

### THAT 202XT, 202XTC, 202R

#### FEATURES

- Wide Dynamic Range: >124 dB
- Wide Gain Range: > 130 dB
- Logarithmic Gain Control
- Very Low Distortion: (0.003% @0 dB gain, 0.02% @20dB gain)
- Temperature Compensated (202XTC)
- Package Compatible with dbx 202

#### APPLICATIONS

- Faders
- Console Automation
- Panners
- Compressors
- Expanders
- Filters
- Oscillators

#### Description

The **THAT 202XT, 202XTC and 202R2** modular voltage-controlled amplifiers (VCAs) are extremely high performance current-in/current-out devices with negative-sense control ports. Intended for the most demanding of applications, these parts require almost no external support circuitry and are packaged on small, 1" X 2" circuit boards. Their pin configurations are identical to that of the original dbx 202 VCA, as well as later dbx models 202C, 202X, 202XL and 2001. The **202XTC** has a control constant of  $-20\text{dB/Volt}$ , and is internally tempera-

ture compensated for very low thermal drift. The **202XTC** is recommended for all new designs. The **202XT** is intended to replace a dbx 202C, 202X or 202XL in designs where control-voltage temperature compensation was provided externally. Like the 202C, -X and -XL, the **202XT** has a control constant of  $-20\text{dB/Volt}$ , with a predictable  $+0.33\%/^{\circ}\text{C}$  temperature drift. The **202R** is intended to replace the original dbx 202. The **202R** matches the dbx 202's control sensitivity of  $-6\text{mV/dB}$  and its predictable  $+0.33\%/^{\circ}\text{C}$  temperature drift

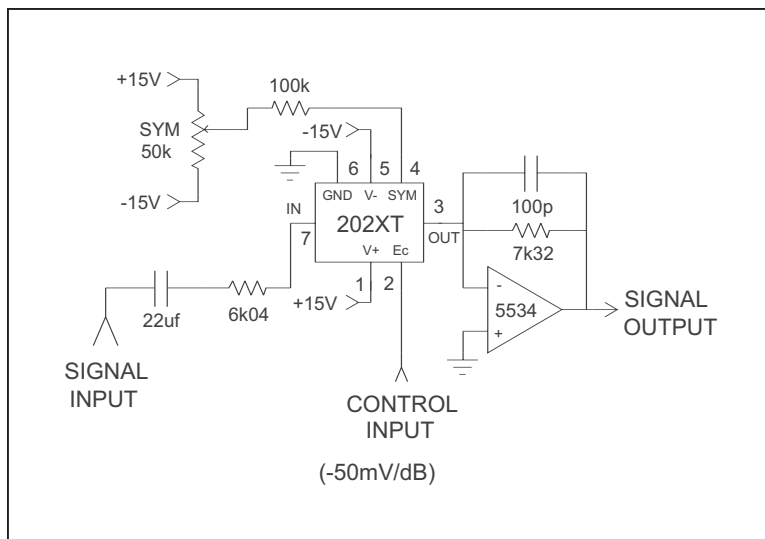


Figure 1. 202XT, 202XTC Typical Application Circuit

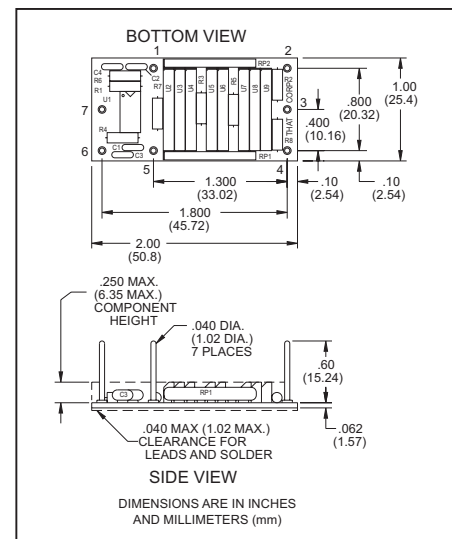


Figure 2. 202XT, 202R, 202XTC Physical Outline

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# SPECIFICATIONS<sup>1</sup>

