SONY CXA1449Q

ATF for 8mm VTR

Description

CXA1449Q is an IC for ATF* for 8mm VTR, in which all the functions necessary for ATF operations are incorporated.

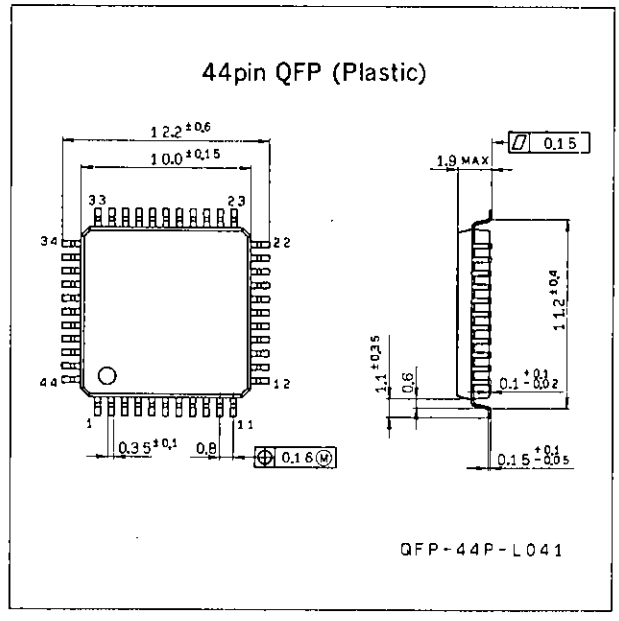
*Automatic Track Finding

Features

- All the functions can be configured with a limited number of peripheral components, permitting reduction and stabilization of the set.
- A record pilot signal generating circuit is incorporated.
- A BPF for ATF error signals, f_H and $3f_H$ is incorporated.
- A circuit for switching over between f_H and $3f_H$ is incorporated.
- An AGC circuit for playback signal is incorporated.
- Corresponding to PCM after recording
  Recording pilot signal while playing back is possible.

Package Outline

Unit : mm



Applications

8mm VTR

Structure

Bi-CMOS IC

Absolute Maximum Ratings (Ta=25°C)

• Supply voltage	V_{CC}	6	V
• Storage temperature	T_{stg}	−50 to +150	°C
• Allowable power dissipation	P_D	500	mW

Recommended Operating Condictions

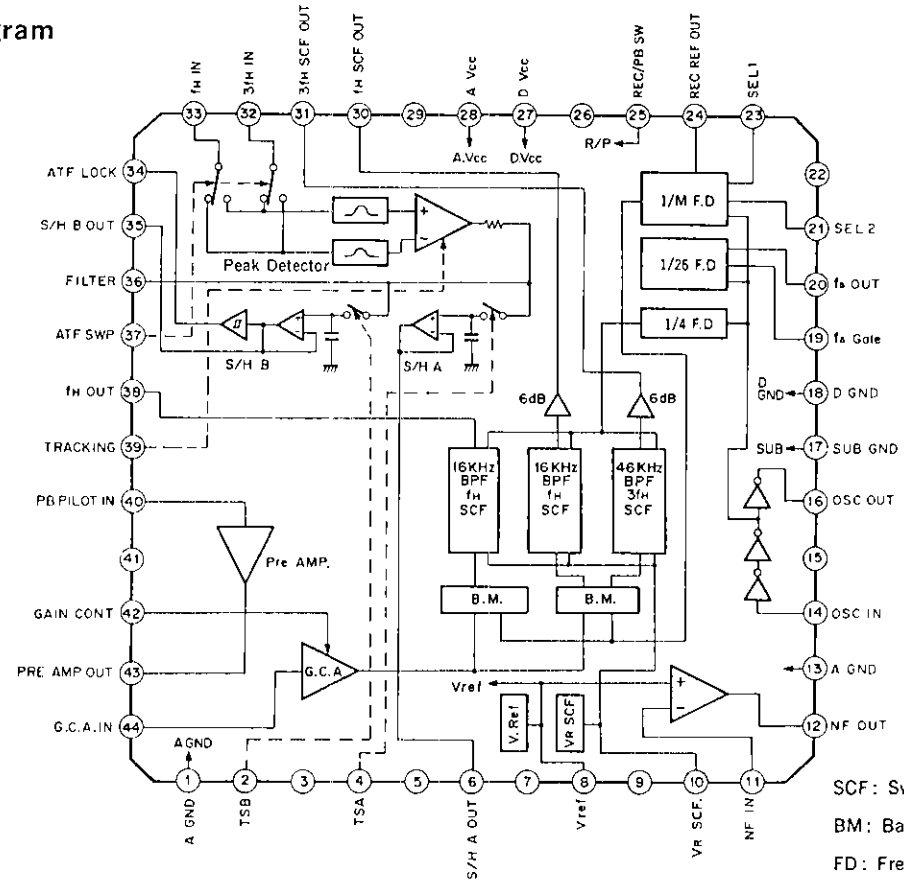
• Supply voltage	V_{CC}	4.75 to 5.25	V
• Operating temperature	T_{opr}	−10 to +75	°C

