TDA7466

DIGITALLY CONTROLLED AUDIO PROCESSOR WITH SRS SURROUND SOUND AND VOICE CANCELLER

SRS ®
everything else is only stereo™

*The Device incorporates the SRS WOW® Technology under licence from SRS Labs, Inc.*

- 1 STEREO INPUT
- INPUT ATTENUATION CONTROL IN 0.5dB STEP
- TREBLE MIDDLE AND BASS CONTROL
- VOICE CANCELLER IS AVAILABLE
- STEREO SRS SURROUND SOUND WITH CENTER & SPACE CONTROL IS AVAILABLE
- THREE STANDARD SURROUND MODES ARE AVAILABLE:
  - MUSIC IN 4 DIFFERENT SELECTABLE RESPONSES
  - MOVIE AND SIMULATED IN 256 DIFFERENT SELECTABLE RESPONSES
- 2 SPEAKERS OUTPUTS
  - INDEPENDENT ATTENUATORS IN 1dB STEP FOR BALANCE FACILITY
  - ZERO CROSSING ATTENUATION AVAILABLE
  - AVAILABILITY OF LOUDSPEAKERS EQUALIZATION FIXED BY EXTERNAL COMPONENTS
  - INDEPENDENT MUTE FUNCTION
- 2 RECORD OUTPUTS
  - INDEPENDENT ATTENUATORS IN 1dB STEP FOR BALANCE FACILITY
  - MUX AVAILABLE FOR PROCESSES SIGNAL SELECTION
  - INDEPENDENT MUTE FUNCTION
- ALL FUNCTIONS PROGRAMMABLE VIA SERIAL BUS

SDIP42

ORDERING NUMBER: TDA7466(S)

PIN CONNECTION

V_S	1		42	CREF
PS4	2		41	NBRO
PS3	3		40	NBRIN
PS2	4		39	LPVC
PS1	5		38	R_IN
LP	6		37	VREFOUT
LP1	7		36	L_IN
HP1	8		35	NBLIN
HP2	9		34	NBLO
VAR_L	10		33	NETW2
BASSO_L	11		32	NETW1
VAR_R	12		31	RECOUT_L
BASSO_R	13		30	RECOUT_R
BASS_LO	14		29	L_OUT
BASS_LI	15		28	R_OUT
BASS_RO	16		27	DIG_GND
BASS_RI	17		26	SCL
MIDDLE_LO	18		25	SDA
MIDDLE_LI	19		24	AGND
MIDDLE_RO	20		23	TREBLE_L
MIDDLE_RI	21		22	TREBLE_R

D96AU445A

DESCRIPTION

The TDA7466 is a volume tone (bass middle and treble) balance (Left/Right) processors with stereo SRS and voice canceller for quality audio applications in car radio, Hi-Fi, TV systems.

It reproduces SRS (Sound Retrieval System) sound by external components and surround sound by using phase shifters and a signal matrix. The AC signal setting is obtained by resistor networks and switches combined with operational amplifiers according to the SRS laboratories specification. Control of all the functions is accomplished by serial bus.
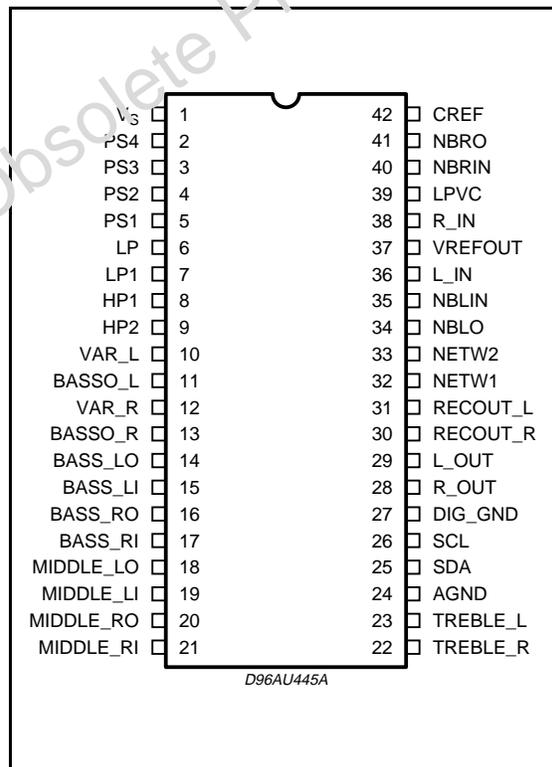
Thanks to the used BIPOLAR/CMOS Technology, Low Distortion, Low Noise and DC stepping are obtained.

