

PT Pericom Technology Inc.

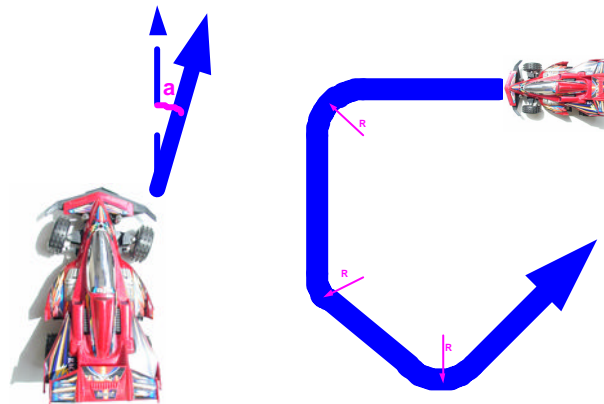
Digital Proportional Remote Controller

Digital proportional Remote Controller

Application Notes

Why proportional control

Simple action control



Left:

no turn, full left turn

Forward:

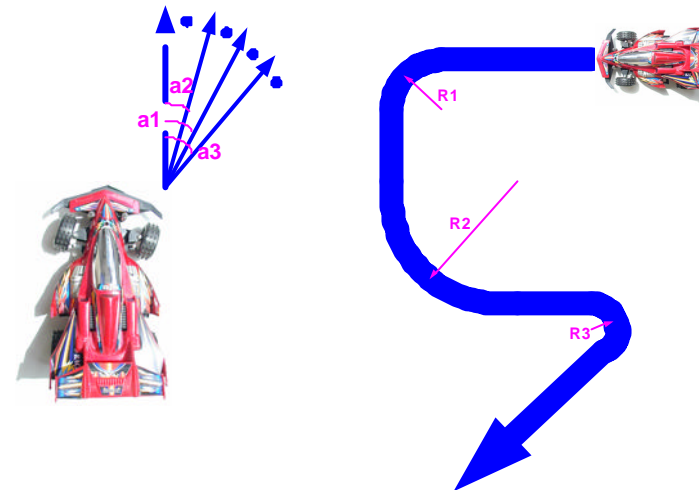
stop, low-speed, high-speed
(100% full)

Example:

PT8A977/978...

(Forward, backward, left, right, turbo..).

Proportional control



Left turn wheel:

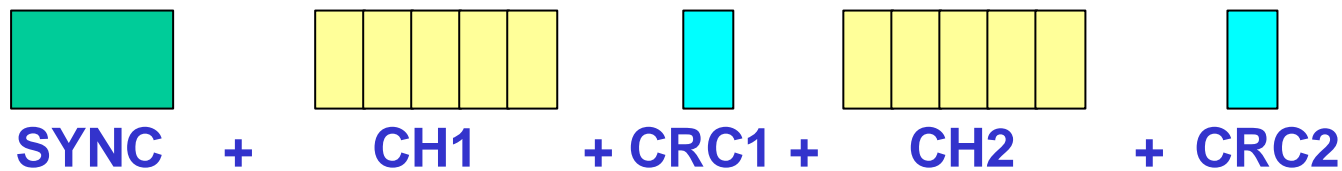
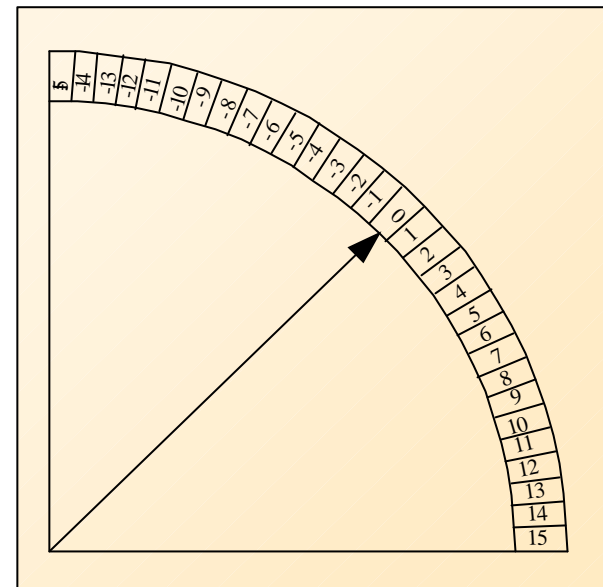
0 center, 1 degree, 2 degree...

