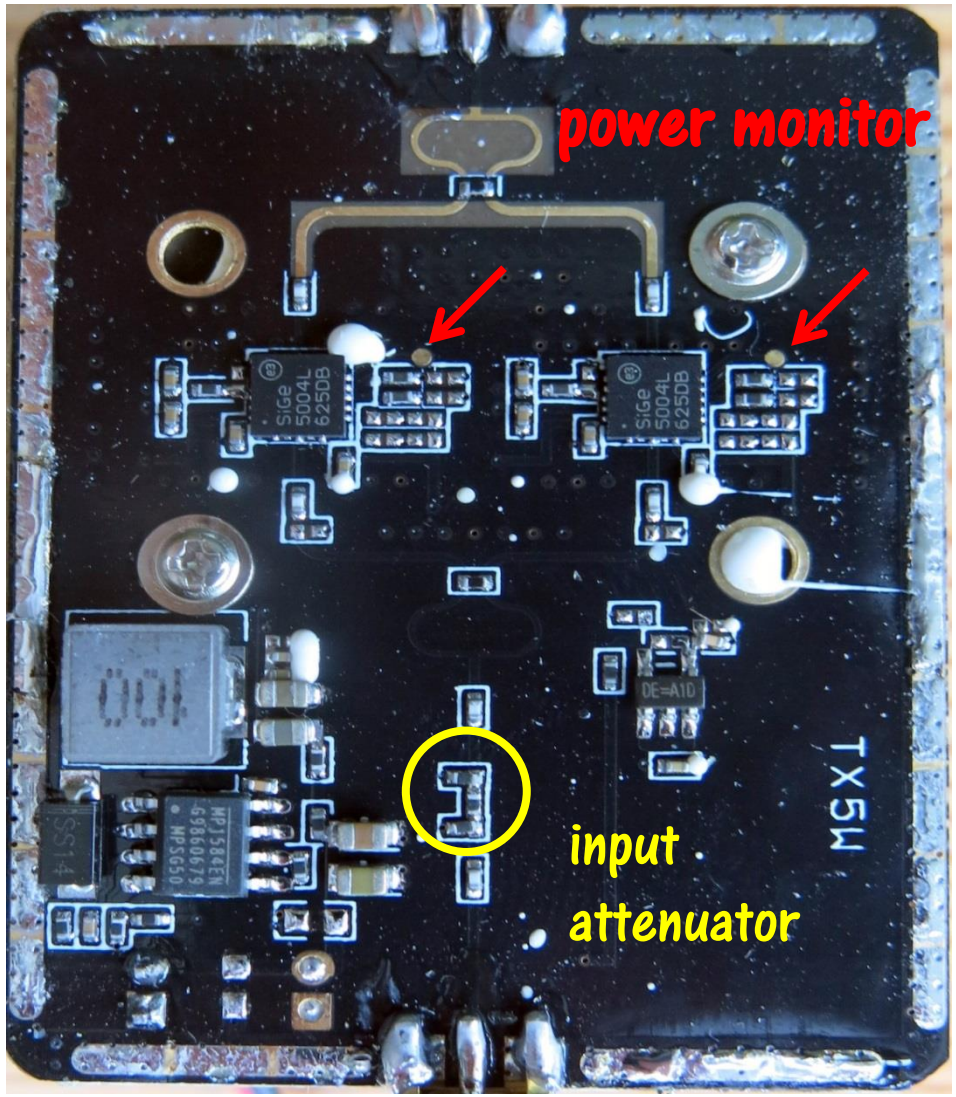


TS582000 Tx module

Nominal RF output 2 W (1.7 W measured)

Built-in microphone and fan (noisy)

More Tx power - 2



TXPA58002W5 PA module

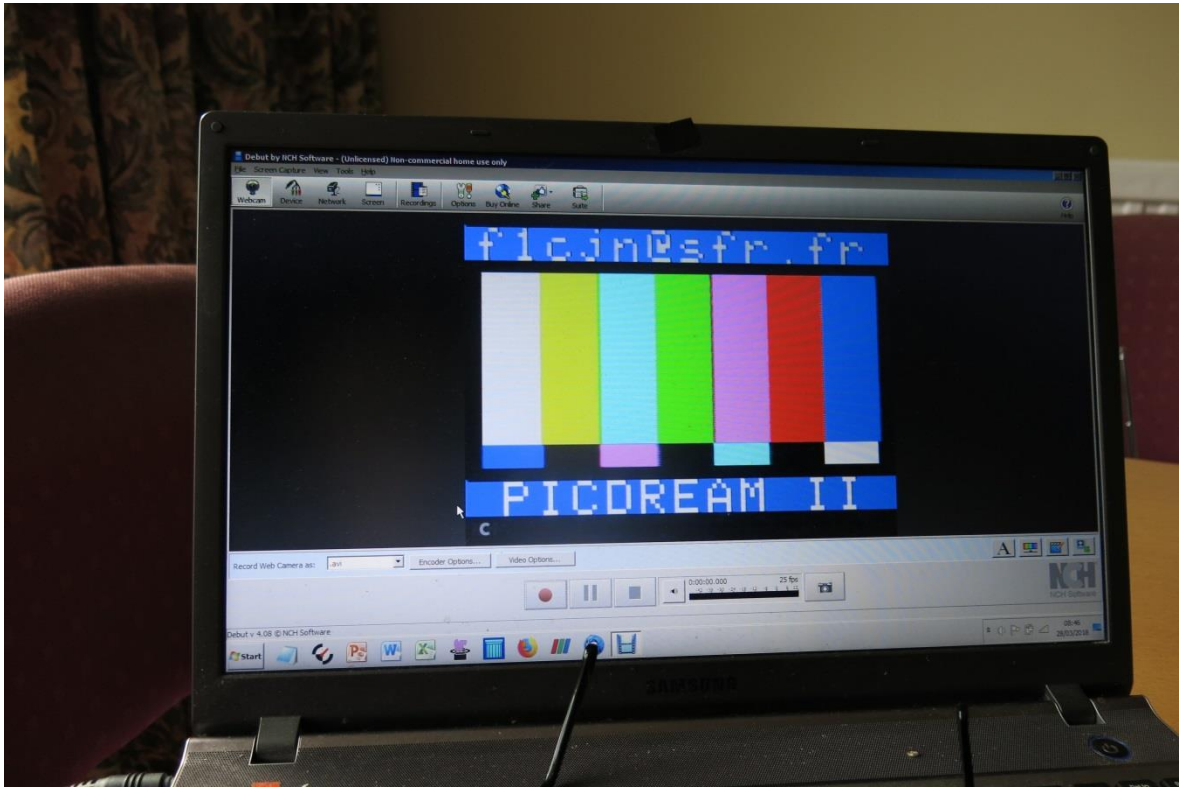
Nominal 600 mW RF input
Nominal 2.5 W RF output

FRAGILE (SMPS or RF ?)