BLOCK DIAGRAM
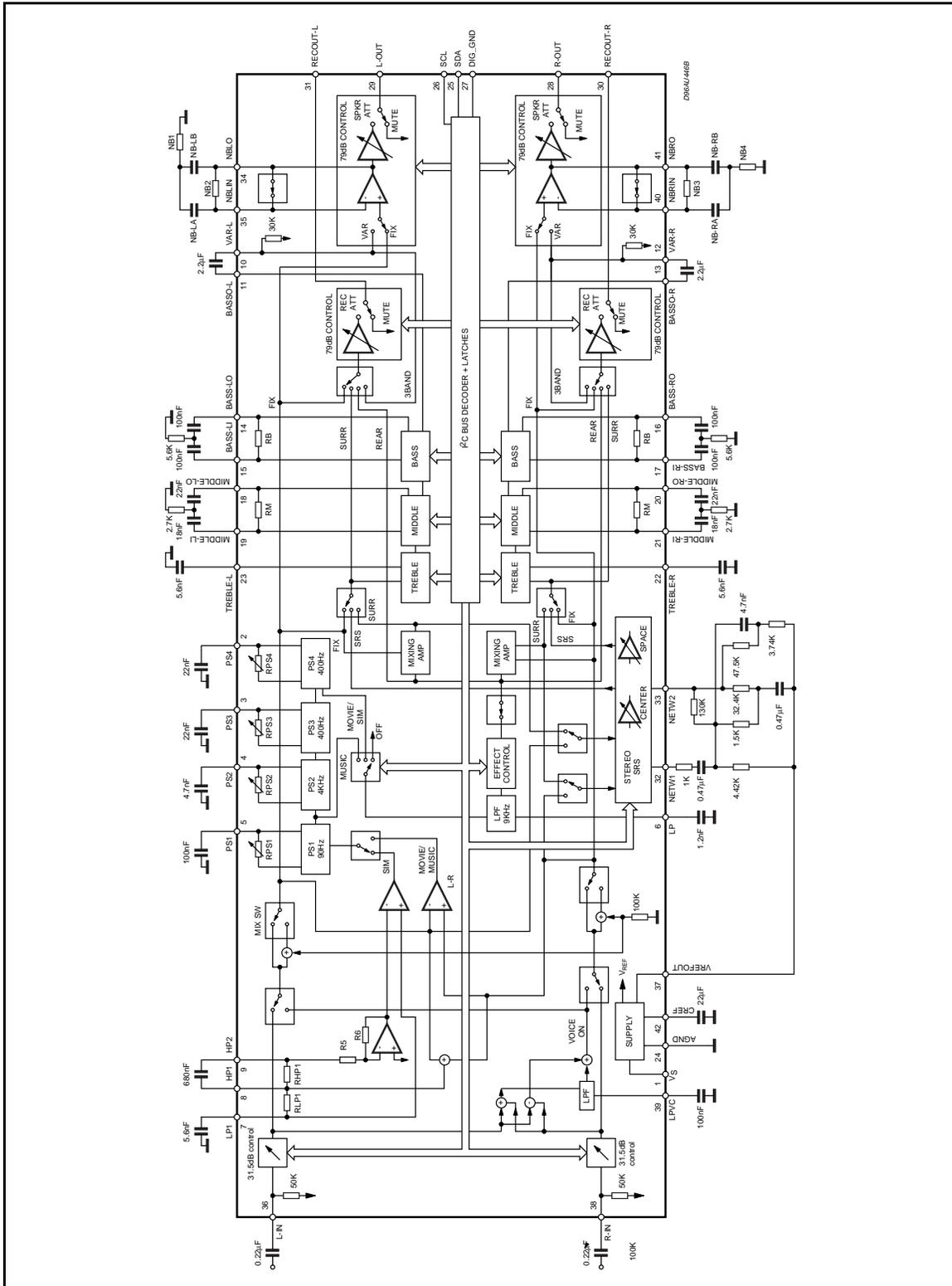
THERMAL DATA

Symbol	Description		Value	Unit
$R_{th\ j\text{-}pins}$	Thermal Resistance Junction-pins	Max.	85	°C/W

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	Operating Supply Voltage	11	V
T_{amb}	Operating Ambient Temperature	-10 to 85	°C
T_{stg}	Storage Temperature Range	-55 to +150	°C

QUICK REFERENCE DATA

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_S	Supply Voltage	7	9	10.2	V
V_{CL}	Max. input signal handling	2			Vrms
THD	Total Harmonic Distortion V = 1Vrms f = 1KHz		0.01	0.1	%
S/N	Signal to Noise Ratio V out = 1Vrms (mode = OFF)		106		dB
S_C	Channel Separation f = 1KHz		90		dB
	Input Attenuation Control (0.5dB)	-31.5		0	dB
	Treble Control (2db step)	-14		+14	dB
	Middle Control (2db step)	-14		+14	dB
	Bass Control (2dB step)	-14		+14	dB
	Balance Control 1dB step (L_{CH}, R_{CH})	-79		0	dB
	Mute Attenuation		100		dB

ELECTRICAL CHARACTERISTICS (refer to the test circuit T_{amb} = 25°C, V_S = 9V, R_L = 10KΩ,
V_{in} = 1Vrms; R_G = 600Ω, all controls flat (G = 0dB), Effect Ctrl = -6dB, MODE = OFF; f = 1KHz
unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
SUPPLY						
V_S	Supply Voltage		7	9	10.2	V
I_S	Supply Current			25		mA
SVR	Ripple Rejection	L_{CH} / $R_{CH\ out}$, Mode = OFF	60	80		dB
INPUT STAGE						
R_{IN}	Input Resistance		37.5	50	62.5	KΩ
V_{CL}	Clipping Level	THD = 0.3%	2	2.5		Vrms
A_{RANGE}	Attenuation Range			31.5		dB
A_{VMIN}	Min. Attenuation		-1	0	1	dB
A_{VMAX}	Max. Attenuation		31	31.5	32	dB
A_{STEP}	Step Resolution		-1	0.5	1	dB
V_{DC}	DC Steps	Adjacent att. step	-3	0	3	mV
A_{VO1}	Voice Canceller Output 1	L_{IN} = R_{IN}, R_{IN} = ON, V_{mix} = 0V FIX, 0dB attenuation	5	6	7	dB
A_{VO2}	Voice Canceller Output 2	L_{IN} = R_{IN} = 0V V_{mix} = 1V$_{rms}$ FIX, 0dB attenuation	-1	0	1	dB

ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
SUPPLY						
A_{VO3}	Voice Canceller Output 3	$L_{IN} = -R_{IN}$, V_{mix} = 0V FIX, 0dB attenuation	5	6	7	dB
R_{LPV}	Low Pass Filter Resistance		24	32	40	KΩ
BASS CONTROL						
Gb	Control Range	Max. Boost/cut	±12.0	±14.0	±16.0	dB
B_{STEP}	Step Resolution		1	2	3	dB
R_B	Internal Feedback Resistance		33	44	55	KΩ
MIDDLE CONTROL						
Gm	Control Range	Max. Boost/cut	±12.0	±14.0	±16.0	dB
M_{STEP}	Step Resolution		1	2	3	dB
R_M	Internal Feedback Resistance		18.75	25	31.25	KΩ
TREBLE CONTROL						
Gt	Control Range	Max. Boost/cut	±13.0	±14.0	±15.0	dB
T_{STEP}	Step Resolution		1	2	3	dB

STANDARD SURROUND SOUND MATRIX

TEST CONDITION (Phase Resistor Selection D0=0, D1=1, D2=0. D3=1, D4=0, D5=1, D6=0, D7=1

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
G_{OFF}	In-phase Gain (OFF)	Mode OFF, Input signal of 1kHz, 1.4 V_{p-p}, $R_{in} \rightarrow R_{out}$ $L_{in} \rightarrow L_{out}$	-1	0	1	dB
D_{GOFF}	LR In-phase Gain Difference (OFF)	Mode OFF, Input signal of 1kHz, 1.4 V_{p-p} $R_{in} \rightarrow R_{out}$, $L_{in} \rightarrow L_{out}$	-1	0	1	dB
G_{MOV}	In-phase Gain (Movie)	Movie mode, Effect Ctrl = -6dB Input signal of 1kHz, 1.4 V_{p-p} $R_{in} \rightarrow R_{out}$, $L_{in} \rightarrow L_{out}$		8		dB
D_{GMOV}	LR In-phase Gain Difference (Movie)	Movie mode, Effect Ctrl = -6dB Input signal of 1kHz, 1.4 V_{p-p} $(R_{in} \rightarrow R_{out}) - (L_{in} \rightarrow L_{out})$		0		dB
G_{MUS}	In-phase Gain (Music)	Music mode, Effect Ctrl = -6dB Input signal of 1kHz, 1.4 V_{p-p} $(R_{in} \rightarrow R_{out})$, $(L_{in} \rightarrow L_{out})$		7		dB
D_{GMUS}	LR In-phase Gain Difference (Music)	Music mode, Effect Ctrl = -6dB Input signal of 1kHz, 1.4 V_{p-p} $(R_{in} \rightarrow R_{out}) - (L_{in} \rightarrow L_{out})$		0		dB
L_{MON1}	Simulated L Output 1	Simulated Mode, Effect Ctrl = -6dB Input signal of 250Hz, 1.4 V_{p-p}, R_{in} and $L_{in} \rightarrow L_{out}$		4.5		dB
L_{MON2}	Simulated L Output 2	Simulated Mode, Effect Ctrl = -6dB Input signal of 1kHz, 1.4 V_{p-p}, R_{in} and $L_{in} \rightarrow L_{out}$		− 4.0		dB
L_{MON3}	Simulated L Output 3	Simulated Mode, Effect Ctrl = -6dB Input signal of 3.6kHz, 1.4 V_{p-p}, R_{in} and $L_{in} \rightarrow L_{out}$		7.0		dB

ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_{MON1}	Simulated R Output 1	Simulated Mode, Effect Ctrl = -6dB Input signal of 250Hz, 1.4 V_{p-p}, R_{in} and $L_{in} \rightarrow R_{out}$		– 4.5		dB
R_{MON2}	Simulated R Output 2	Simulated Mode, Effect Ctrl = -6dB Input signal of 1kHz, 1.4 V_{p-p}, R_{in} and $L_{in} \rightarrow R_{out}$		3.8		dB
R_{MON3}	Simulated R Output 3	Simulated Mode, Effect Ctrl = -6dB Input signal of 3.6kHz, 1.4 V_{p-p}, R_{in} and $L_{in} \rightarrow R_{out}$		– 20		dB
R_{LP1}	Low Pass Filter Resistance		7.5	10	12.5	KΩ
R_{HPI}	High Pass Filter Resistance		45	60	75	KΩ
R_{LPF}	LP Pin Impedance		7.5	10	12.5	KΩ
STANDARD SURROUND SOUND EFFECT CONTROL						
C_{RANGE}	Control Range		- 21		- 6	dB
S_{STEP}	Step Resolution			1		dB
SURROUND SOUND MATRIX PHASE						
R_{PS10}	Phase Shifter 1: D1 = 0, D0 = 0		8.8	11.8	14.8	KΩ
R_{PS11}	Phase Shifter 1: D1 = 0, D0 = 1		10.6	14.1	17.6	KΩ
R_{PS12}	Phase Shifter 1: D1 = 1, D0 = 0		13.4	17.9	22.4	KΩ
R_{PS13}	Phase Shifter 1: D1 = 1, D0 = 1		28	37.3	46.6	KΩ
R_{PS20}	Phase Shifter 2: D3 = 0, D2 = 0		4.2	5.6	7	KΩ
R_{PS21}	Phase Shifter 2: D3 = 0, D2 = 1		5.1	6.8	8.5	KΩ
R_{PS22}	Phase Shifter 2: D3 = 1, D2 = 0		6.3	8.4	10.5	KΩ
R_{PS23}	Phase Shifter 2: D3 = 1, D2 = 1		13.7	18.3	22.9	KΩ
R_{PS30}	Phase Shifter 3: D5 = 0, D4 = 0		9	12.1	15.1	KΩ
R_{PS31}	Phase Shifter 3: D5 = 0, D4 = 1		10.9	14.5	18.1	KΩ
R_{PS32}	Phase Shifter 3: D5 = 1, D4 = 0		13.6	18.1	22.6	KΩ
R_{PS33}	Phase Shifter 3: D5 = 1, D4 = 1		29.3	39.1	48.9	KΩ
R_{PS40}	Phase Shifter 4: D7 = 0, D6 = 0		9	12.1	15.1	KΩ
R_{PS41}	Phase Shifter 4: D7 = 0, D6 = 1		10.9	14.5	18.1	KΩ
R_{PS42}	Phase Shifter 4: D7 = 1, D6 = 0		13.6	18.1	22.6	KΩ
R_{PS43}	Phase Shifter 4: D7 = 1, D6 = 1		29.3	39.1	48.9	KΩ

SRS SURROUND SOUND MATRIX

CENTER	SRS Control Range		-31		0	dB
$Step_C$	Center Step Resolution			1		dB
SPACE	SRS Space Control Range			-31	0	dB
$Step_S$	Space Step Resolution			1		dB
P_{ERSP1}	Perspective 1	Input Signal of 125Hz SPACE = 0dB, CENTER = MUTE R_{in} = GND; $L_{in} \rightarrow R_{OUT}$		12		dB
P_{ERSP2}	Perspective 2	Input Signal of 2.15KHz SPACE = 0dB, CENTER = MUTE R_{in} = GND; $L_{in} \rightarrow R_{OUT}$		0		dB
L+R	L+ R SRS Curve	SPACE = MUTE, CENTER =0dB R_{in} = GND; $L_{in} \rightarrow R_{OUT}$		-8.5		dB

ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
SPEAKER & RECORD ATTENUATORS						
C_{range}	Control Range			79		dB
S_{STEP}	Step Resolution		0.5	1	1.5	dB
E_A	Attenuation set error	Av = 0 to -20dB	-1.5	0	1.5	dB
		Av = -20 to -79dB	-3	0	2	dB
V_{DC}	DC Steps	Adjacent att. steps	-3	0	3	mV
A_{MUTE}	Output Mute Condition		70	100		dB
R_{VAR}	Input Impedance		22.5	30	37.5	KΩ
SPEAKER ATTENUATORS						
V_{TH}	Zero CrossingThreshold	D7 = 0	$\frac{V_S}{2} + 20$			mV
AUDIO OUTPUTS						
$N_{O(OFF)}$	Output Noise (OFF)	Output Mute, Flat B_W = 20Hz to 20KHz		4 5		µVrms µVrms
$N_{O(MOV)}$	Output Noise (Movie) Standard Surround Sound	Mode =Movie , B_W = 20Hz to 20KHz		30		µVrms
$N_{O(MUS)}$	Output Noise (Music) Standard Surround Sound	Mode = Music , B_W = 20Hz to 20KHz,		30		µVrms
$N_{O(SIM)}$	Output Noise (Simulated) Standard Surround Sound	Mode = Simulated, B_W = 20Hz to 20KHz		30		µVrms
$N_{O(SRS)}$	Output Noise (SRS) Surround Sound	B_W = 20Hz to 20KHz		50		µVrms
d	Distorsion	Av = 0 ; V_{in} = 1Vrms		0.01	0.1	%
S_C	Channel Separation		70	90		dB
V_{OCL}	Clipping Level	d = 0.3%	2	2.5		Vrms
R_{OUT}	Output Resistance		10	30	50	Ω
V_{OUT}	DC Voltage Level			3.8		V
BUS INPUTS						
V_{IL}	Input Low Voltage				1	V
V_{IH}	Input High Voltage		3			V
I_{IN}	Input Current		-5		+5	µA
V_O	Output Voltage SDA Acknowledge	I_O = 1.6mA			0.4	V

I²C BUS INTERFACE

Data transmission from microprocessor to the TDA7466 and viceversa takes place through the 2 wires I²C BUS interface, consisting of the two lines SDA and SCL (pull-up resistors to positive supply voltage must be connected).