Principal Electrical Characteristics

• Supply voltage		5±0.25	V
• Supply current			
	In recording	13	mA
	In playback	24	mA

E89X26-HP

Block Diagram



SCF: Swithed capacitor filter (BPF)

BM: Balanced modulator (multiplicator)

FD: Frequency Demultiplier

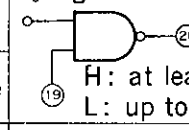
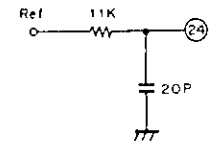
Pin Description

(Vcc=5.0V, Ta=25°C)

No.	Symbol	Standard DC voltage	Input-output impedance	Standard AC voltage	Remarks
1	A-GND	—	—	—	Analog amp. GND
2	TSB	—	—	HOLD / SAMPLE	H: at least 3.5V L: up to 0.5V
3	N.C.	—	—	—	—
4	TSA	—	—	HOLD / SAMPLE	H: at least 3.5V L: up to 0.5V
5	N.C.	—	—	—	—
6	S/H A OUT	2.5V	—	—	—
7	N.C.	—	—	—	—
8	V_{Ref}	2.5V	30Ω	—	For analog amp. Standard voltage
9	N.C.	—	—	—	—
10	V_R S.C.F.	1.25V	100Ω	—	Standard voltage for S.C.F.
11	NF IN.	(2.5V)	Open base	—	—
12	NF OUT	(2.5V)	S.E.P.P.	—	—
13	A-GND	—	—	—	Analog amp. GND
14	OSC IN	—	Open gate	5.9MHz sine wave*1	

*1 { NTSC—378fH / PAL—375fH

Pin Description (V_{CC}=5.0V, Ta=25°C)

