

# Digital servo controller for VCRs

## BU2890 series

The BU2890 series are LSI linear digital-servo controllers that allows construction of a VCR servo system using one IC. The package is a SDIP 42 pin.

The circuit provides linear input signal wave-shaping, and has a servo function for output of the speed and phase control for the drum and capstan. In addition, it generates a quasi-V pulse for special playback, and has a recording mode auto-discrimination function, an FM audio head switch signal generator for Hi-Fi systems, and is compatible with VISS / VASS operation. It can also steplessly vary capstan speed during FF / REW. It also has a mixing amplifier and CTL amplifier for linear signal wave-shaping, so external linear circuits are not required.

### ●Applications

VCRs

### ●Features

- 1) All VCR servo functions on a single chip.
- 2) Built-in CTL and mixing amplifiers with AGC.
- 3) Built-in wave-shaping circuit for the DFG, DPG and CFG signals.
- 4) Mode setting via two-line serial data transfer with parity checking.
- 5) Built-in digital gain-compensation circuit for the capstan system.
- 6) VISS / VASS compatible with CTL overwrite for playback and VISS code discrimination.
- 7) Microprocessor control for stepless capstan speed control during FF and REW.
- 8) Special constant-voltage diode for playback head switching logic.

### ●Recommended operating conditions (Ta = 25°C)

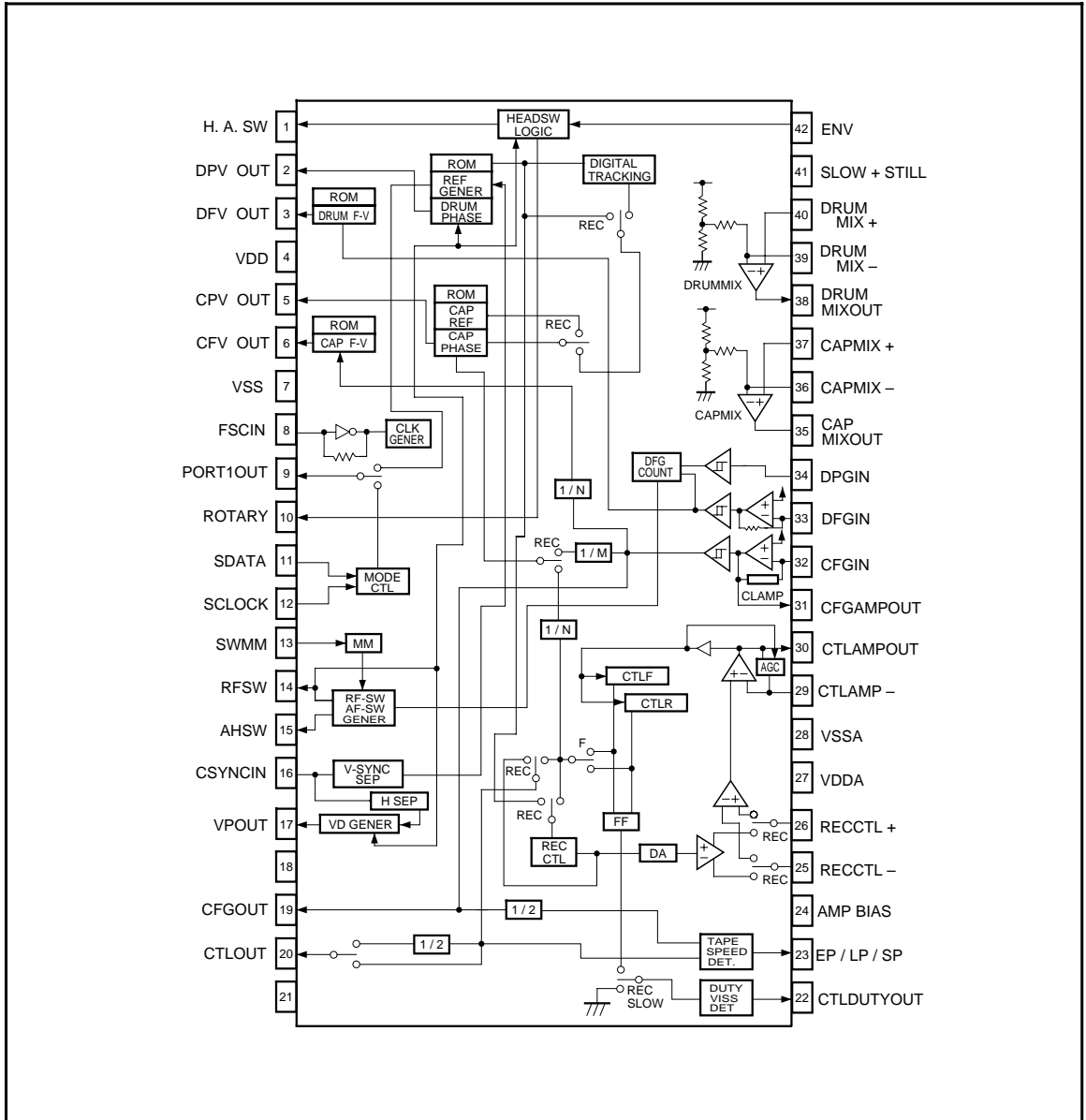
Parameter	Symbol	Limits	Unit
Power supply voltage	V <sub>DD</sub>	4.5 ~ 5.5	V