Data Validity

As shown in fig. 3, the data on the SDA line must be stable during the high period of the clock. The HIGH and LOW state of the data line can only change when the clock signal on the SCL line is LOW.

Start and Stop Conditions

As shown in fig.4 a start condition is a HIGH to LOW transition of the SDA line while SCL is HIGH. The stop condition is a LOW to HIGH transition of the SDA line while SCL is HIGH.

Byte Format

Every byte transferred on the SDA line must contain 8 bits. Each byte must be followed by an ac-knowledge bit. The MSB is transferred first.

Acknowledge

The master (μP) puts a resistive HIGH level on the SDA line during the acknowledge clock pulse (see fig. 5). The peripheral (audioprocessor) that ac-knowledges has to pull-down (LOW) the SDA line during this clock pulse.

The audioprocessor which has been addressed has to generate an acknowledge after the recep-tion of each byte, otherwise the SDA line remains at the HIGH level during the ninth clock pulse time. In this case the master transmitter can gen-erate the STOP information in order to abort the transfer.

Transmission without Acknowledge

Avoiding to detect the acknowledge of the audio-processor, the μP can use a simpler transmission: simply it waits one clock without checking the slave acknowledging, and sends the new data.

This approach of course is less protected from misworking.

**Figure 3:** Data Validity on the I²CBUS
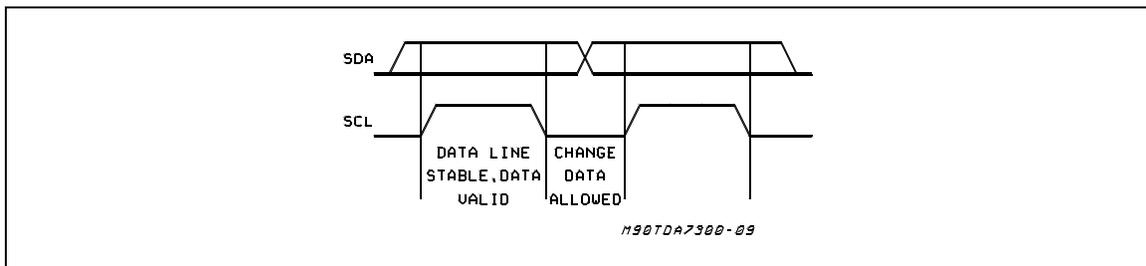

Figure 4: Timing Diagram of I²CBUS
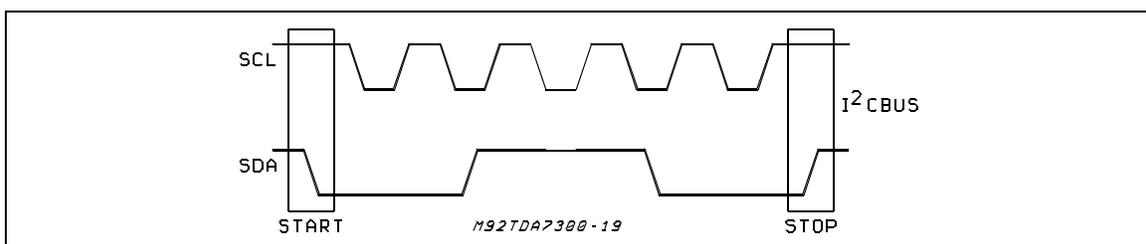
F**igure 5:** Acknowledge on the I²CBUS
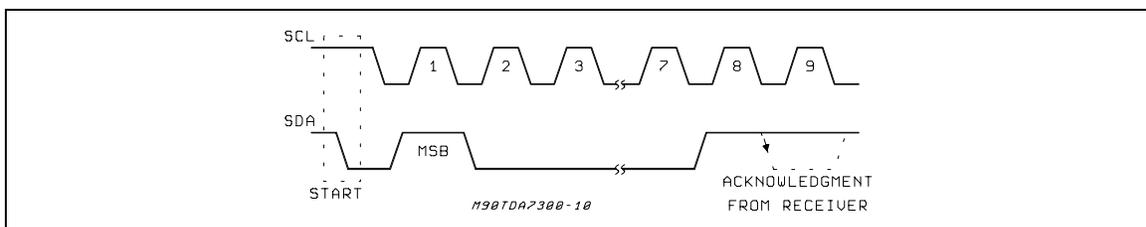
SOFTWARE SPECIFICATION
Interface Protocol

The interface protocol comprises:
- A start condition (S)
- A chip address byte, containing the TDA7466 address
- A subaddress bytes
- A sequence of data (N byte + achnowledge)
- A stop condition (P)

	CHIP ADDRESS									SUBADDRESS				DATA 1 to DATA n				
	MSB					LSB				MSB		LSB		MSB		LSB		
S	1	0	0	0	0	0	A	0	ACK	B	DATA		ACK		DATA		ACK	P

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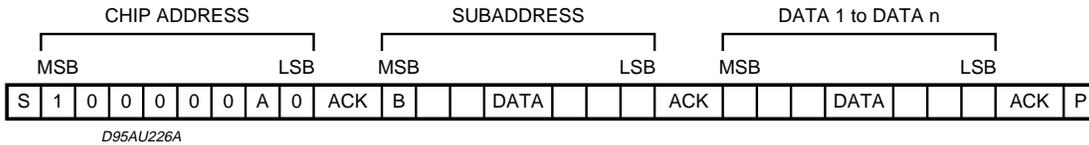
ACK = Achnowledge
S = Start
P = Stop
A = Address
B = Auto Increment

EXAMPLES
### No Incremental Bus
The TDA7466 receives a start condition, the cor- rect chip address, a subaddress with the MSB = 0 (no incremental bus), N-data (all these data concern the subaddress selected), a stop condition.
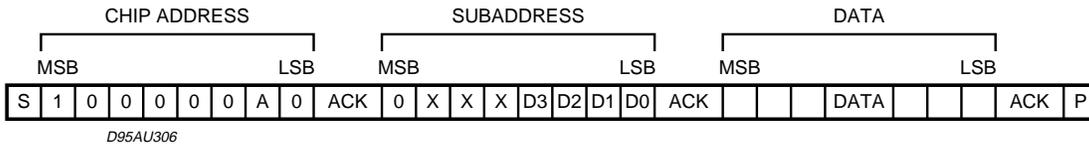
	CHIP ADDRESS									SUBADDRESS								DATA					
	MSB					LSB				MSB							LSB	MSB			LSB			
S	1	0	0	0	0	0	A	0	ACK	0	X	X	X	D3	D2	D1	D0	ACK		DATA		ACK	P

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Incremental Bus
The TDA7466 receives a start condition, the cor- rect chip address, a subaddress with the MSB = 1 (incremental bus): now it is in a loop condition with an autoincrease of the subaddress whereas SUBADDRESS from "1XXX1010" to "1XXX1111" of DATA are ignored.

