Silicon Systems®
A Texas Instruments Company

# SSI 32P4741
## Read Channel with 1,7 ENDEC, 4-burst Servo

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## DESCRIPTION

The SSI 32P4741 device is a high performance BiCMOS single chip read channel IC that contains all the functions needed to implement a complete zoned recording read channel for hard disk drive systems. Functional blocks include the pulse detector, programmable filter, 4-burst servo capture, time base generator, and data separator with 1,7 RLL ENDEC. Data rates can be programmed using an internal DAC whose reference current is set by a single external resistor.

Programmable functions of the SSI 32P4741 device are controlled through a bi-directional serial port and banks of internal registers. This allows zoned recording applications to be supported without changing external component values from zone to zone.

The SSI 32P4741 utilizes an advanced BiCMOS process technology along with advanced circuit design techniques which result in high performance devices with low power consumption.

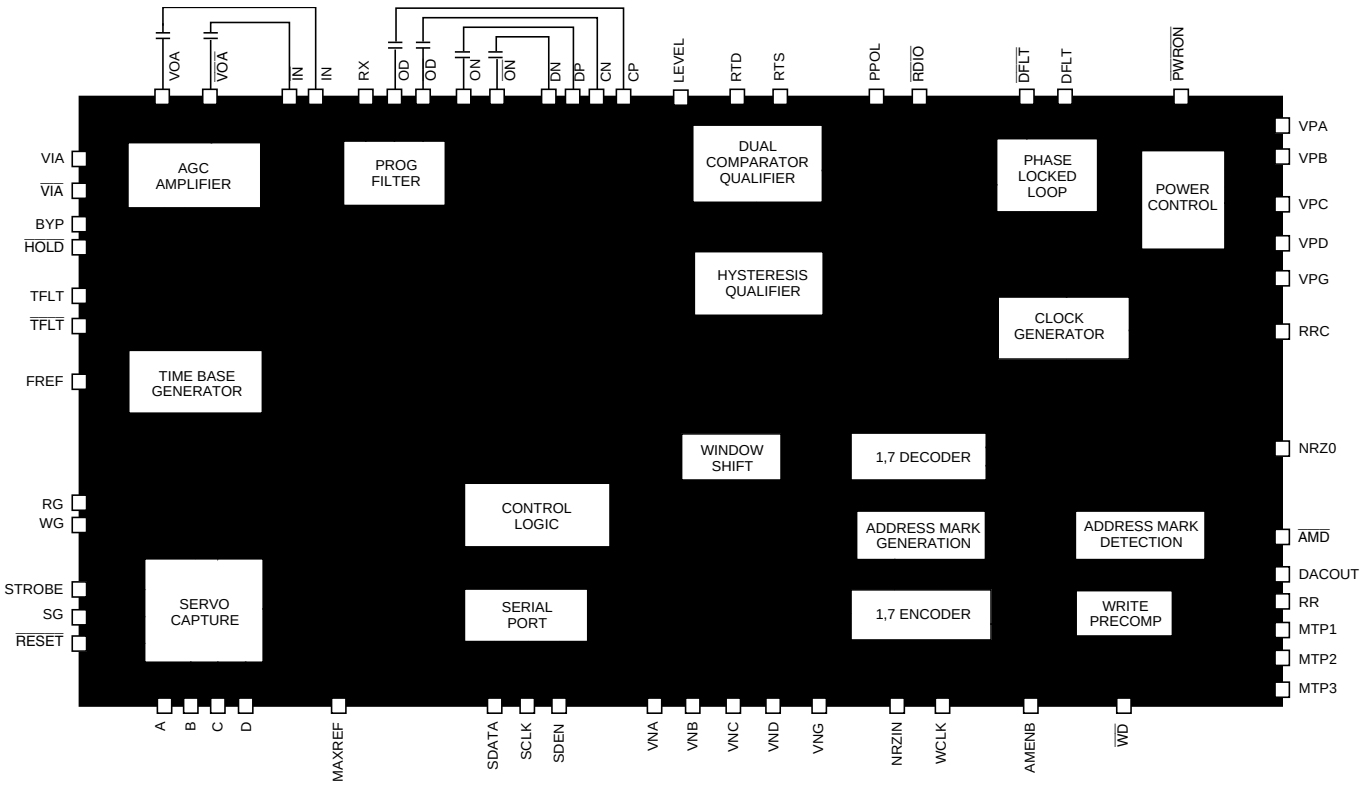
## FEATURES

### GENERAL

- **DAC controlled programmable data rates from 14 to 40 Mbit/s**
- **Complete zoned recording application support**
- **Low power operation, - 425 mW typical @ 40 Mbit/s at 5V**
- **Bi-directional serial port for register access**
- **Register programmable power management (sleep mode < 0.5 mA)**
- **Power supply range (4.5 to 5.5 volts)**
- **Small footprint 64-lead TQFP package**

(continued)