Forward:

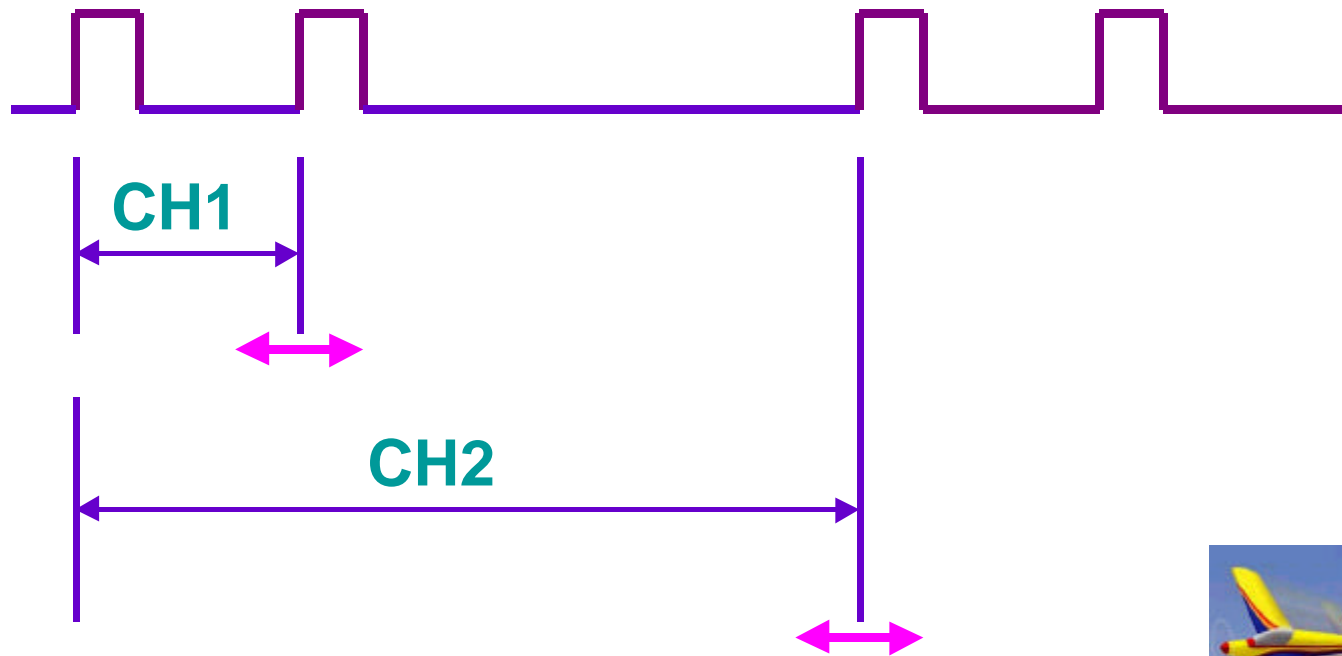
0 stop, 1%, 2%...100%

Two CH Digital proportional control

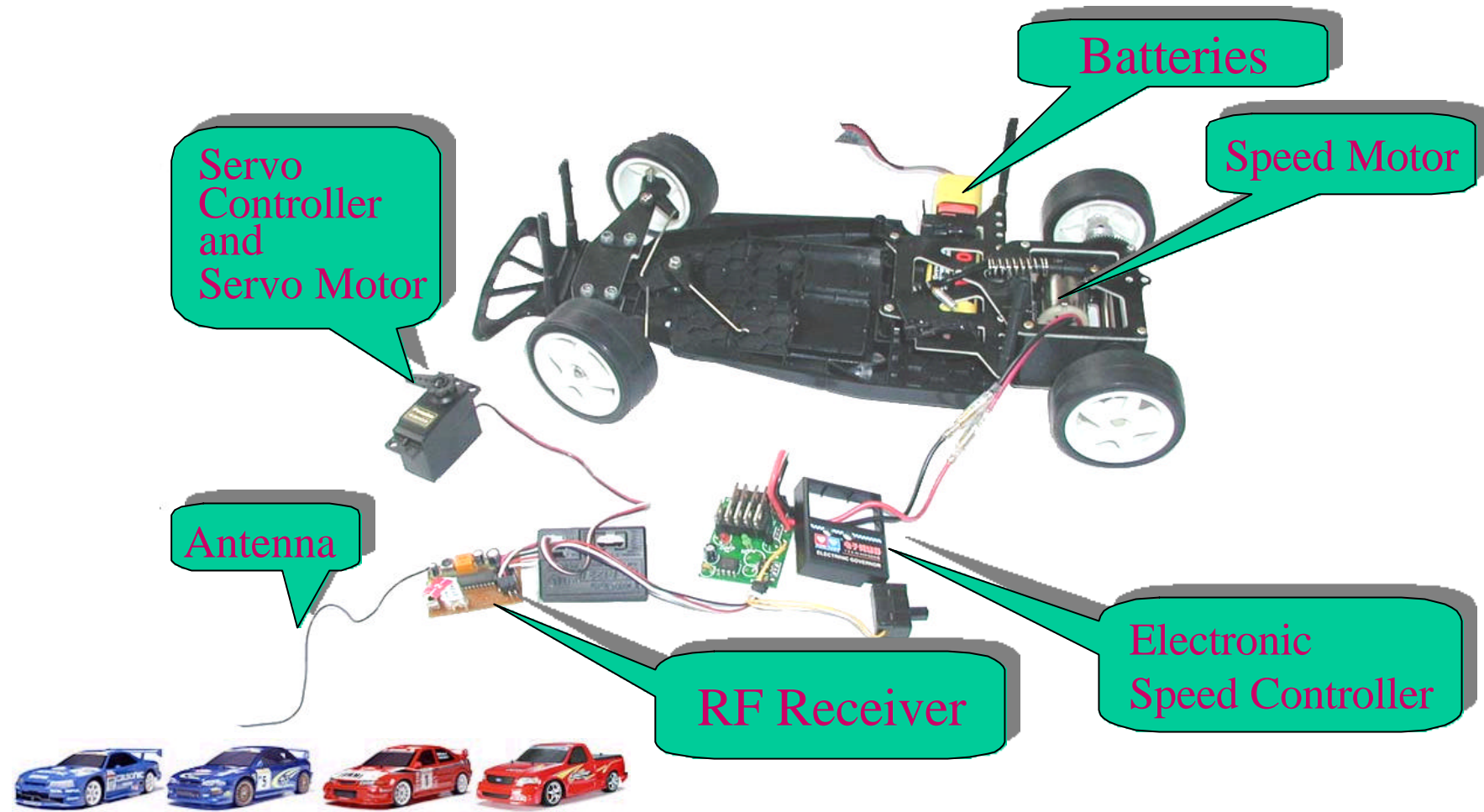
5 bit data for proportional
-15, -14, -13, ...-2, -1, 0,
1, 2, 3, ...13, 14, 15