The DATA 1 concerns thesubaddress sent, and the DATA 2 concerns the subaddress sent plus one in the loop etc. and, at the end, it receives the stop condition.

	CHIP ADDRESS									SUBADDRESS								DATA 1 to DATA n					
	MSB					LSB				MSB							LSB	MSB			LSB			
S	1	0	0	0	0	0	A	0	ACK	1	X	X	X	D3	D2	D1	D0	ACK		DATA		ACK	P

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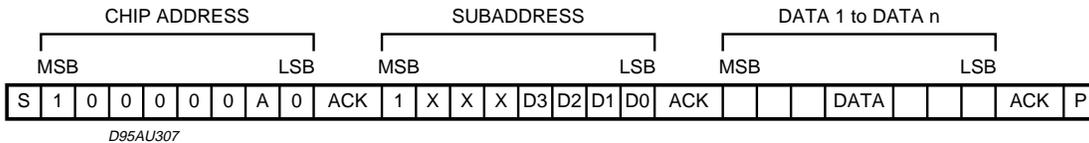
DATA BYTES (Address = 80(HEX)):
FUNCTION SELECTION:

The first byte (subaddress)

MSB							LSB	SUBADDRESS
D7	D6	D5	D4	D3	D2	D1	D0	
B	X	X	X	0	0	0	0	INPUT ATTENUATION
B	X	X	X	0	0	0	1	SURROUND & OUT & EFFECT CONTROL
B	X	X	X	0	0	1	0	PHASE RESISTOR
B	X	X	X	0	0	1	1	BASS & NATURAL BASE
B	X	X	X	0	1	0	0	MIDDLE & TREBLE
B	X	X	X	0	1	0	1	SPEAKER ATTENUATION "L"
B	X	X	X	0	1	1	0	SPEAKER ATTENUATION "R"
B	X	X	X	0	1	1	1	RECORD ATTENUATION "L"
B	X	X	X	1	0	0	0	RECORD ATTENUATION"R"
B	X	X	X	1	0	0	1	INPUT MULTIPLEXER, VOICE CANCELLER & REC OUT
B	X	X	X	1	0	1	0	SRS / SPACE ATTENUATION
B	X	X	X	1	0	1	1	SRS / CENTER ATTENUATION

B = 1 INCREMENTAL BUS; ACTIVE

B = 0 NO INCREMENTAL BUS;

X = DONT'CARE

INPUT ATTENUATION SELECTION

MSB							LSB	INPUT ATTENUATION
D7	D6	D5	D4	D3	D2	D1	D0	0.5 dB STEPS
	1				0	0	0	0
	1				0	0	1	-0.5
	1				0	1	0	-1
	1				0	1	1	-1.5
	1				1	0	0	-2
	1				1	0	1	-2.5
	1				1	1	0	-3
	1				1	1	1	-3.5
								4 dB STEPS
	1	0	0	0				0
	1	0	0	1				-4
	1	0	1	0				-8
	1	0	1	1				-12
	1	1	0	0				-16
	1	1	0	1				-20
	1	1	1	0				-24
	1	1	1	1				-28

INPUT ATTENUATION = 0 ~ -31.5dB

STANDARD SURROUND SELECTION

MSB							LSB	
D7	D6	D5	D4	D3	D2	D1	D0	SURROUND MODE
						0	0	SIMULATED
						0	1	MUSIC
						1	0	OFF
						1	1	MOVIE
								OUT
					0			VAR
					1			FIX
								EFFECT CONTROL
	0	0	0	0				-6
	0	0	0	1				-7
	0	0	1	0				-8
	0	0	1	1				-9
	0	1	0	0				-10
	0	1	0	1				-11
	0	1	1	0				-12
	0	1	1	1				-13
	1	0	0	0				-14
	1	0	0	1				-15
	1	0	1	0				-16
	1	0	1	1				-17
	1	1	0	0				-18
	1	1	0	1				-19
	1	1	1	0				-20
	1	1	1	1				-21

PHASE RESISTOR SELECTION

MSB							LSB	SURROUND PHASE RESISTOR
D7	D6	D5	D4	D3	D2	D1	D0	PHASE SHIFT 1 (KΩ)
						0	0	12
						0	1	14
						1	0	18
						1	1	37
								PHASE SHIFT 2 (KΩ)
				0	0			6
				0	1			7
				1	0			8
				1	1			18
								PHASE SHIFT 3 (KΩ)
		0	0					12
		0	1					14
		1	0					18
		1	1					39
								PHASE SHIFT 4 (KΩ)
0	0							12
0	1							14
1	0							18
1	1							39

MSB							**LSB**	**BASS**
D7	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**	**2 dB STEPS**
				0	0	0	0	-14
				0	0	0	1	-12
				0	0	1	0	-10
				0	0	1	1	-8
				0	1	0	0	-6
				0	1	0	1	-4
				0	1	1	0	-2
				0	1	1	1	0
				1	1	1	1	0
				1	1	1	0	2
				1	1	0	1	4
				1	1	0	0	6
				1	0	1	1	8
				1	0	1	0	10
				1	0	0	1	12
				1	0	0	0	14
								NATURAL BASE
			0					NBRIN, NBRO, NBLIN, NBLO PIN ACTIVE
			1					NO NBRIN, NBRO, NBLIN, NBLO PIN

BASS SELECTION

When external components aren't connected, the data from NATURAL BASE must put "OFF"

MIDDLE & TREBLE SELECTION								
MSB							LSB	MIDDLE
D7	D6	D5	D4	D3	D2	D1	D0	2 dB STEPS
				0	0	0	0	-14
				0	0	0	1	-12
				0	0	1	0	-10
				0	0	1	1	-8
				0	1	0	0	-6
				0	1	0	1	-4
				0	1	1	0	-2
				0	1	1	1	0
				1	1	1	1	0
				1	1	1	0	2
				1	1	0	1	4
				1	1	0	0	6
				1	0	1	1	8
				1	0	1	0	10
				1	0	0	1	12
				1	0	0	0	14
								TREBLE
								2 dB STEPS
0	0	0	0					-14
0	0	0	1					-12
0	0	1	0					-10
0	0	1	1					-8
0	1	0	0					-6
0	1	0	1					-4
0	1	1	0					-2
0	1	1	1					0
1	1	1	1					0
1	1	1	0					2
1	1	0	1					4
1	1	0	0					6
1	0	1	1					8
1	0	1	0					10
1	0	0	1					12
1	0	0	0					14