Simplest Rx using laptop for video display

Debut software (free download)

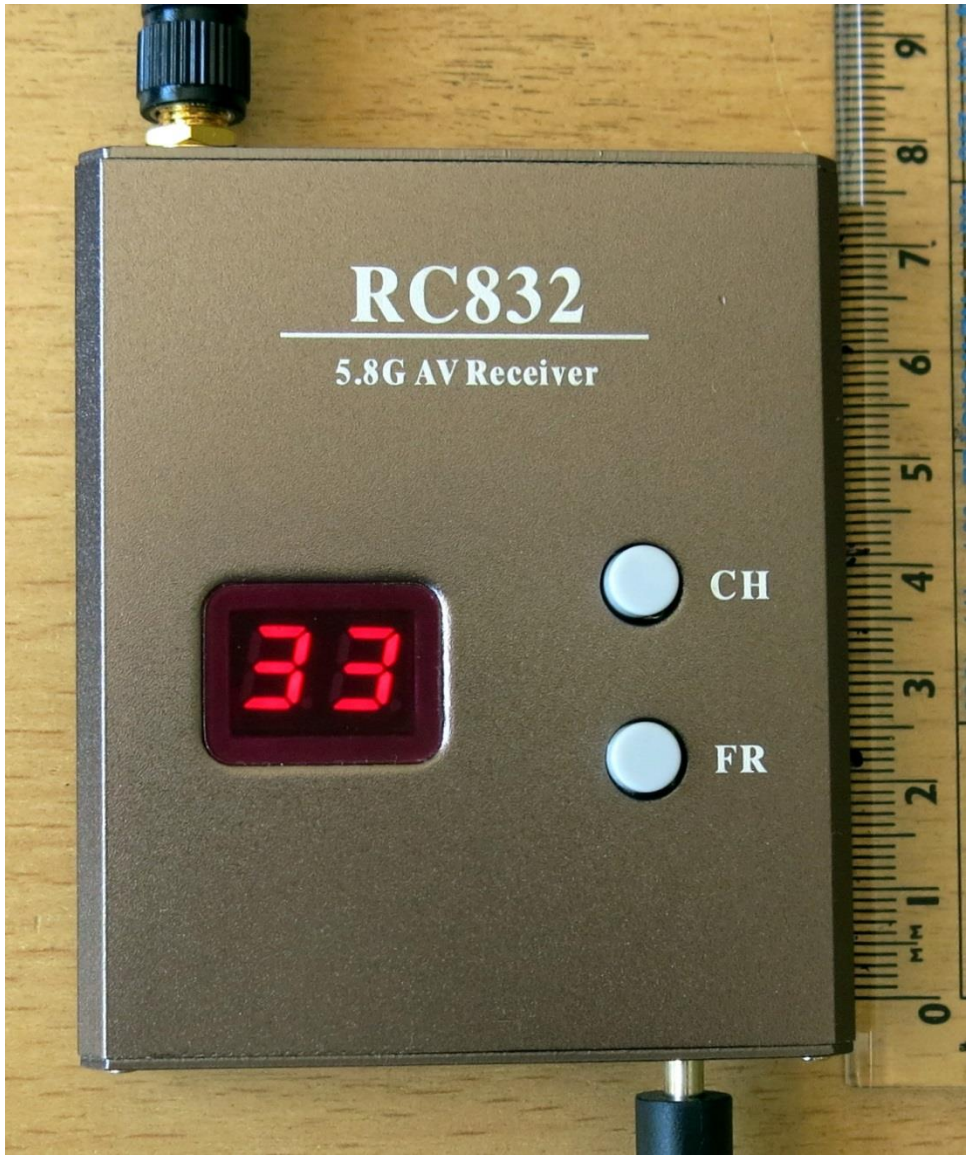
Debut software



Input from USB video source - webcam or ROTG01 FPV receiver

Can save video or screenshots

RC832 receiver



Synthesised LO

LEDs show channel number

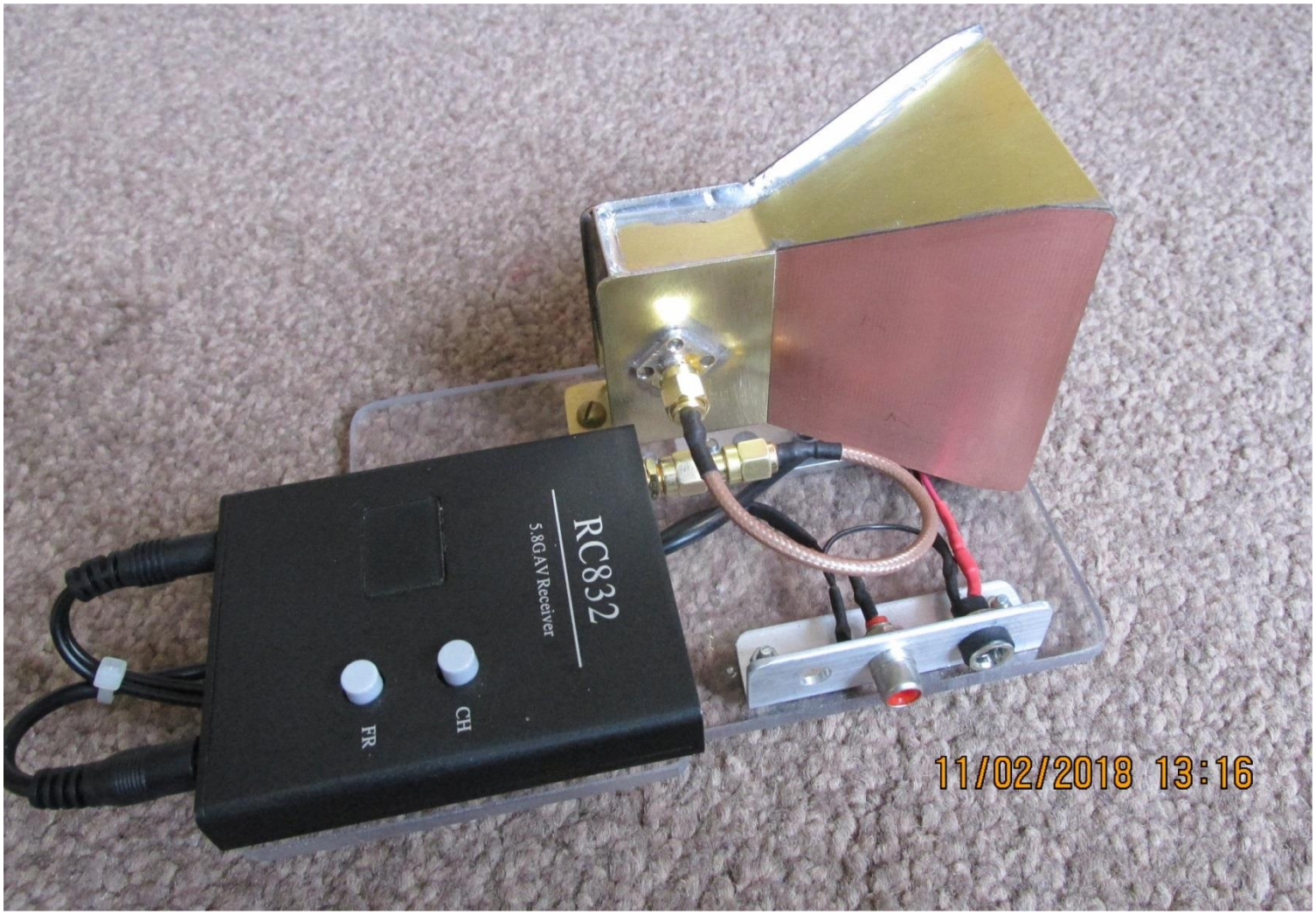
Two independent outputs for both video and audio