Two CH Analog proportional control



Traditional proportional control

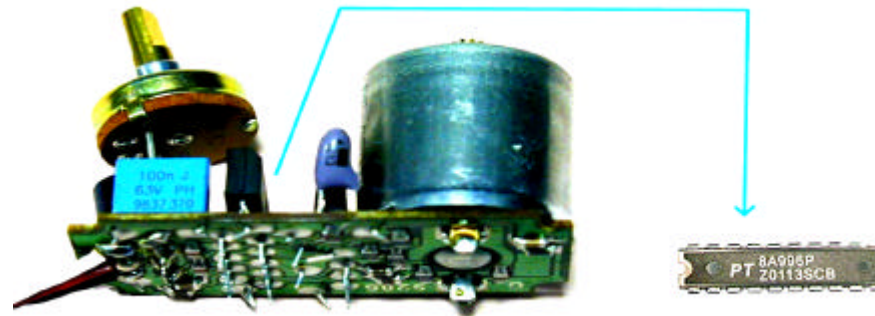


PT8A995/996

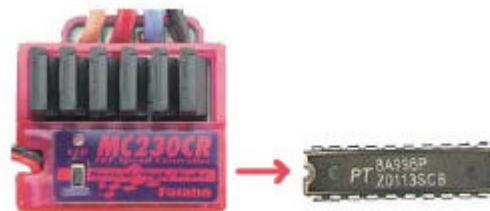
Overview

Receiver IC ----- PT8A996

Integrated servo controller (except power transistor)