No.	Symbol	Standard DC voltage	Input-output impedance	Standard AC voltage	Remarks
15	N.C.	—	—	—	—
16	OSC OUT	—	Emitter follower output	5Vp-p square wave	—
17	SUB GND	—	—	—	IC SUB-GND
18	D.GND	—	—	—	SCF divider, oscillator GND
19	f_5 GATE	—	Open gate	—	f_5 signal  H: at least 3.5V L: up to 0.5V
20	f_5 OUT	—	—	5Vp-p square wave	
21	SEL2	Note	Open gate	—	H: at least 3.5V L: up to 0.5V
22	N.C.	—	—	—	—
23	SEL1	Note	Open gate	—	H: at least 3.5V L: up to 0.5V
24	Rec, Ref Output	—	11kΩ	3.75Vp-p	
25	REC/PB SW	High; PB Low; REC	Open gate	—	H: at least 3.5V L: up to 0.5V
26	N.C.	—	—	—	—
27	D. V_{CC}	(5V)	—	—	SCF divider, oscillator power supply
28	A. V_{CC}	(5V)	—	—	Analog power supply
29	N.C.	—	—	—	—
30	f_H SCF OUT	1.3V	200Ω	—	—
31	$3f_H$ SCF OUT	2.4V	200Ω	—	—
32	$3f_H$ IN	2.5V	10kΩ	—	—
33	f_H IN	2.5V	10kΩ	—	—
34	ATF LOCK	—	Open collector	—	—
35	S/H B OUT	2.5V	—	—	—
36	FILTER	2.5V	—	—	—
37	ATF SWP		Open gate	—	H: at least 3.5V ㊱=$3f_H-f_H$ L: up to 0.5V ㊱=f_H-3f_H
38	f_H ERROR OUT	2.6V	—	—	—
39	TRACKING	1.8V	27kΩ	—	—

Pin Description

(V_{CC}=5.0V, Ta=25°C)

No.	Symbol	Standard DC voltage	Input-output impedance	Standard AC voltage	Remarks
40	PB PILOT IN	1.8V	10kΩ	PB PILOT	—
41	N.C.	—	—	—	—
42	GAIN CONT	—	Open base	—	—
43	PRE AMP OUT	1.5V	100Ω	—	—
44	G.C.A.IN	3.1V	850Ω	—	—

Electrical Characteristics

(V_{CC}=5.0V, Ta=25°C)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Playback mode, current consumption	I_{PB}	S1 to S7=1 Current on ammeter Ⓐ is measured.	16	22	32	mA
Record mode (power save), current consumption	I_{REC}	S1 to S7=1, V_{PB} Current on ammeter Ⓐ is measured.	—	8	13	mA
Pre-amp. gain	G_{pre}	S1=3, S2=2, others=1 SG1 ; f=118.95kH, 3mVp-p $G_{pre}=20\log\frac{V_{43}}{3}$ (dB)	24	28	32	dB
GCA+multiplier +16k BPF gain (1)	$G_{30/44}$	S1=2, others=1 $V_{C21}=V_{C23}=5V$, $V_{GCA}=3.2V$ SG2 ; f=118.95kHz, 20mVp-p $G=20\log\frac{V_{30}}{20}$ (dB)	27	30	35	dB
GCA+multiplier +16k BPF gain (2)	$G_{38/44}$	S1=2, others=1 $V_{C21}=V_{C23}=5V$, $V_{GCA}=3.2V$ SG2 ; f=118.95kHz, 20mVp-p $G=20\log\frac{V_{30}}{20}$ (dB)	21	24	29	dB
GCA+multiplier +46k BPF gain	$G_{31/44}$	S1=2, others=1 $V_{C21}=V_{C23}=5V$, $V_{GCA}=3.2V$ SG2 ; f=148.69kHz, 20mVp-p $G=20\log\frac{V_{31}}{20}$ (dB)	27	30	34.5	dB
GCA Gain variable width	ΔG	S1=2, others=1 SG2 ; f=118.95kHz, 20mVp-p Difference in gain between $V_{GCA}=4.0V$ and $V_{GCA}=2.5V$ Measuring pin 38 ΔG=G−G′ where, $G=20\log\frac{V_{38}}{20}$ $G'=20\log\frac{V'_{38}}{20}$	7	14	—	dB

Electrical Characteristics

(V_{CC}=5.0V, Ta=25°C)