Simple antennas

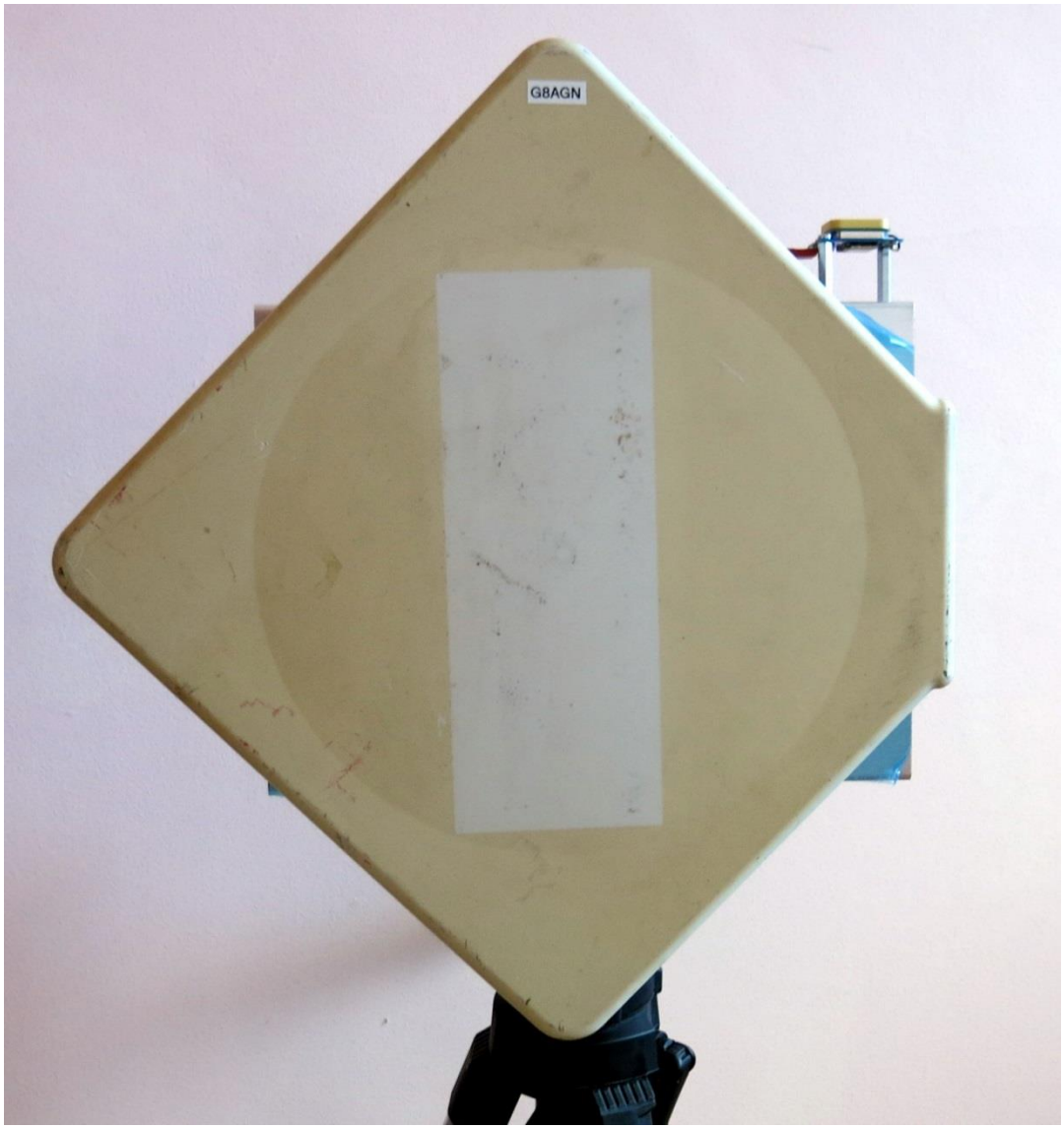
WA5VJB
log-periodic
2 -11 GHz
(G4DDK)

FPV whip
(not
recommended !)