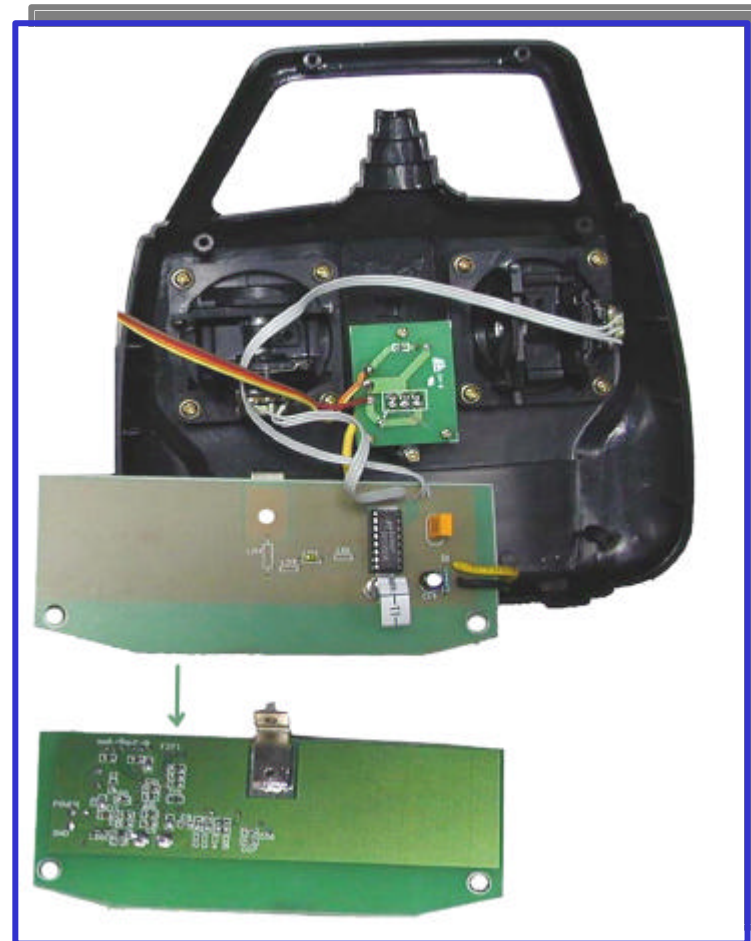


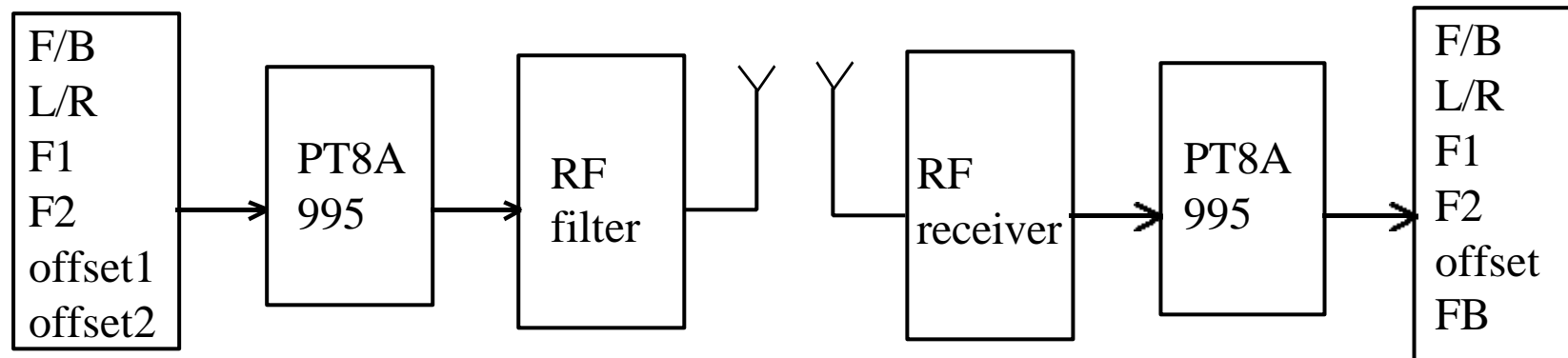
Integrated speed controller (except power transistor)