## Absolute-Maximum Ratings ( $T_A = 25^\circ\text{C}$ )

Positive Supply Voltage ( $V_{CC}$ )	+18 V	Power Dissipation ( $P_D$ )	1.5 W
Negative Supply Voltage ( $V_{EE}$ )	-18 V	Operating Temperature Range ( $T_{OP}$ )	-20 to $+75^\circ\text{C}$
Supply Current ( $I_{CC}$ )	40 mA	Storage Temperature Range ( $T_{ST}$ )	-40 to $+125^\circ\text{C}$

## Recommended Operating Conditions

Parameter	Symbol	Conditions	<u>202XT</u>			<u>202R</u>			<u>202XTC</u>			Units
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Positive Supply Voltage	$V_{CC}$		+12	+15	+16	12	+15	+16	+12	+15	+16	V
Negative Supply Voltage	$V_{EE}$		12	-15	-16	-12	-15	-16	-12	-15	-16	V
Signal Current		$V_{CC}=-V_{EE}=15\text{ V}$	—	1.4	6.0	—	1.4	6.0	—	1.4	6.0	mA

## Electrical Characteristics<sup>2</sup>

Parameter	Symbol	Conditions	<u>202XT</u>			<u>202R</u>			<u>202XTC</u>			Units
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Supply Current	$I_{CC}$	No Signal	—	26	33	—	26	33	—	26	33	mA
Input Impedance	$R_{IN}$		1.18	1.25	1.32	1.18	1.25	1.32	1.18	1.25	1.32	k $\Omega$
Equiv. Input Bias Current	$I_B$	No Signal	—	40	64	—	40	64	—	40	64	nA
Input Offset Voltage	$V_{OFF(IN)}$	No Signal	—	+10	—	—	+10	—	—	+10	—	mV
Output Offset Voltage	$V_{OFF(OUT)}$	$R_{out}=7.32\text{ k}\Omega$										
		-100 dB < gain < 0 dB	—	1	2	—	1	2	—	1	2	mV
		+20 dB gain	—	5	10	—	5	10	—	5	10	mV
Gain-Control Constant	dB gain/ $E_C$	$T_A=27^\circ\text{C}$ -100 dB < gain < +40 dB	19.3	20	20.7	161.0	166.7	172.6	19.3	20	20.7	dB/V
Gain-control TempCo	$\Delta\text{Gain}/\Delta T_A$	$0^\circ\text{C} < T_A < 70^\circ\text{C}$ $E_C$ constant	—	-0.33	—	—	-0.33	—	-0.04	0.0	+0.04	%/ $^\circ\text{C}$
Gain-Control Linearity		-60 to +40 dB gain	—	0.5	2	—	0.5	2	—	0.5	2	%
Off Isolation		$E_C = -6\text{V}$	110	115	—	—	—	—	110	115	—	dB
		$E_C = -72\text{V}$	—	—	—	110	115	—	—	—	—	dB
Output Noise	$e_{n(OUT)}$	20Hz-20kHz, $R_{out} = 7.32\text{ k}\Omega$										
		0 dB gain	—	-98	-95	—	-98	-95	—	-98	-95	dBV
		+20 dB gain	—	-85	-82	—	-85	-82	—	-85	-82	dBV
Total Harmonic Distortion	THD	$I_{IN}+I_{OUT}=700\text{ mA}, 1\text{ kHz}$										
		0 dB gain	—	0.003	0.01	—	0.003	0.01	—	0.003	0.01	%
		$\pm 20\text{ dB gain}$	—	0.02	0.05	—	0.02	0.05	—	0.02	0.05	%
Symmetry Control Voltage	$V_{SYM}$	$A_V=0\text{ dB}, \text{THD}<0.01\%$	-8	0	+8	-8	0	+8	-8	0	+8	mV
Symmetry Port Impedance	$R_{SYM}$	$T_A = 27^\circ\text{C}$	48.4	51	53.6	48.4	51	53.6	48.4	51	53.6	$\Omega$
Control Port Impedance	$R_C$	$T_a = 27^\circ\text{C}$	813	822	831	200	203	206	798	842	885	$\Omega$

1. All specifications subject to change without notice.
2. Unless otherwise noted,  $T_A=25^\circ\text{C}$ ,  $V_{CC} = +15\text{V}$ ,  $V_{EE} = -15\text{V}$ . Test circuit is as shown in Figure 1.