Horn feed for Sky dish (GORPH)



Flat panel antenna - 1



Gain 21 dBi

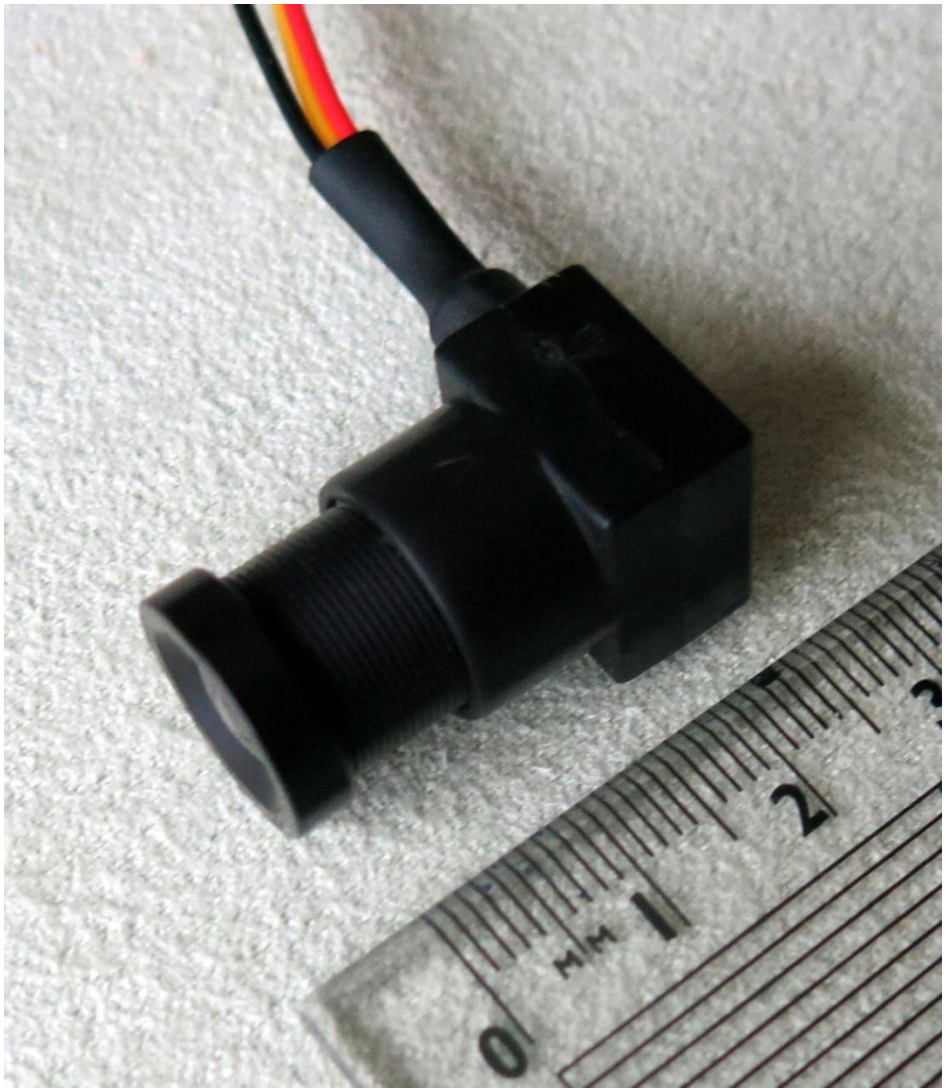
(ex G3AAF)

Flat panel antenna - 2

Gibeon 24 dBi gain

Mikrotik 23dBi gain

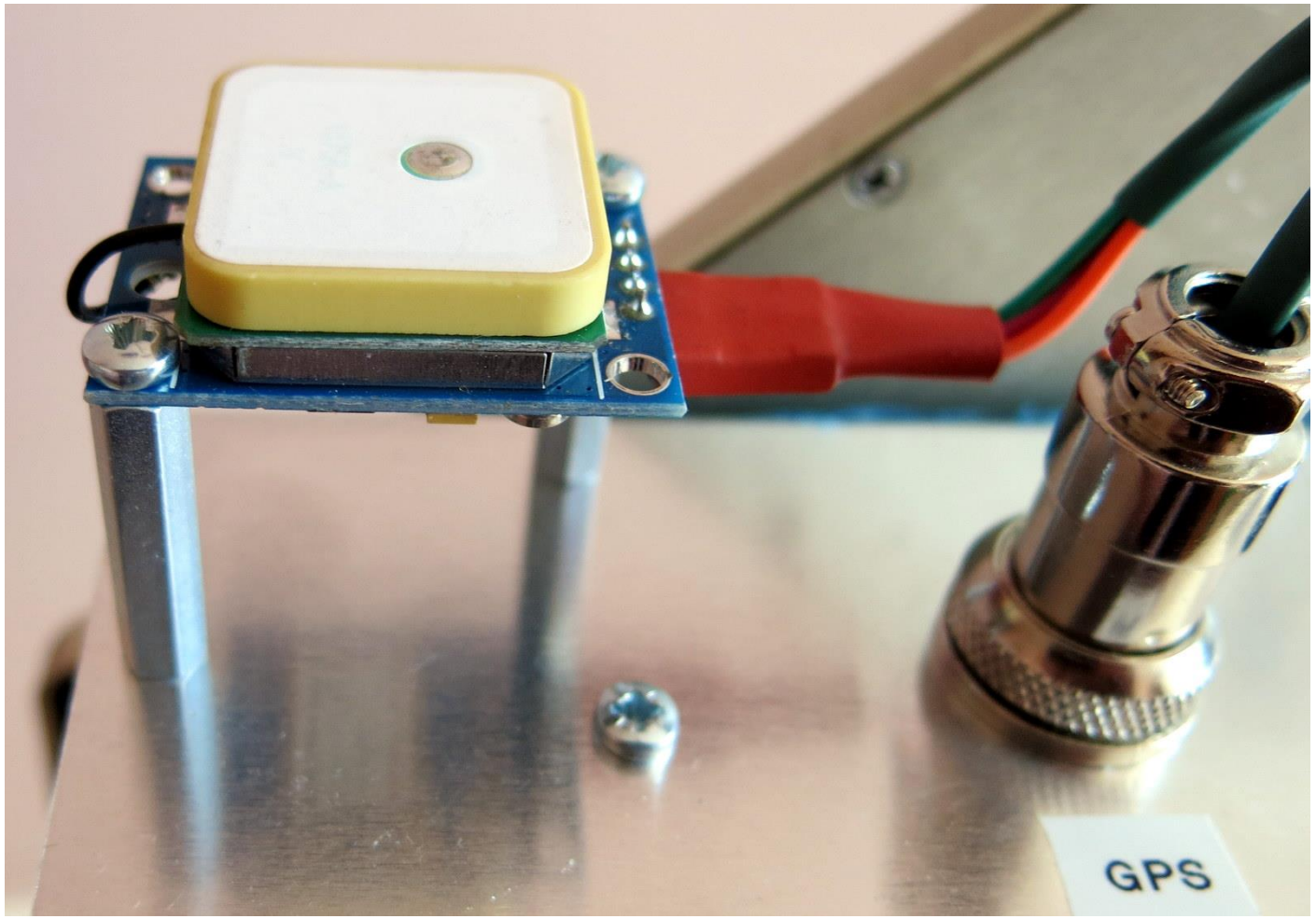
Vision sources



Any camera which outputs CVBS (1V p-p into 75 ohms)