Transmitter IC ----- PT8A995

code, modulation, RF Amp



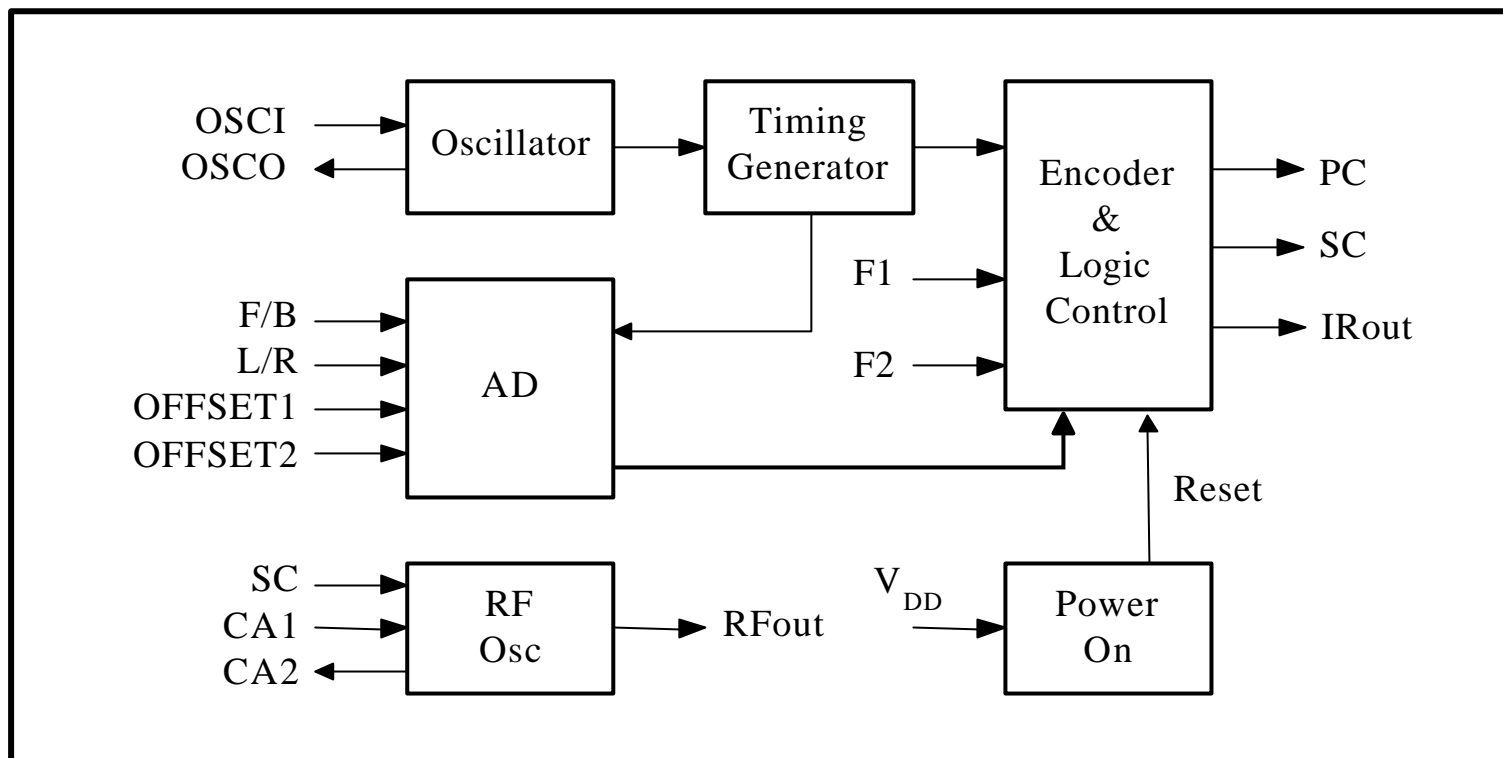


- PT8A995 works as encoder and PT8A996 works as decoder
- Two Digital Proportional channels, 5Bit resolution ratio (+/-15 steps)
- Two Fine-tuning for Digital Proportional channels (offset +/- 3 steps)
- Two nominal control channels

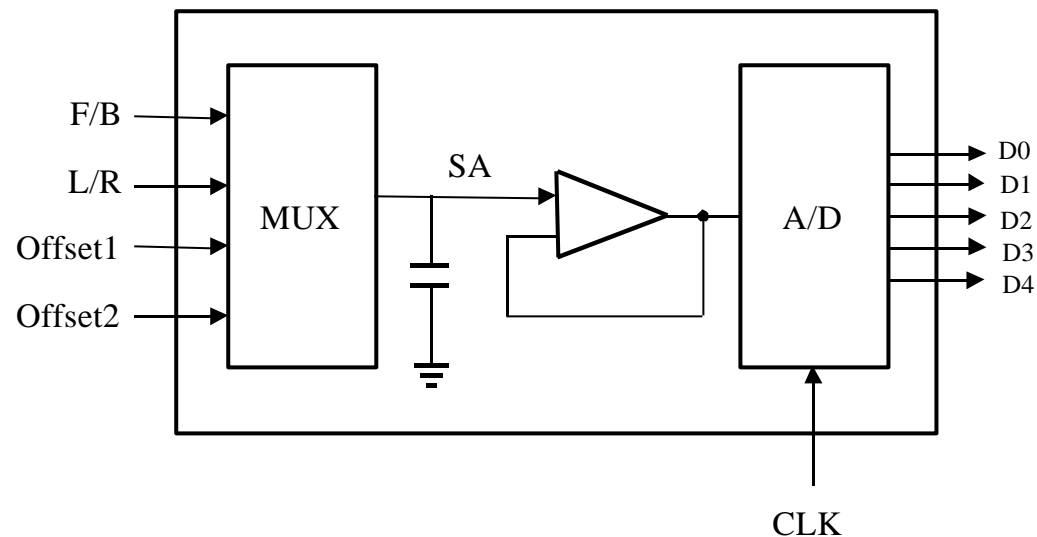
- Build-in 5bit AD convector
- Using Manchester code with out DC offset
- Build-in DPLL for data Sample to improve bit error rate
- Tow motors over-load protection to meet HD271 safety specification
- One Attach pin compatible Futaba S3003 servo set
- Few external components needed
- Built-in voltage regulator (996P)

- Build-in complete RF circuit (995P)
- Build-in RF low voltage PA, 6V, 50mW @27MHz (995P)
- Build-in tow stage amplifies to improve sensitivity (996P)
- Base band signal sensitivity overmatch 5mVpp (996P)
- With super-regenerative RF sensitivity overmatch –100dbm (996P)
- One complete closed loop adjustment for servo motor (996P)
- One open loop adjustment for motor speed (996P)