## BLOCK DIAGRAM



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## FEATURES (continued)

### PULSE DETECTOR

- Fast attack/decay modes for rapid AGC recovery
- Dual rate charge pump for fast transient recovery
- Low Drift AGC hold circuitry
- Temperature compensated, exponential control AGC
- Wide bandwidth, high precision full-wave rectifier
- Dual mode pulse qualification circuitry (user selectable)
- Register programmable voltage qualification threshold level
- CMOS $\overline{\text{RDIO}}$ signal output for servo timing support
- Internal LOW-Z and fast decay timing
- 0.8 ns max. pulse pairing

### SERVO CAPTURE

- 4-burst servo capture with A, B, C, D outputs
- Internal hold capacitors
- Programmable charge current (4-bit DAC)
- Separate registers for FC and VTH during servo mode
- 4-bit DAC for AGC level control (0.75 to 1 Vp-p)

### PROGRAMMABLE FILTER

- Programmable cutoff frequency of 6 to 18 MHz
- Programmable boost/equalization of 0 to 13 dB
- Matched normal and differentiated outputs
- ± 15% $f$c accuracy
- ± 2% maximum group delay variation to $f$c
- Less than 1.5% total harmonic distortion
- Low-Z input switch, internally controlled for rapid transient recovery
- No external filter components required

### TIME BASE GENERATOR

- Better than 1% frequency resolution
- Up to 75 MHz frequency output
- Independent M and N divide-by registers
- VCO center frequency matched to data synchronizer VCO

### DATA SEPARATOR

- Fast acquisition phase lock loop with zero phase restart technique
- Integrated 1,7 RLL Encoder/Decoder
- Fully integrated data separator
  - No external delay lines or active devices required
  - No external active PLL components required
- Programmable decode window symmetry control via serial port
  - Window shift control ± 34.5% (4-bit)
  - Includes delayed read data and VCO clock monitor points
- Programmable write precomp (3-bits each), separate early and late controls
- Hard and soft sector operation
- VCO and Synchronized Read Data test points

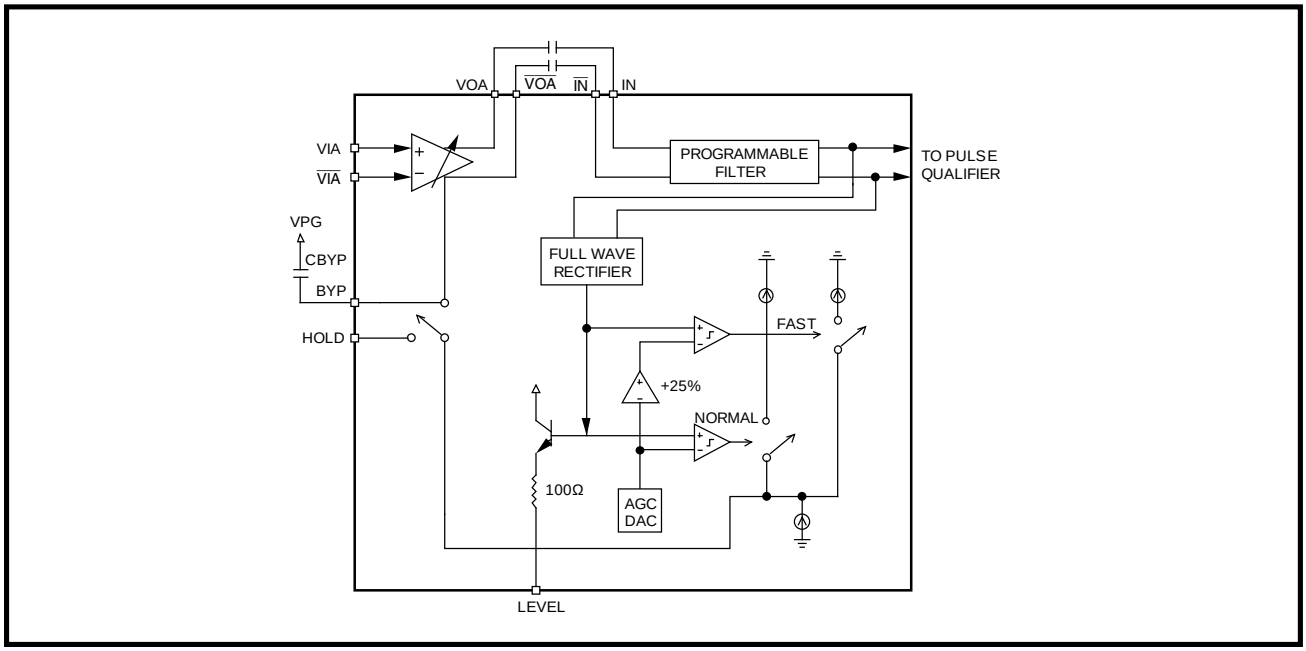


**FIGURE 1: AGC Block**