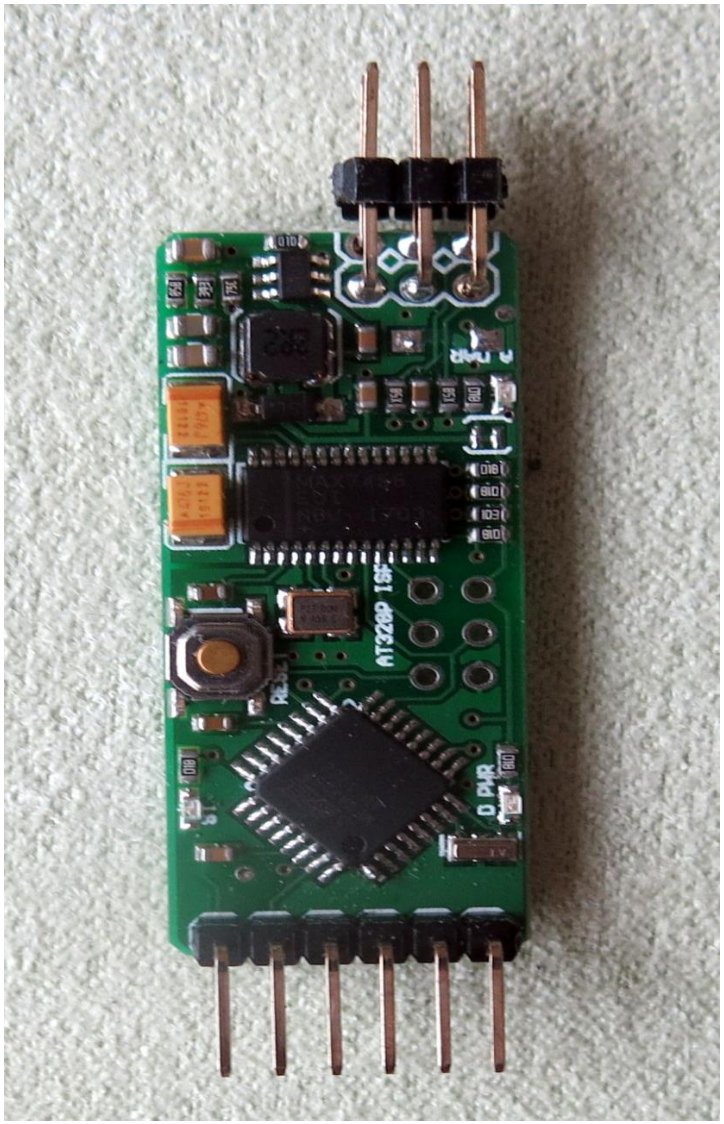
e.g.
FPV camera
700 TV lines
Adjustable lens
12 V supply

GPS



uBlox NEO-6M

Caption generator (minim or micro OSD)



Superimposes captions on video from camera

Arduino based (Pro Mini Atmel 328)

MAX7456 character generator chip

Character set can be modified easily

Accepts input from GPS for calculation of

8 figure Maidenhead locator

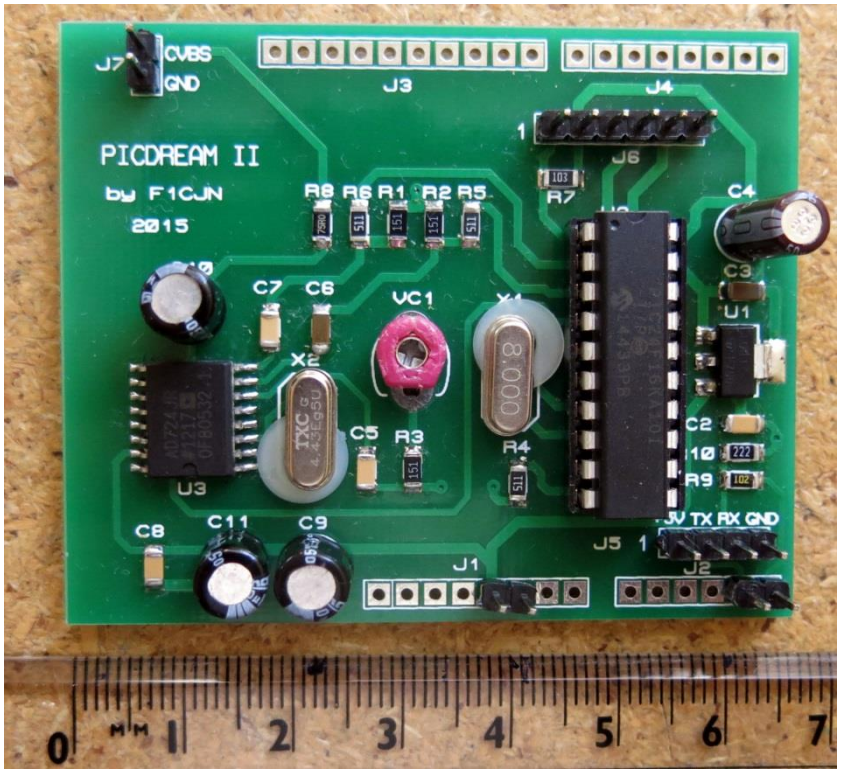
Transmitted video with caption

PICDREAM 2 (F1CJN)