LEFT CHANNEL SPEAKER ATTENUATION SELECTION

MSB							LSB	SPEAKER/RECORD ATT
D7	D6	D5	D4	D3	D2	D1	D0	1 dB STEPS
					0	0	0	0
					0	0	1	-1
					0	1	0	-2
					0	1	1	-3
					1	0	0	-4
					1	0	1	-5
					1	1	0	-6
					1	1	1	-7
								8 dB STEPS
	0	0	0	0				0
	0	0	0	1				-8
	0	0	1	0				-16
	0	0	1	1				-24
	0	1	0	0				-32
	0	1	0	1				-40
	0	1	1	0				-48
	0	1	1	1				-56
	1	0	0	0				-64
	1	0	0	1				-72
								MUTE
	1	0	1	X				
	1	1	X	X				

LEFT & RIGHT CHANNELS BOTH

MSB							LSB	ZERO CROSS ATT. MODE
D7	D6	D5	D4	D3	D2	D1	D0	1 dB STEPS
0								ON
1								OFF

X = DON'TCARE
SPEAKER/RECORD ATTENUATION = 0dB ~ -79dB

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RECORD AND RIGHT CHANNEL SPEAKER ATTENUATION SELECTION

MSB							LSB	SPEAKER/RECORD ATT
D7	D6	D5	D4	D3	D2	D1	D0	1 dB STEPS
					0	0	0	0
					0	0	1	-1
					0	1	0	-2
					0	1	1	-3
					1	0	0	-4
					1	0	1	-5
					1	1	0	-6
					1	1	1	-7
								8 dB STEPS
	0	0	0	0				0
	0	0	0	1				-8
	0	0	1	0				-16
	0	0	1	1				-24
	0	1	0	0				-32
	0	1	0	1				-40
	0	1	1	0				-48
	0	1	1	1				-56
	1	0	0	0				-64
	1	0	0	1				-72
								MUTE
	1	0	1	X				
	1	1	X	X				

X = DON'T CARE
SPEAKER/RECORD ATTENUATION = 0dB ~ -79dB

VOICE CANCELLER/INPUT/RECOUT L & R SELECTION

MSB							LSB	
D7	D6	D5	D4	D3	D2	D1	D0	VOICE CANCELLER
1					1	1	0	OFF
1					1	1	1	ON
								REC OUT "L"
1			0	0	1	1		VAR 1 (3BAND)
1			0	1	1	1		VAR 2 (SURR)
1			1	0	1	1		VAR 3 (REAR)
1			1	1	1	1		FIX
								REC OUT "R"
1	0	0			1	1		VAR 1(3BAND)
1	0	1			1	1		VAR 2 (SURR)
1	1	0			1	1		VAR 3 (REAR)
1	1	1			1	1		FIX

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SRS SPACE CONTROL: ATTENUATION SELECTION

MSB							LSB	SPACE ATTENUATION
D7	D6	D5	D4	D3	D2	D1	D0	1 dB STEPS
					0	0	0	0
					0	0	1	-1
					0	1	0	-2
					0	1	1	-3
					1	0	0	-4
					1	0	1	-5
					1	1	0	-6
					1	1	1	-7
								8 dB STEPS
		0	0	0				0
		0	0	1				-8
		0	1	0				-16
		0	1	1				-24
								MUTE
		1	X	X	X	X	X	

X = DON'T CARE
SPEAKER/RECORD ATTENUATION = 0dB ~ -31dB

SRS CENTER CONTROL: ATTENUATION SELECTION

MSB							LSB	CENTER ATTENUATION
D7	D6	D5	D4	D3	D2	D1	D0	1 dB STEPS
					0	0	0	0
					0	0	1	-1
					0	1	0	-2
					0	1	1	-3
					1	0	0	-4
					1	0	1	-5
					1	1	0	-6
					1	1	1	-7
								8 dB STEPS
		0	0	0				0
		0	0	1				-8
		0	1	0				-16
		0	1	1				-24
								MUTE
		1	X	X	X	X	X	
								SRS INPUT
	0							NO SURROUND SIGNAL
	1							SURROUND SIGNAL
								SRS SWITCH
0								SRS ON
1								SRS OFF

X = DON'T CARE
SPACE ATTENUATION = 0dB ~ -31dB
RECOMMENDED TO ATTENUATE -3dB IN INPUT ATTENUATION DURING "SRS OFF"
TO FULFILL SRS BYPASS MODE WHEN SRS FUNCTION IS USED

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POWER ON RESET	
SURROUND & OUT CONTROL+ EFFECT CONTROL	OFF + FIX + MAX ATTENUATION
SPEAKER/RECORD ATTENUATION L &R MODE	MUTE + ZERO CROSS ATT.OFF
INPUT ATTENUATION + REAR SWITCH	MAX ATTENUATION + ON
NATURAL BASE	OFF
VOICE CANCELLER	OFF
INPUT	IN1
MIX SWITCH	NO MIX PIN
SRS SURROUND	OFF + MAX ATTENUATION
BASS & MIDDLE	2dB
TREBLE	0dB

PIN DESCRIPTION

PIN: L-OUT, R-OUT, RECOUT-L, RECOUT-R
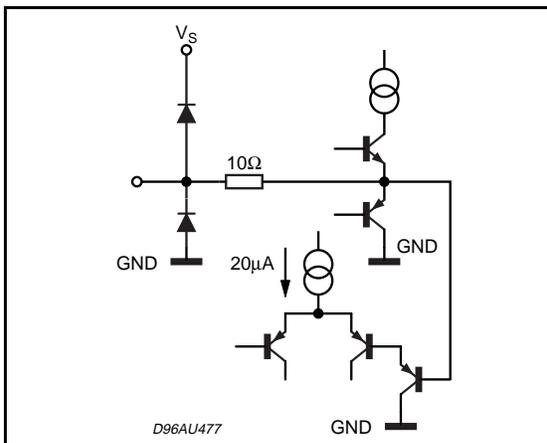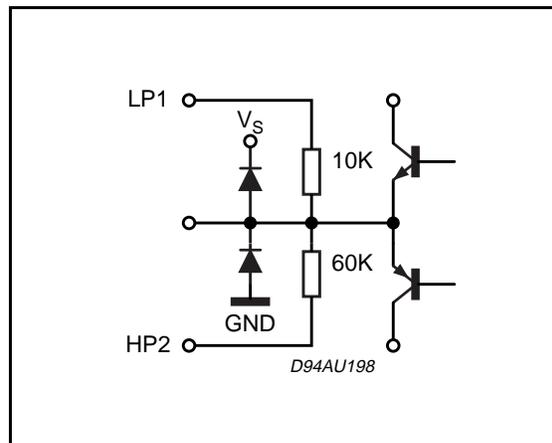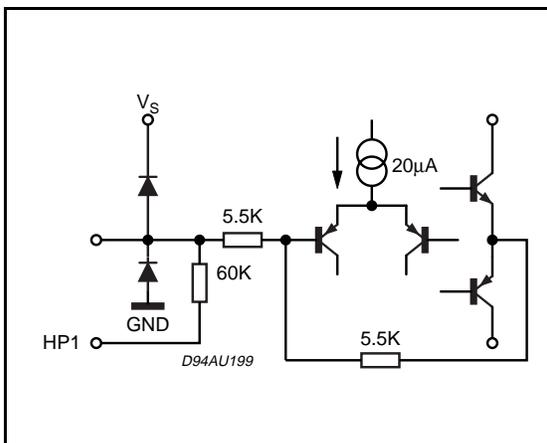
D96AU477