	Item	Symbol	Condition		Min.	Typ.	Max.	Unit
16kHz BPF characteristics (1)	F_0 frequency (design quarantee)	F_0 (16k)	S1=2, others=1 SG2; f=100k to 200k, 20mVp-p (SWP time 99sec) $V_{C21}=V_{C23}=5V$ measuring instrument spectrum analyzer Max Hold SCAN 0.2sec	V_{30} is monitored by spectrum analyzer to measure frequency at which peak is reached.	16.08	16.46	16.84	kHz
	9kHz damping	9k		V_{30} is monitored by spectrum analyzer to measure level difference between 9kHz and 28kHz relative to 16.46kHz.	—	—	−20	dB
	28kHz damping	28k			—	—	−20	
	102.54kHz damping (design quarantee)	102.54k		V_{30} is monitored by spectrum analyzer to measure level difference of 102.54kHz relative to peak.	—	—	−20	
16kHz BPF characteristics (2)	F_0 frequency (design quarantee)	F_0' (16k)	S1=2, others=1 SG2; f=100k to 200k, 20mVp-p (SWP time 99sec) $V_{C21}V_{C23}=5V$ measuring instrument spectrum analyzer Max Hold SCAN 0.2sec	V_{38} is monitored by spectrum analyzer to measure frequency at which peak is reached.	16.08	16.46	16.84	kHz
	9kHz damping	9k		V_{38} is monitored by spectrum analyzer to measure level difference between 9kHz and 28kHz relative to 16.46kHz.	—	—	−20	dB
	28kHz damping	28k			—	—	−20	
	102.54kHz damping (design quarantee)	102.54k		V_{38} is monitored by spectrum analyzer to measure level difference of 102.54kHz relative to peak.	—	—	−20	

Electrical Characteristics

(V_{CC}=5.0V, Ta=25°C)

Item		Symbol	Condition		Min.	Typ.	Max.	Unit
46kHz BPF characteristics	F_0 frequency (design quarantee)	F_0 (64k)	S1=2, others=1 SG2; f=100k to 200k, 20mVp-p (SWP time 99sec) $V_{C21}=V_{C23}=5V$ measuring instrument spectrum analyzer Max Hold SCAN 0.2sec	V_{31} is monitored by spectrum analyzer to measure frequency giving peak.	45.28	46.20	47.12	kHz
	33kHz damping	33k		V_{31} is monitored by spectrum analyzer to measure level difference between 33kHz and 65kHz relative to 46.26kHz.	—	—	−20	dB
	65kHz damping	65k			—	—	−20	
	102.54kHz damping (design quarantee)	102.54k		V_{31} is monitored by spectrum analyzer to measure level difference of 102.54kHz relative to peak.	—	—	−20	
16kHz, 46kHz BPF f_0 gain difference		G	Difference between gain of 16kHz BPF (V_{30}) at 16.46kHz and gain of 46kHz BPF (V_{31}) at 46.20kHz (absolute value).		—	—	2	dB
Subtractor offset		V_{OFF}	S1 to S7=1 $V_{TSA}=V_{TSB}=0.5V$, $V_{SWP}=1.5V$ $V_{36}-V_8$ DC diffrence is measured.		−80	0	80	mV
Subtractor output voltage (1)		$V_{36\,(1)}$	S4=2, others=1	V_{36} voltage difference between $V_b=V_{32}+30mV$ and $V_b=V_{32}+80mV$ is measured. *Note 1	−550	500	−430	mV
Subtractor output voltage (2)		$V_{36\,(2)}$		V_{36} voltage difference between $V_b=V_{32}+30mV$ and $V_b=V_{32}+80mV$ is measured. *Note 1	400	500	550	mV

Electrical Characteristics (Vcc=5.0V, Ta=25°C)