PT8A995 Block Diagram

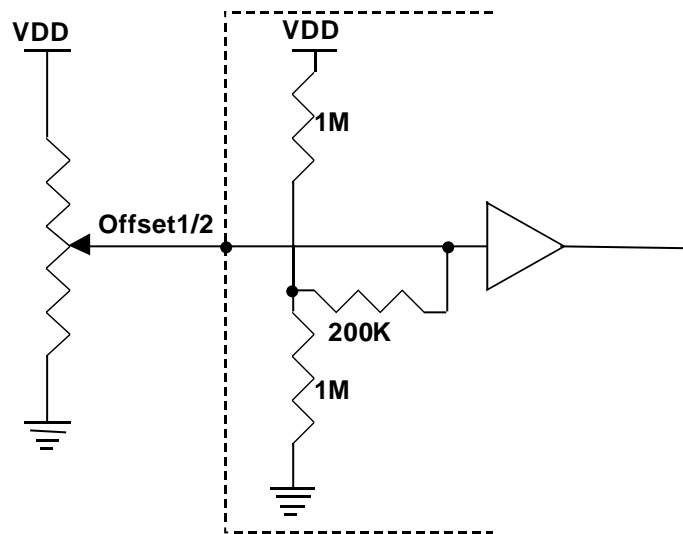


Internal A/D Converter of PT8A995P



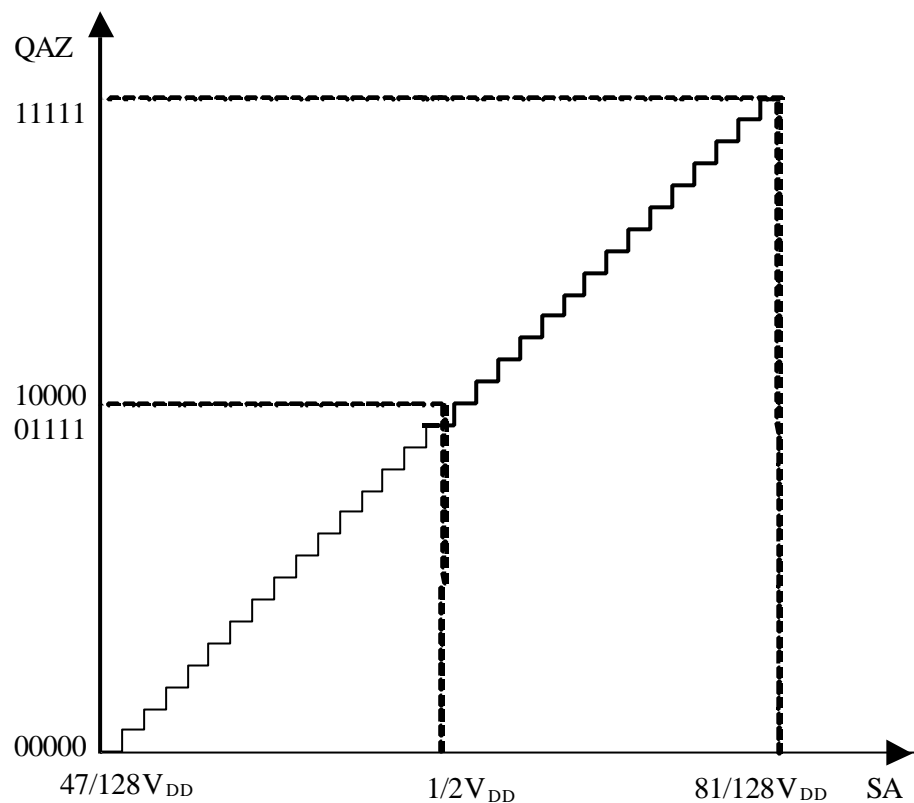
- F/B, L/R Proportional channels, 5Bit resolution ratio (+/-15 steps)
- Two Fine-tuning (offset1, offset2) for Digital Proportional channels (+/- 3 steps)

Offset balance resistor PT8A995P



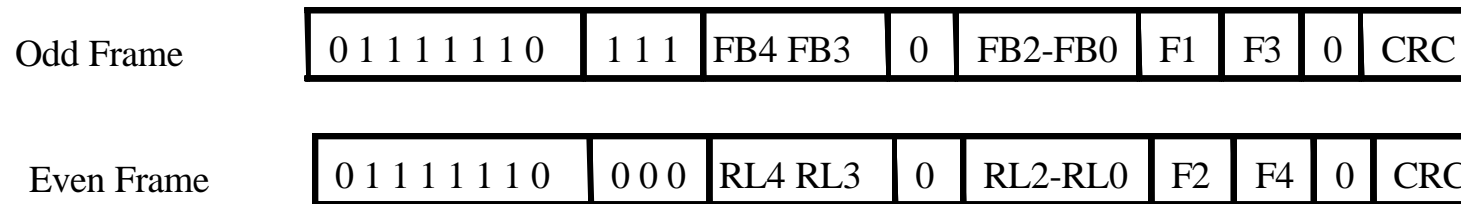
- Independence offset input compliant 2-channel pistol grip radio
- Internal base when using machine Fine trims for two-stick radio

Analog Voltage and Digitized Values



- Input Range is $1/4V_{DD}$ (-15 ~ +15 step)
- Central point is $1/2V_{DD}$

Encoder



Notes:

FB4-FB0: F/B values;

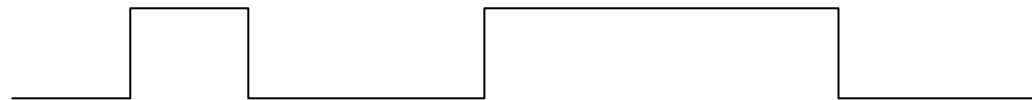
RL4-RL0: R/L values;

F2-F1: function value;