Optional colour bars

Scrolling and/or fixed messages

Programmed 'on the fly' using laptop and USB to serial interface



Arduino and TVOut software

Simple hardware uses Arduino Nano and 2 resistors for composite video output

B & W only

Fixed and moving text and Teletext type graphics

Can also use bitmaps

Monitors

Many analogue TFT colour monitors are available, e.g. for car reversing cameras

Must have CVBS (analogue composite video) input , 1 V p-p into 75 ohms

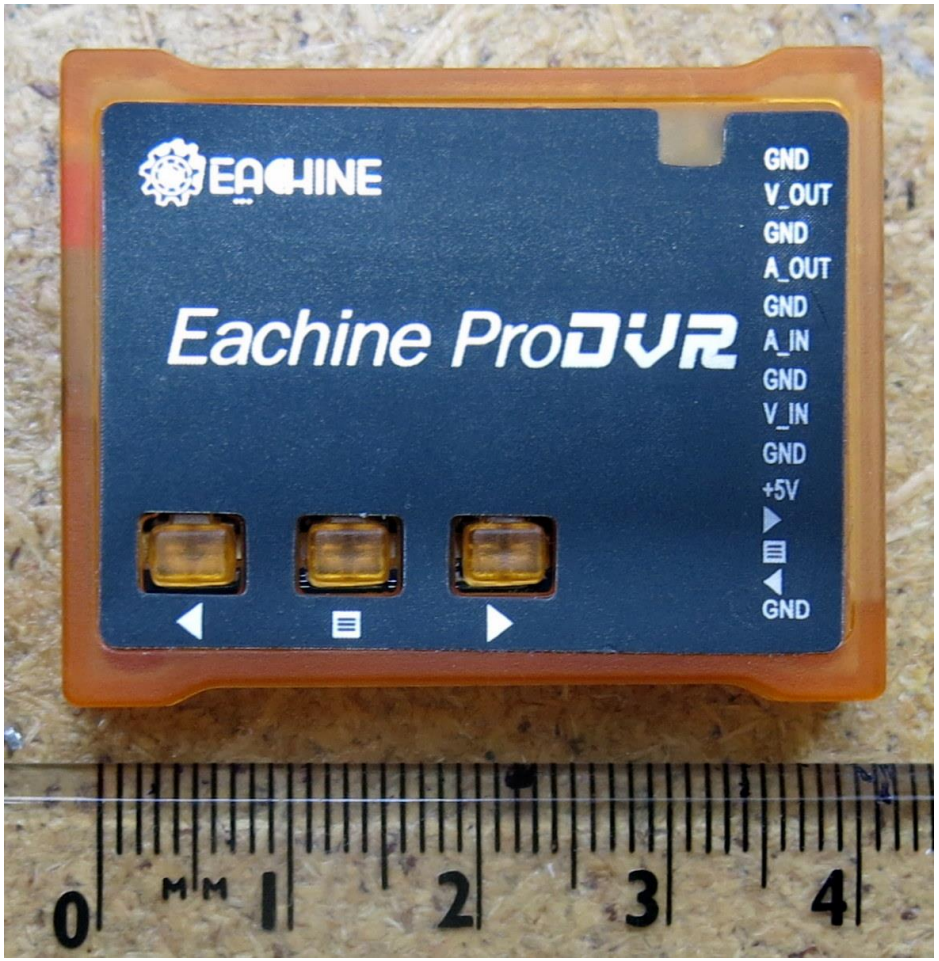
Ideally will also have audio input and loudspeaker

Most monitors will select PAL or NTSC automatically BLUE SCREEN

Be careful when choosing nominal screen resolution
640 x 480 means maximum of 240 horizontal lines (non-interlaced)
Ideally PAL needs about 288 otherwise the picture is clipped, especially at the bottom (but can live with this)

Beware of high resolution monitors which are meant for PCs (digital only)

Video recorder



Eachine ProDVR

5 V supply

Records both video and audio

Up to 18 hours on 32 GB micro SD

Video can be routed to the monitor via the recorder to eliminate “Blue Screen” problem for weak signals

Stop recording before removing power to the recorder !!