### ●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V <sub>DD</sub>	7	V
Power dissipation	P <sub>d</sub>	500*	mW
Operating temperature	T <sub>opr</sub>	- 15 ~ + 70	°C
Storage temperature	T <sub>stg</sub>	- 55 ~ + 125	°C
Pin applied voltage	V <sub>IN</sub>	V <sub>SS</sub> - 0.3 ~ V <sub>DD</sub> + 0.3	V

\* Reduced by 5mW for each increase in Ta of 1°C over 25°C.

●Block diagram



## ●Pin descriptions

Pin No.	Pin name	Function
1	H. A. SW	Head amplifier switch output
2	DPVOUT	Drum phase error PWM output
3	DFVOUT	Drum speed error PWM output
4	VDD	Logic power supply
5	CPVOUT	Capstan phase error PWM output
6	CFVOUT	Capstan speed error PWM output
7	VSS	Logic ground
8	FSCIN	fsc input
9	PORT1OUT	Serial port 1 output
10	ROTARY	Chroma rotary output
11	SDATA	Serial data input
12	SCLOCK	Serial clock input
13	SWMM	SW monostable multivibrator
14	RFSW	Video head switch output
15	AHSW	Audio head switch output
16	CSYNCIN	Composite synchronization input
17	VPOUT	Quasi-Vpulse output
18		Optional pin
19	CFGOUT	CFG wave shaping output
20	CTLOUT	CTL wave shaping output
21		Optional pin
22	CTLDUTYOUT	CTL duty discriminant output / VISS discriminant output
23	EP / LP / SP	Tape speed discriminator output
24	AMPBIAS	Amplifier bias voltage output
25	RECCTL -	CTL coil ( - )
26	RECCTL +	CTL coil ( + )
27	VDDA	Analog power supply
28	VSSA	Analog ground
29	CTLAMP -	CTL amplifier ( - ) input
30	CTLAMPOUT	CTL amplifier output
31	CFGAMPOUT	CFG amplifier output
32	CFGIN	CFG amplifier input
33	DFGIN	DFG amplifier input
34	DPGIN	DPG amplifier input
35	CAPMIXOUT	Capstan MIX amplifier output
36	CAPMIX -	Capstan MIX amplifier ( - ) input
37	CAPMIX +	Capstan MIX amplifier ( + ) input
38	DRUMMIXOUT	Drum MIX amplifier output
39	DRUMMIX -	Drum MIX amplifier ( - ) input
40	DRUMMIX +	Drum MIX amplifier ( + ) input
41	SLOW + STILL	Slow / still input
42	ENV	Envelope detector input

●Electrical characteristics (unless otherwise noted,  $T_a = 25^\circ\text{C}$  and  $V_{DD} = 5\text{V}$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply current	$I_{DD}$	17	33	60	mA	
Logic output high level voltage	$V_H$	4.0	4.7	—	V	$I_{LOAD} = -1.0\text{mA}$
Logic output low level voltage	$V_L$	—	0.2	0.5	V	$I_{LOAD} = 1.0\text{mA}$
Logic input threshold	$V_{TH}$	1.5	—	3.5	V	
Three-value input H / M threshold	$V_{TH1}$	2.85	3.30	4.00	V	
Three-value input M / L threshold	$V_{TH2}$	0.80	1.25	1.75	V	
fsc input level	$V_{fsc}$	0.2	—	3.0	$V_{P-P}$	AC coupling
Monostable multivibrator comparator level	$V_{THM}$	2.15	2.40	2.65	V	
RECCTL output high level voltage	$V_{CTH}$	2.9	3.2	—	V	$I_L = -3.0\text{mA}$
RECCTL output low level voltage	$V_{CTL}$	—	0.3	0.5	V	$I_L = 3.0\text{mA}$
DFG input sensitivity	$V_{DFG}$	0.1	0.2	0.4	$\text{mV}_{P-P}$	
DPG input sensitivity	$V_{DPG}$	30	50	70	$\text{mV}_{O-P}$	
CFG amplifier openloop gain	$G_{CFG}$	70	—	—	dB	
CFG input threshold	$V_{TCF}$	$\pm 120$	$\pm 150$	$\pm 180$	$\text{mV}_{P-P}$	
MIX amplifier openloop gain	$G_{MIX}$	60	—	—	dB	
MIX amplifier output high level voltage	$V_{OH}$	4.2	4.7	—	V	$I_{LOAD} = -5.0\text{mA}$
MIX amplifier output low level voltage	$V_{OL}$	—	0.4	0.6	V	$I_{LOAD} = 5.0\text{mA}$
MIX amplifier bias voltage	$V_{BMI}$	2.4	2.5	2.6	V	

## ●External dimensions (Units: mm)