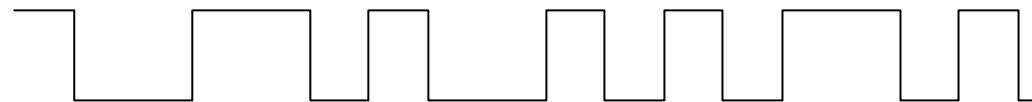
F4/F3 are reserved

Manchester base band code scheme

Original
Data Code

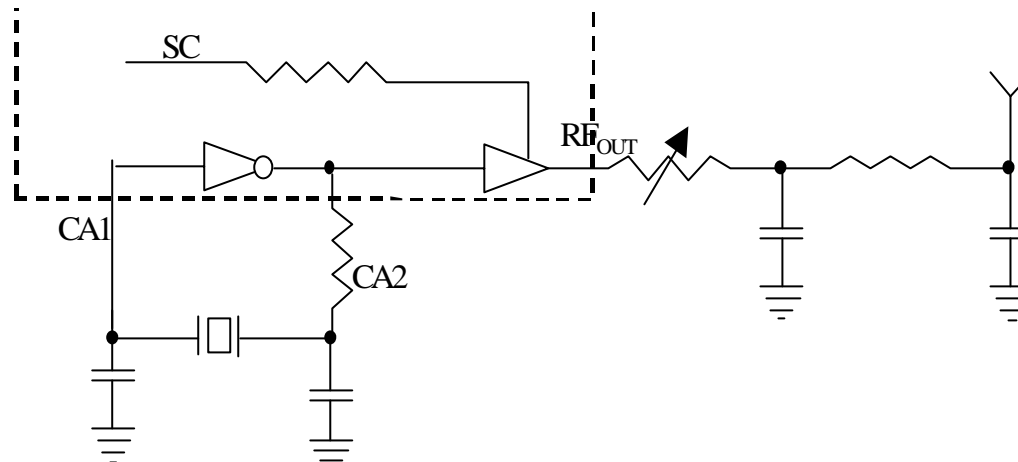


Manchester
base band code



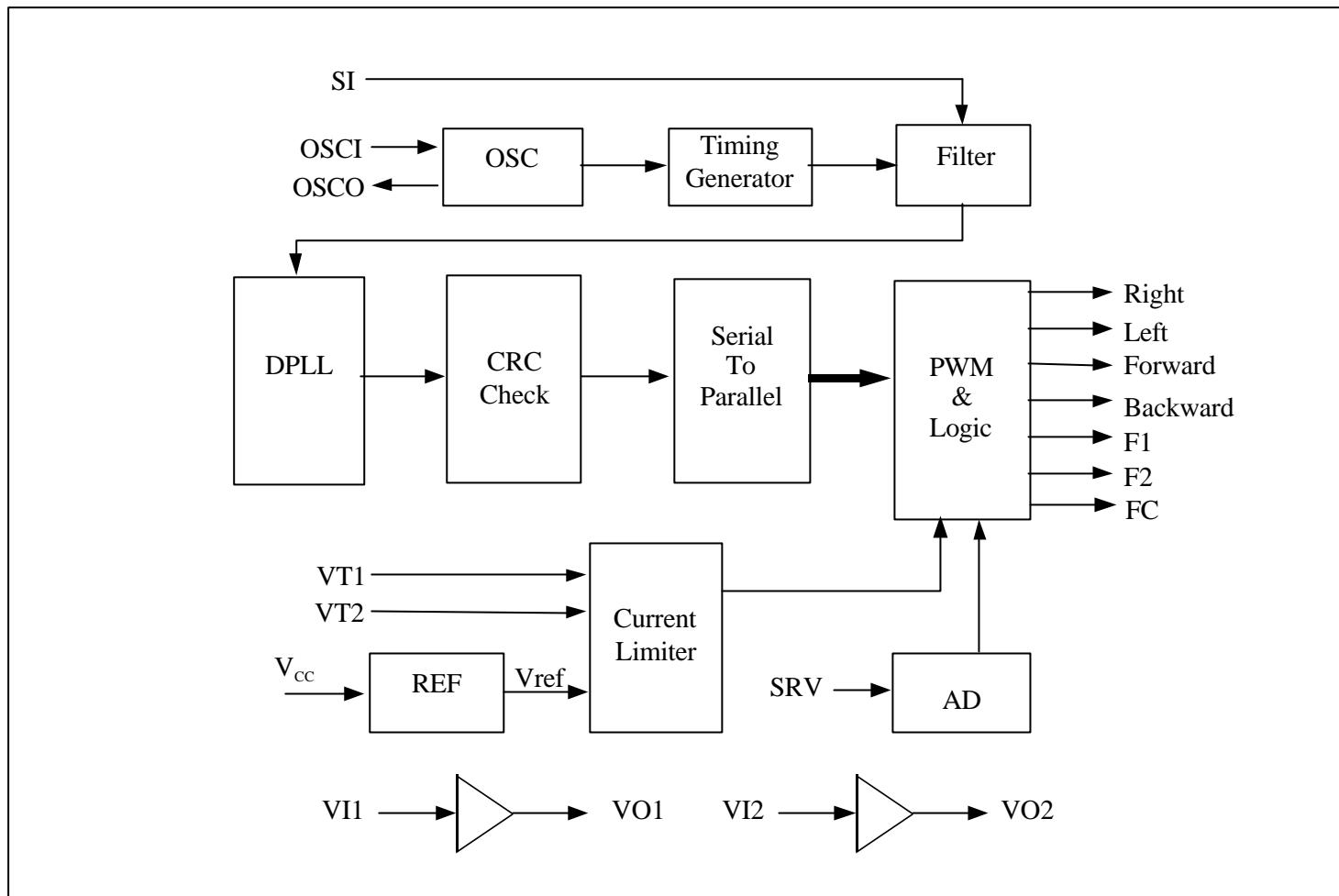
- Using Manchester code without DC offset
- Manchester code have enough edges for receiver recover clock