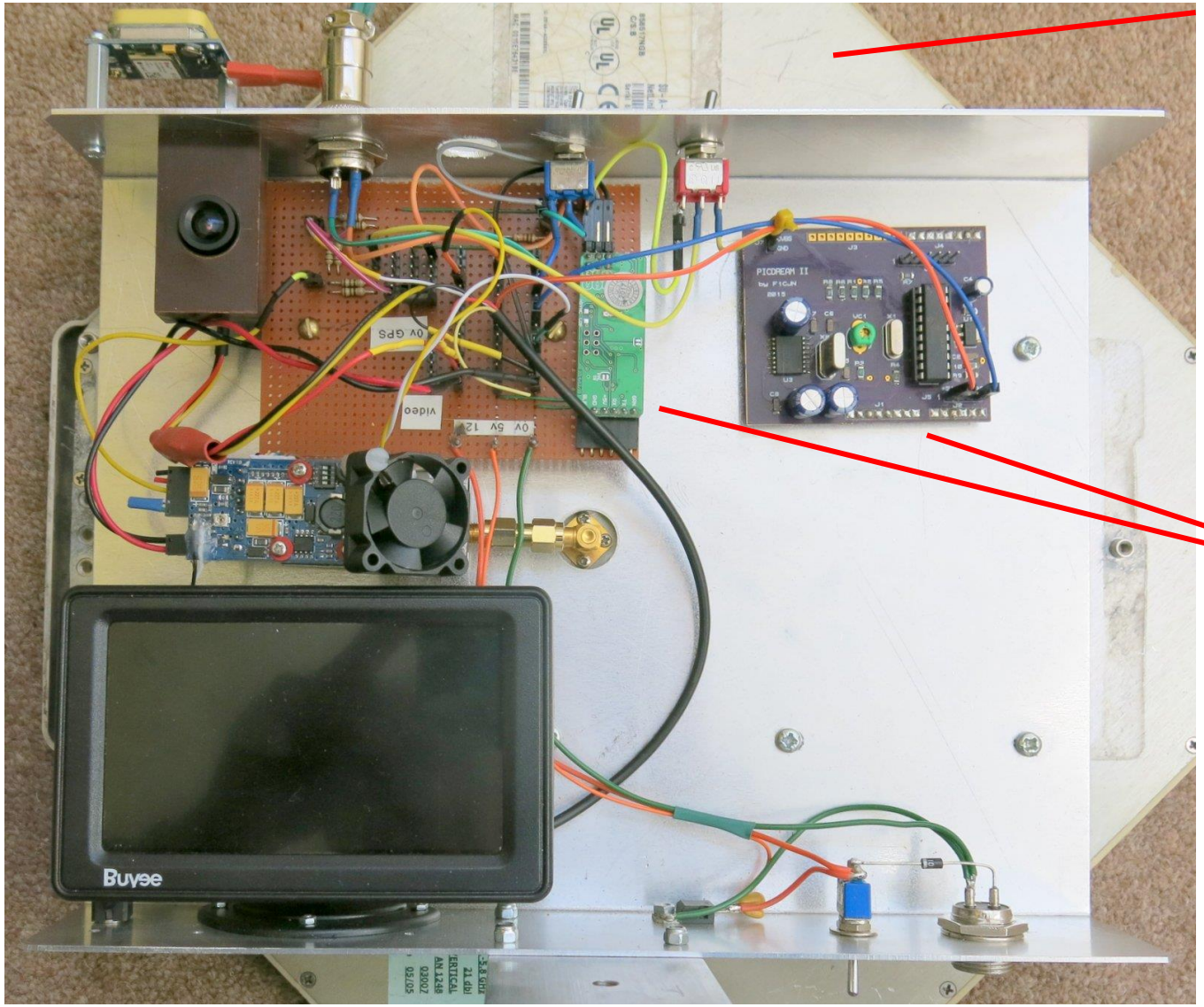
Simple medium power Tx

GPS

Camera

Tx module

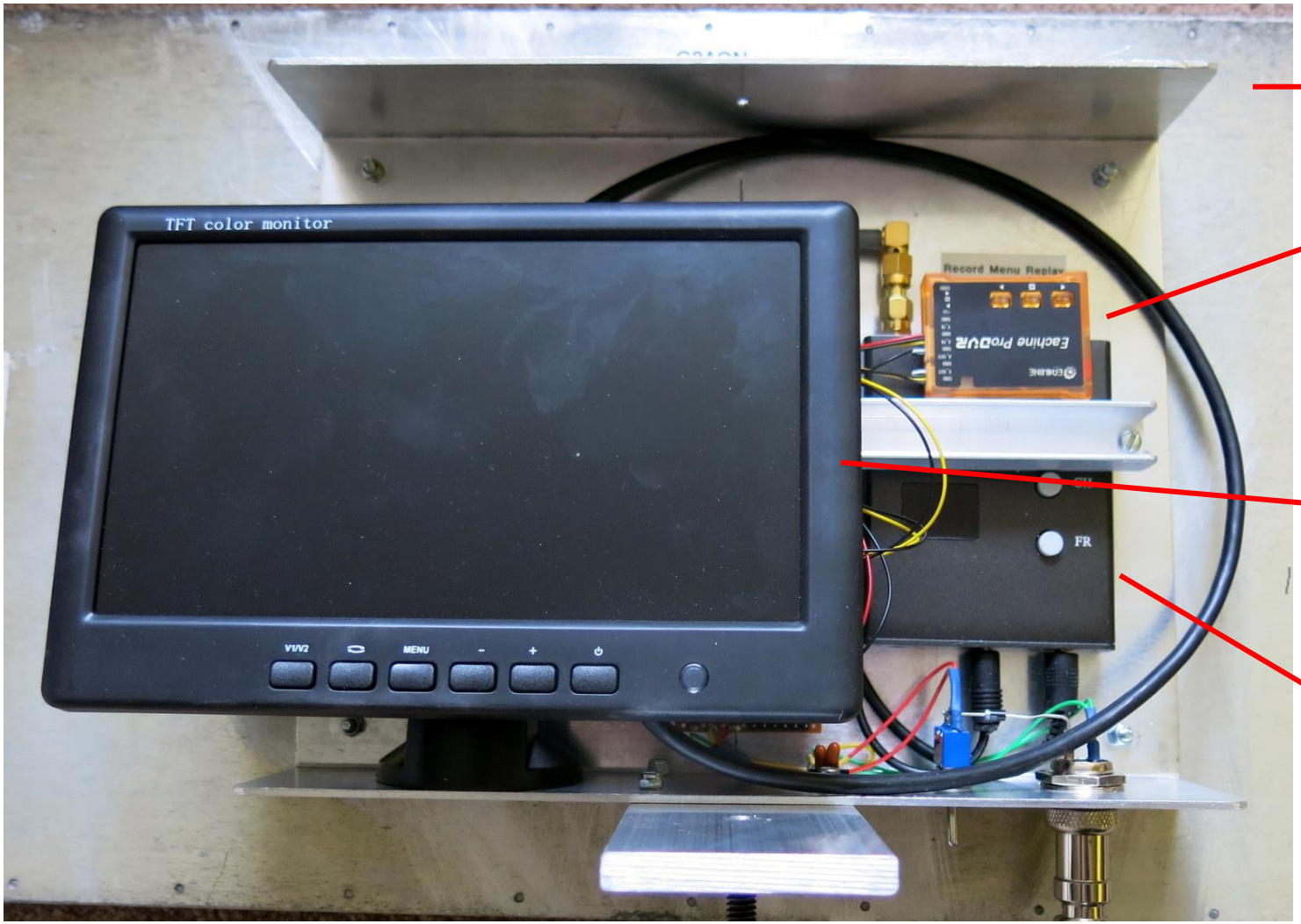
4.3" monitor



Antenna

OSD (2)