Item	Symbol	Condition		Min.	Typ.	Max.	Unit
Subtractor output voltage (3)	$V_{36\,(3)}$	S5=2, others=1	V_{36} voltage difference between $V_a=V_{33}+30mV$ and $V_a=V_{33}+80mV$ is measured. *Note 2	400	500	550	mV
Subtractor output voltage (4)	$V_{36\,(4)}$		V_{36} voltage difference between $V_a=V_{33}+30mV$ and $V_a=V_{33}+80mV$ is measured. *Note 2	−550	−500	−430	mV
Subtractor output voltage (5)	$V_{36\,(5)}$		V_{36} voltage difference between $V_a=V_{32}-30mV$ and $V_b=V_{32}-80mV$ is measured. Note 1	−110	0	80	mV
Subtractor output voltage (6)	$V_{36\,(6)}$		V_{36} voltage difference between $V_a=V_{32}-30mV$ and $V_b=V_{32}-80mV$ is measured. *Note 2	−110	0	80	mV
S/HA output voltage	$V_{S/HA}$	V_6 voltage difference between $V_b=V_{32}+30mV$ and $V_b=V_{32}+80mV$ is measured. *Note 1		430	500	600	mV
S/HB output voltage	$V_{S/HB}$	V_{35} voltage difference between $V_b=V_{32}+30mV$ and $V_b=V_{32}+80mV$ is measured. *Note 1		430	500	600	mV

Note 1) V_{32}: Pins 8 and 32 are short-circuited outside.
Note 2) V_{33}: Pins 8 and 33 are short-circuited outside.

Electrical Characteristics

(V_{CC}=5.0V, Ta=25°C)

Item		Symbol	Condition		Min.	Typ.	Max.	Unit
Standard voltage		V_{Ref}	S1 to S7=1 V_8 voltage is measured.		2.4	2.5	2.6	V
SCF standard voltage		V_{RSCF}	S1 to S7=1 V_{10} voltage is measured.		—	1.25	—	V
Ope Amp offset		V'_{OFF}	S7=2, others=1 V_8–V_{12}voltage difference is measured.		−10	0	10	mV
Ope Amp oscillation margin		V'_{OSC}	S7=2, others=1 V_{12} output noise level		—	—	10	mVp-p
X'tal OSC		$f_{X'tal}$	S1 to S7=1, f=5.94755 for X'tal V_{16} oscillation frequency is measured.		—	5.9	—	MHz
1/M divider	1/58	F1	S1 to S7=1 V_{PB}=1V	V_{C23}(SEL1)=5V V_{C21}(SEL2)=5V	100	102.5	105	kHz
	1/50	F2		V_{C23}(SEL1)=0V V_{C21}(SEL2)=5V	116	119.0	122	
	1/36	F3		V_{C23}(SEL1)=5V V_{C21}(SEL2)=0V	160	165.2	170	
	1/40	F4		V_{C23}(SEL1)=0V V_{C21}(SEL2)=0V	145	148.7	153	
Pilot signal Out signal		V24	S1 to S7=1 V_{C23}(SEL1)=5V V_{C21}(SEL2)=5V	V_{PB}=1V	3.45	3.75	4.15	Vp-p
		V'24		V_{PB}=3V	3.45	3.75	4.15	
F5 frequeney		F_5	S1 to S7=1, V_{F5} Gate=5V		—	228	—	kHz
F5 Output off level		V_{F5}	S1 to S7=1, V_{F5} Gate=0V		—	0	—	Vp-p
Schmitt ON level		V_{SMT}	S6=2, others=1 V_{PB}=3V, V_{TSB}=0.5V While increasing Vc voltage from 0V, V_{35} voltage When V_{34} voltage becomes from High to Low is measured.		2.4	2.6	2.8	V
Schmitt hysteresis		V_{HYS}	S1=2, others=1 V_{TSB}=0.5V While reducing Vc voltage from Schmitt ON level voltage, V_{35} voltage when V_{34} becomes from Low to High is measured, and the level difference from Schmitt ON level is measured.		0.2	0.3	0.4	V
S/HA Dynamic range		$D_{S/HA}$	S5=2, others=1 V_{TSA}=0.5V, V_{SWF}=3.5V, V_a=3.5V V_6 voltage is measured.		4.0	—	—	V
		$D'_{S/HA}$	S1 to S7=1 V_{TSA}=0.5V *Note 3		—	—	1.3	