Internal RF Modulation (AMK)

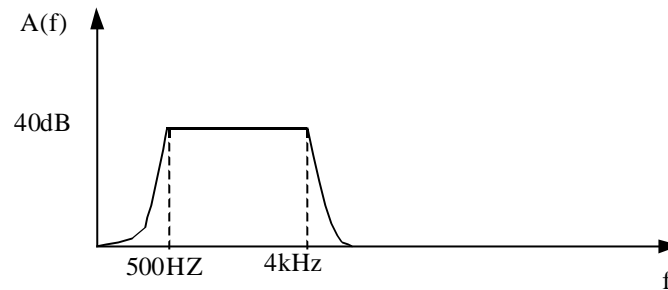
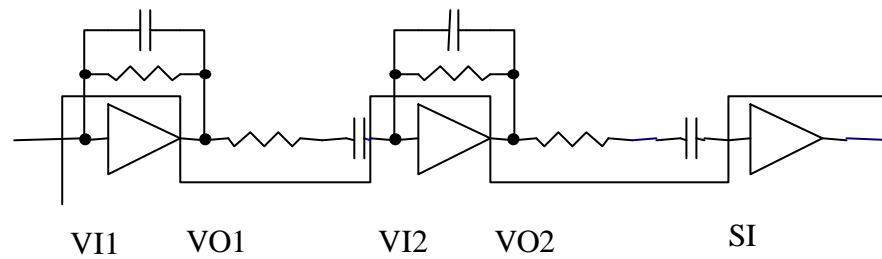


- Integrated modulation RF circuit for easy application
- Can use fundamental crystal or third-tune crystal
- The RF frequency can be 27MHz or 49MHz
- Low voltage RF PA for 6V Batteries power supply

PT8A996 Block Diagram

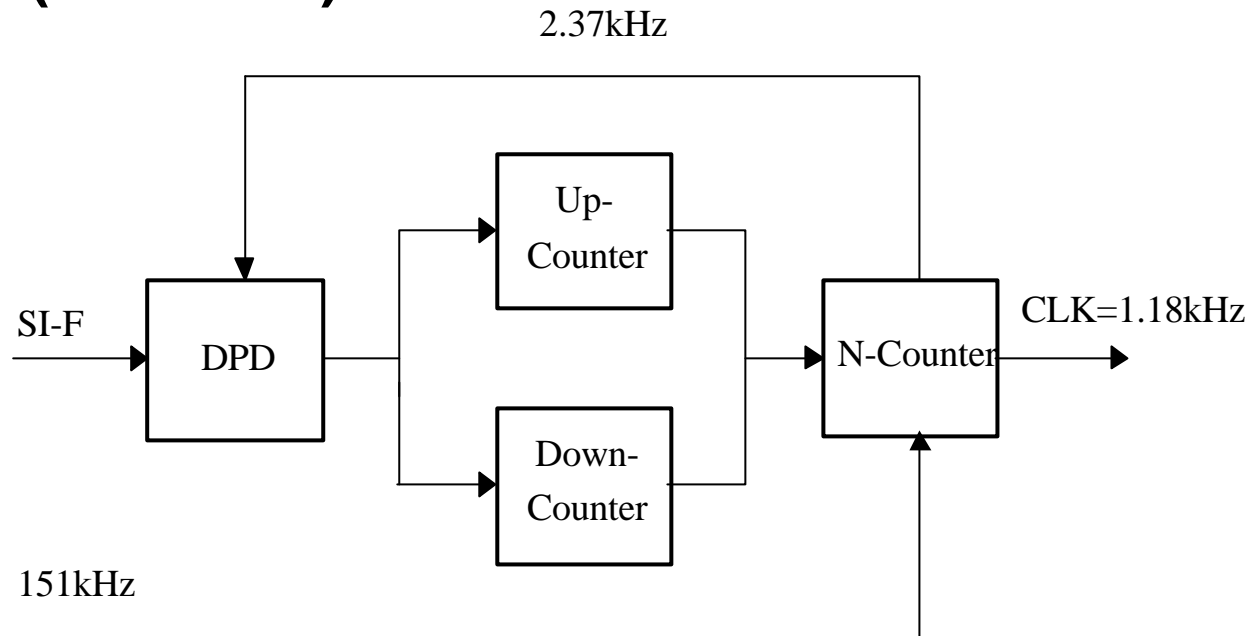


Amplify (PT8A996)



- The base-band signal is amplified in two stages amplifier.
- With external RC build a band-pass filter to reduce noise.

DPLL (PT8A996)



- DPLL recover clock from base band signal
- Use DPLL out Sample the data

Motor Over-Load Protection

- VT1 and VT2 Pin is use for Over-load protection
- Use Rs detect Motor current
- Once VT keeps effective more than T_e and ineffective less than T_m , the chip enters over-load protection mode. It will disable all output.

Application Circuit