Typical Rx



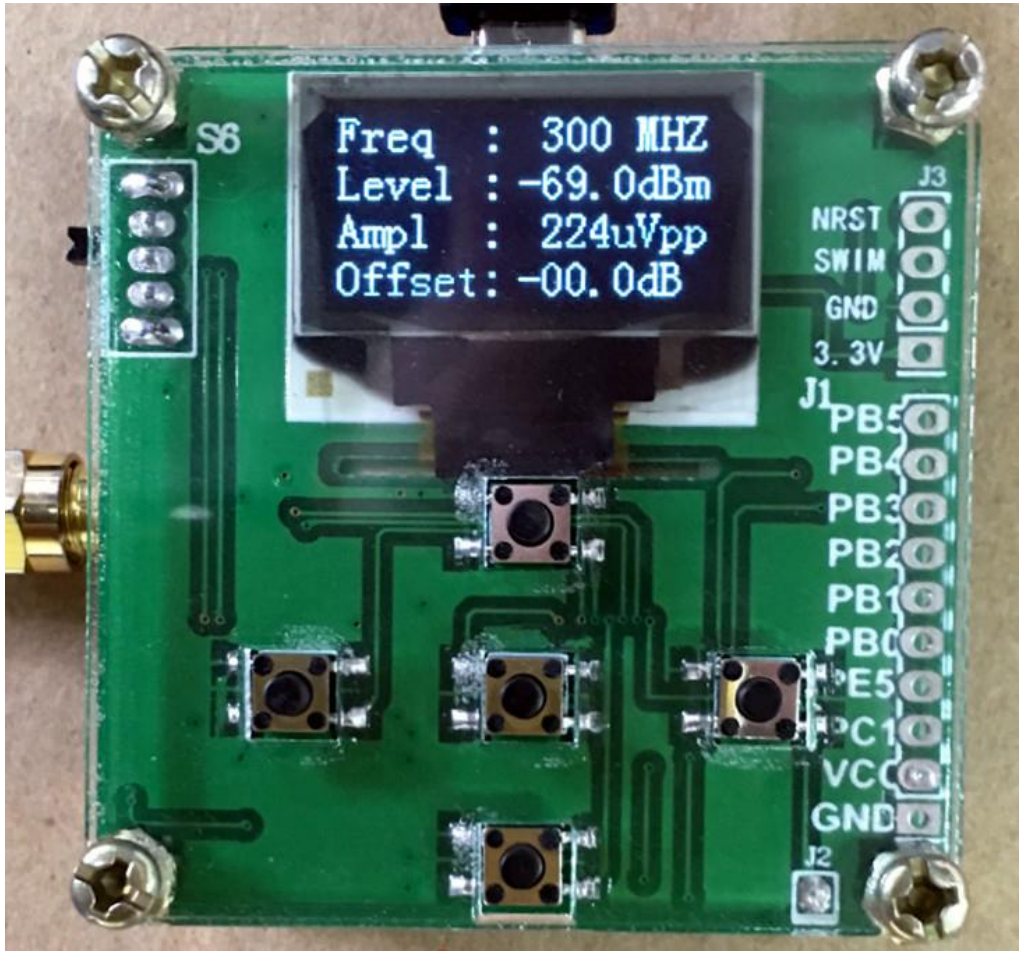
Antenna

proDVR recorder

7" monitor

RC832 Rx

Test Gear- commercial power meter



Power measurement up to 8 GHz

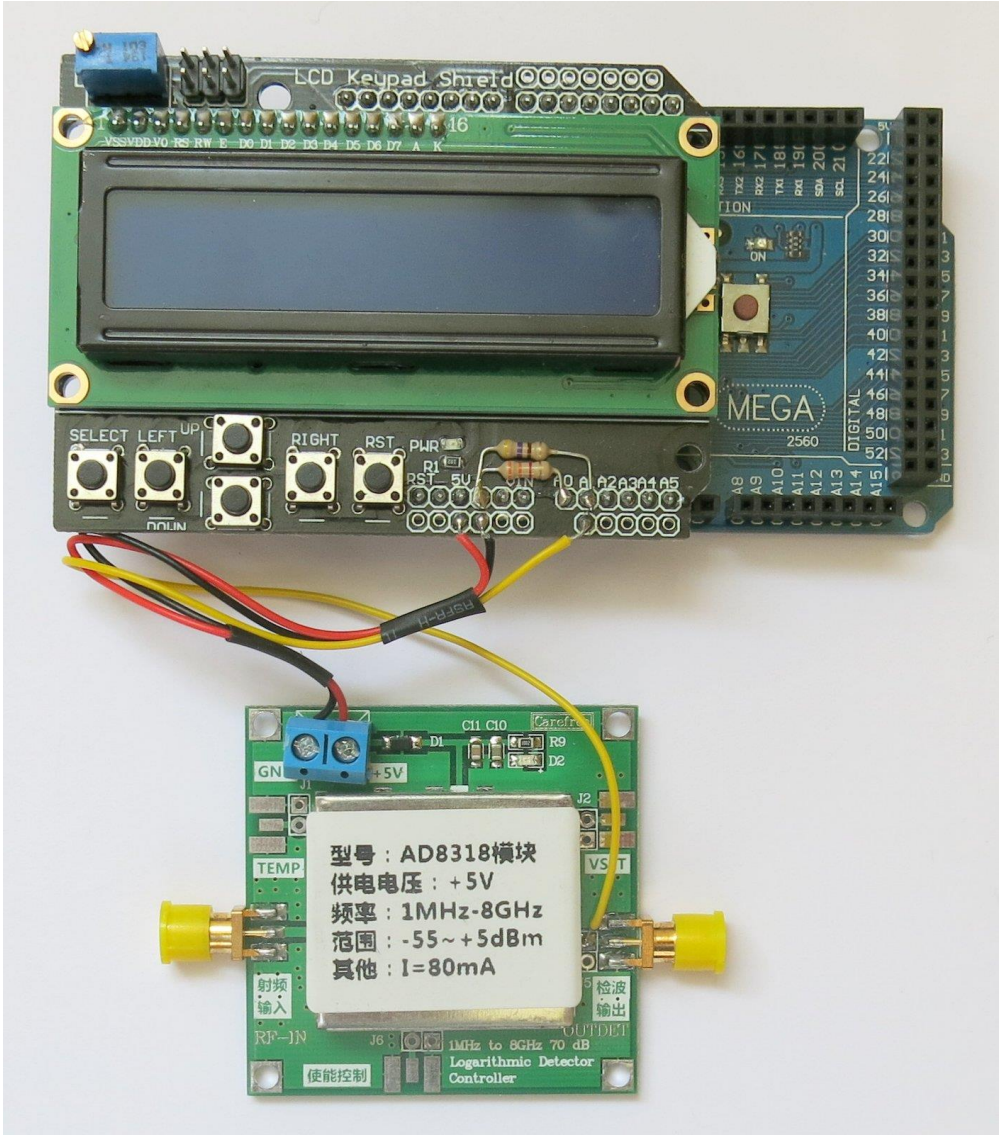
Based on AD8318 log amp

Needs external attenuator

Low cost – Bangood etc

Home-brew version on WWW

Test Gear- homebrew power meter



Details and Arduino sketch on the WWW

Test Gear - 5 GHz scanner

Low cost RX5808 module
uses Richwave RTC6715 chip

Arduino libraries on WWW

Arduino Nano controls Rx frequency and reads RSSI output

128 x 64 OLED displays band and strongest signal frequency

5.6 GHz FPV ATV in the field

Paths which can be worked under normal propagation conditions will be LOS

Check the path profile beforehand using software such as
PathProfile (GOMJW)

Use K factor of 1.33 and station locations in Lat/Long or QRA

Check the direction of the distant station from you using a compass and the beam heading given by PathProfile. Remember magnetic deviation.

If using flat plate antennas, the beamwidth is quite broad so very precise alignment is not necessary. Usually, you should see something on switch-on.

Should be no problems with tuning since all Tx and Rx use synthesisers

Let's look
at some
5.6 GHz video
contacts !