PIN: HP1

D94AU198

PIN: HP2

D94AU199

PIN: L-IN, R-IN

D94AU200

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PIN: VAR-L, VAR-R,

D95AU227

PIN: CREF

D95AU336

PIN: LP1

D94AU211

PIN: SCL, SDA

D94AU205

PIN: PS1, PS2, PS3, PS4, LP

D95AU308

PIN: NETW2

D96AU473

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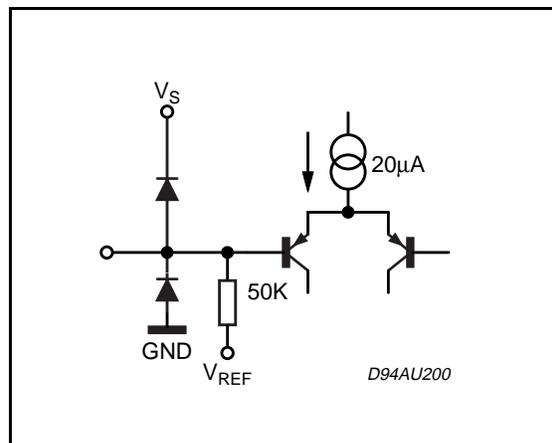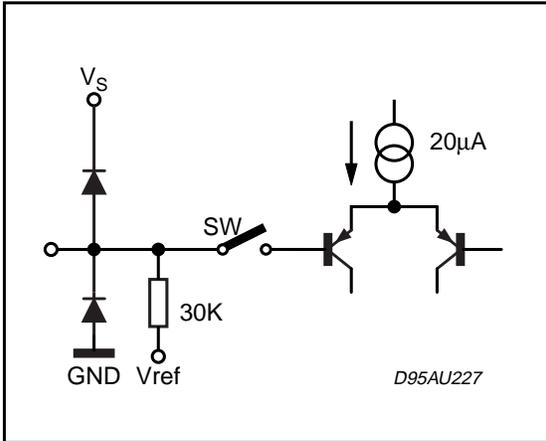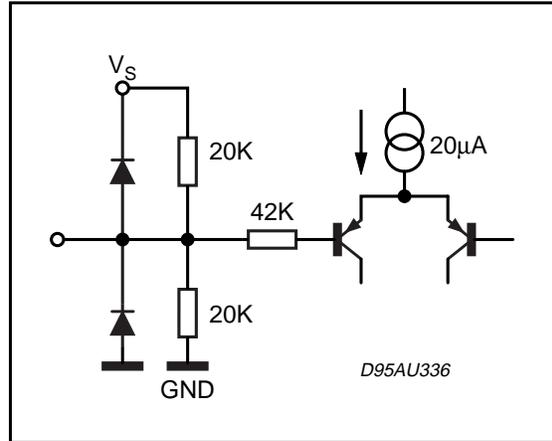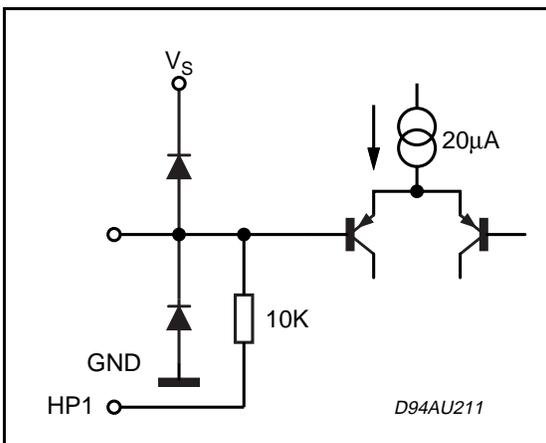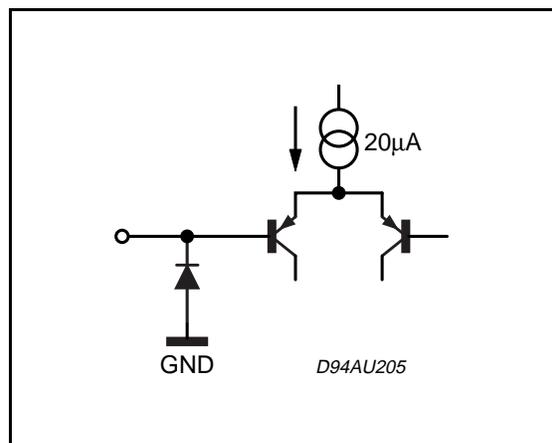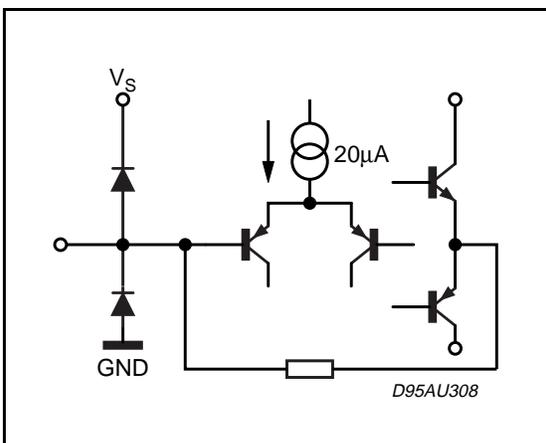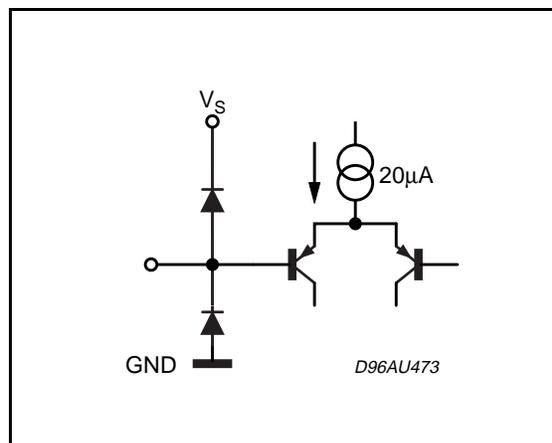
PIN: BASSO-L, BASSO-R, NETW1