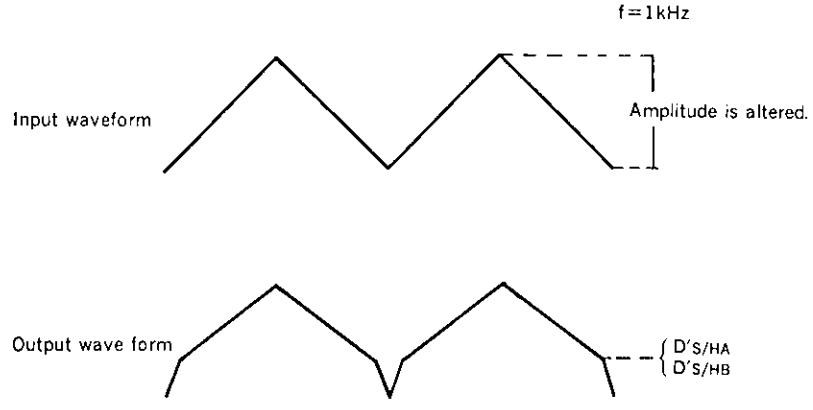
Electrical Characteristics

(V_{CC}=5.0V, Ta=25°C)

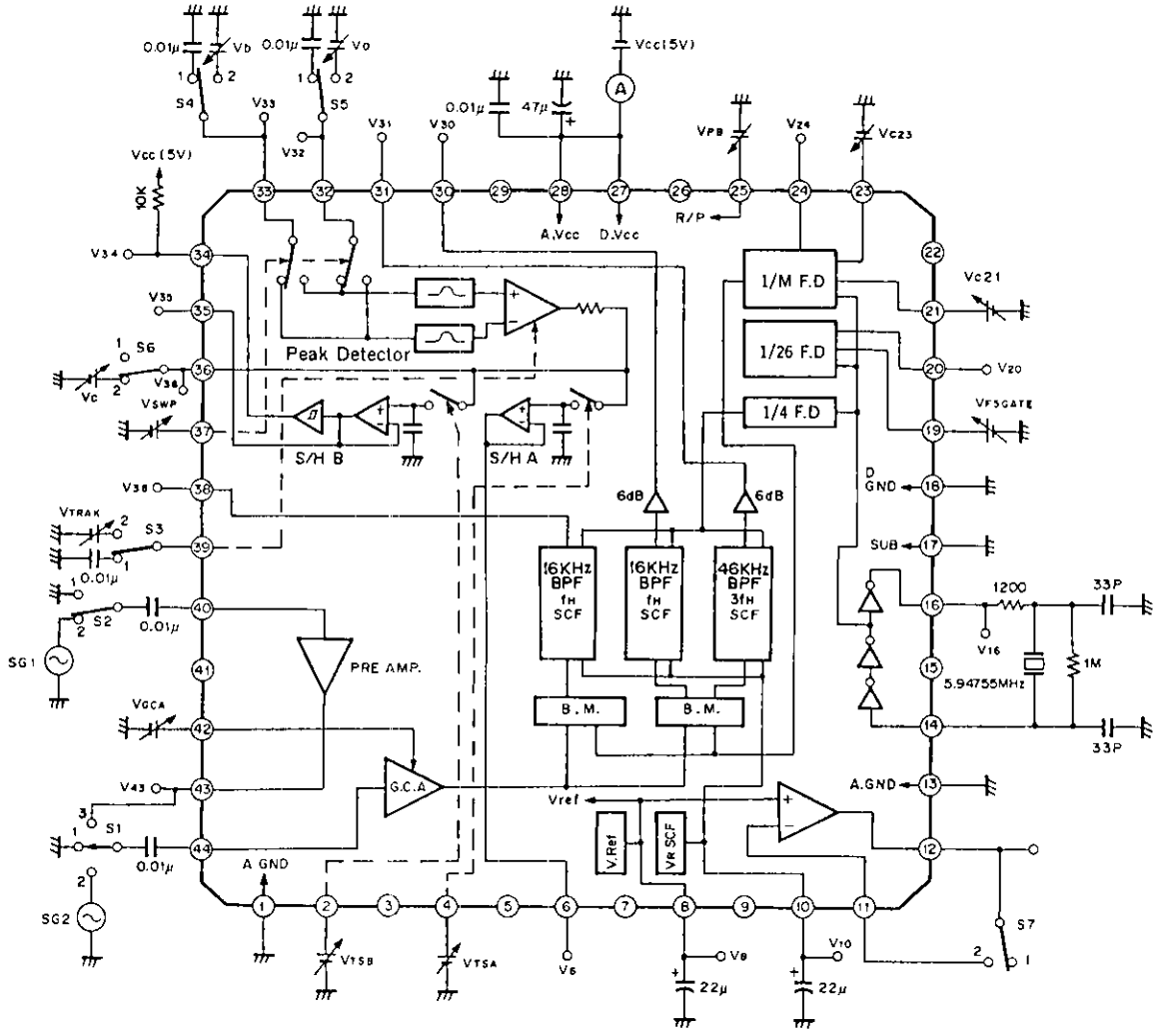
Item		Symbol	Condition	Min.	Typ.	Max.	Unit
S/HB Dynamic range		$D_{S/HB}$	S5=2, others=1 V_{TSB}=0.5V, V_{SWP}=3.5V, V_a=3.5V V_{35} voltage is measured.	4.0	—	—	V
		$D'_{S/HB}$	S1 to S7=1 V_{TSB}=0.5V *Note 3	—	—	1.3	
Control circuit	Gate input "H" level	V_{IH}	Pins 2, 19, 21, 23 and 37	3.5	—	—	
	Gate input "L" level	V_{IL}	Pins 2, 19, 21, 23 and 37	—	—	1.5	
	Pin 4 input "H" level	V_{IH}	Pin 4	3.5	—	—	V
	Pin 4 input "L" level	V_{IL}	Pin 4	—	—	1.0	
	PB operation quarantee voltage	$V_{R/P}$	S1 to S7=1 While increasing V_{PB} from 0V, V_{PB} voltage when current of ammeter Ⓐ is switched over from Low to High is measured.	3.5	—	—	
Tracking variable range		V_T	S3=2, others=1 While changing V_{TRAX} from 0V to 5V, voltage difference at 36 pin output at this point is measured.	1.45	1.75	1.95	V
"H" level Input current		I_{IH}	Pins 2, 19, 21, 23 and 37 V_{IH}=5.0V	−1	0	1	μA
	"L" level	I_{IL}	Pins 2, 19, 21, 23 and 37 V_{IL}=0.0V	−1	0	1	μA
Output current	"H" level	I_{OH}	Pin 20 V_{OH}=4.6V	0.35	0.8	—	mA
	"L" level	I_{OL}	Pin 20 V_{OL}=0.4V	0.35	0.8	—	

***Note 3)** The following triangular wave is entered from Pin 36.

While monitoring Pins 6 and 35 with an oscilloscope, D'S/HA and D'S/HB when output waveform becomes an follows are measured.



Test Circuit



Note) When there is no particular specification of test condition, control voltage is measured under the following conditions.

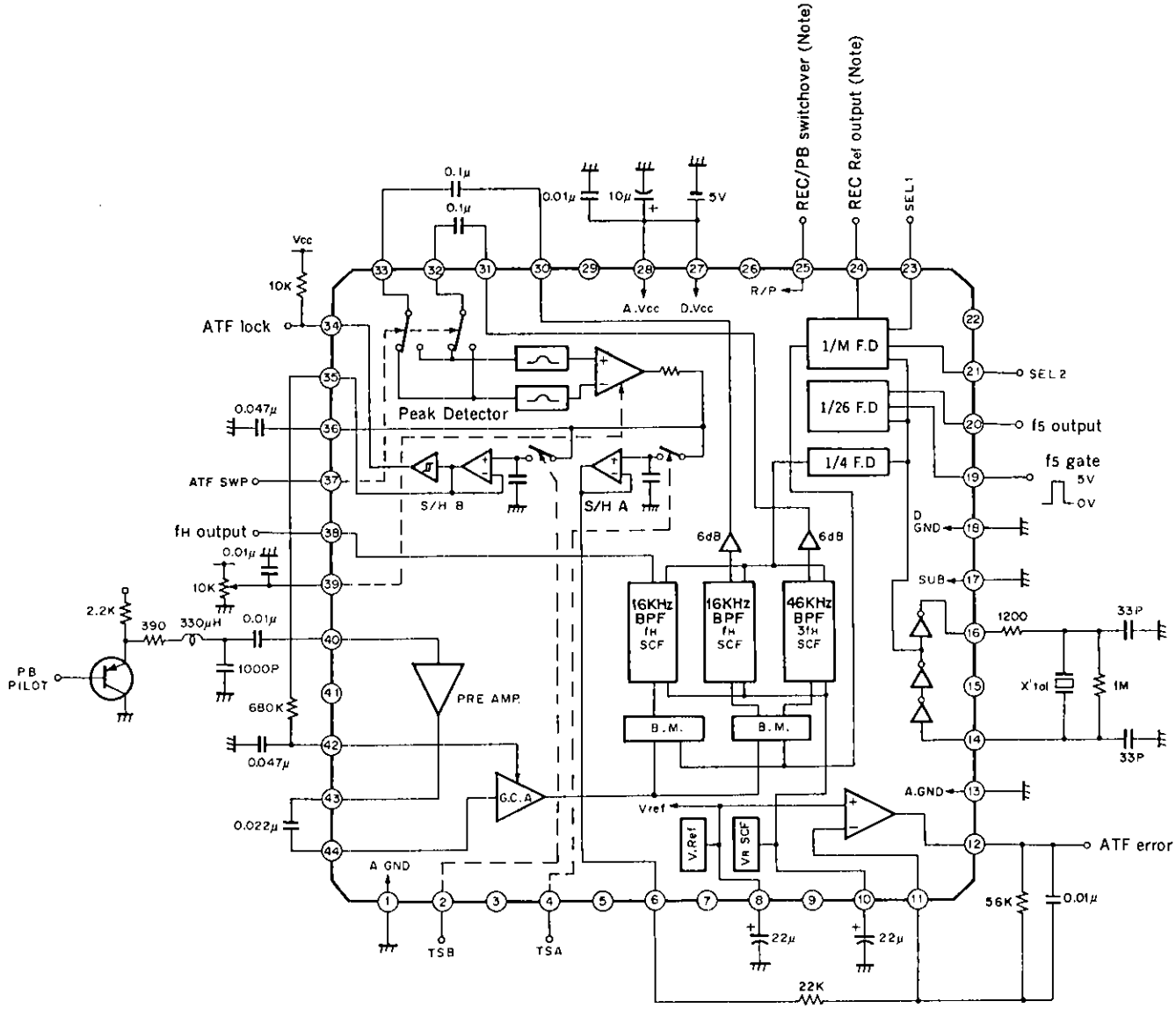
$V_{TSA} = V_{TSB} = V_{F5GATE} = V_{C21} = V_{C23} = V_{SWP} = 0V$

$V_a = V_b = V_c = 2.5V$

$V_{GCA} = 3.2V$

$V_{PB} = 3.5V$

Application Circuit



Note)

SEL1	SEL2	REC Ref output	Dividing ratio
H	H	f_1	1/58
L	H	f_2	1/50
H	L	f_3	1/36
L	L	f_4	1/40

Application circuits shown are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits or for any infringement of third party patent and other right due to same.