D95AU230

PIN: BASS-LI, BASS-RI, MIDDLE-LI, MIDDLE-RI,
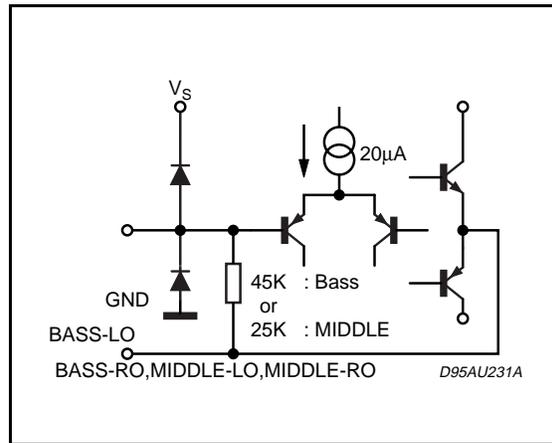
45K : Bass
or
25K : MIDDLE

GND

BASS-LO

BASS-RO,MIDDLE-LO,MIDDLE-RO

D95AU231A

PIN: BASS-LO, BASS-RO, MIDDLE-LO, MIDDLE-RO,

BASS-LI,BASS-RI,MIDDLE-LI,MIDDLE-RI

D95AU232

(*) 45K : Bass
25K : MIDDLE

PIN: TREBLE-L, TREBLE-R

D95AU309

PIN: VOUT REF

D95AU233A

PIN: NBLIN, NBRIN

D95AU234

PIN: NBLO, NBRO

D95AU235A
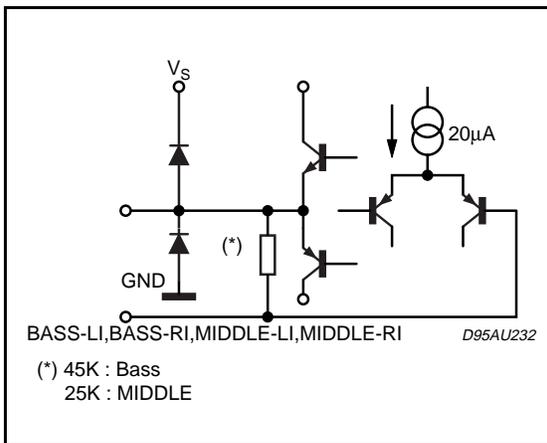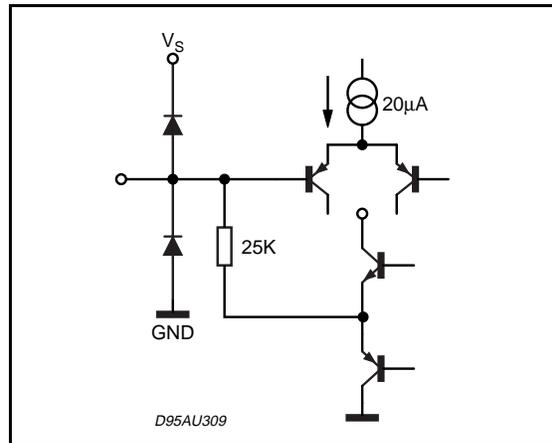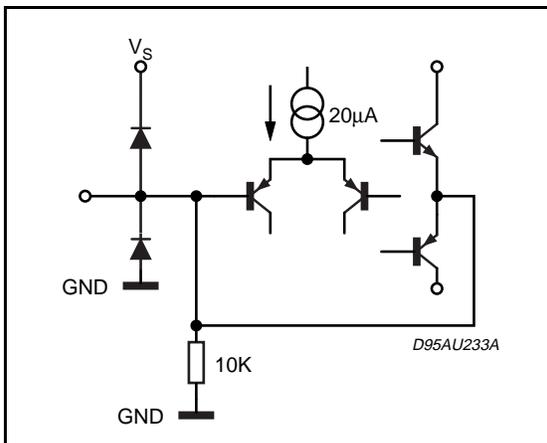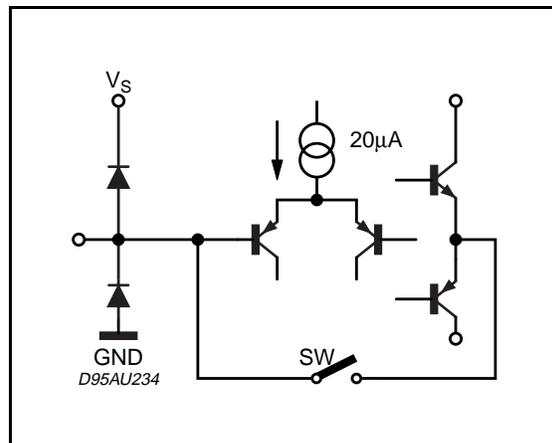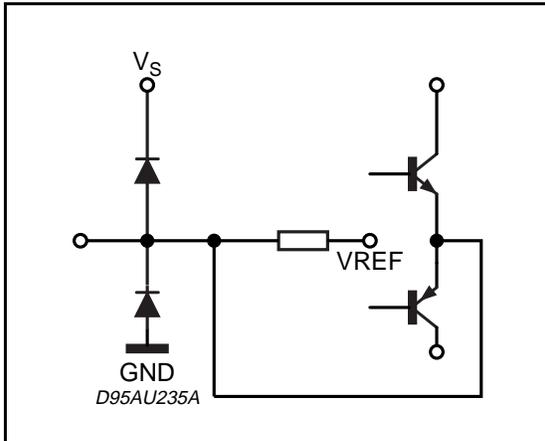
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			5.08			0.20
A1	0.51			0.020		
A2	3.05	3.81	4.57	0.120	0.150	0.180
B	0.38	0.46	0.56	0.0149	0.0181	0.0220
B1	0.89	1.02	1.14	0.035	0.040	0.045
c	0.23	0.25	0.38	0.0090	0.0098	0.0150
D	36.58	36.83	37.08	1.440	1.450	1.460
E	15.24		16.00	0.60		0.629
E1	12.70	13.72	14.48	0.50	0.540	0.570
e		1.778			0.070	
e1		15.24			0.60	
e2			18.54			0.730
e3			1.52			0.060
L	2.54	3.30	3.56	0.10	0.130	0.140

**OUTLINE AND
MECHANICAL DATA**

SDIP42 (0.600")

SDIP42