

THAT 525CH, 525EH

FEATURES

- Unique Spectral Companding System
- Strong Noise Reduction (up to 50 dB)
- Flat Frequency Response: Typ ± 0.6 dB (Back-to-Back)
- Low Distortion: Typ 0.1%
- Excellent Subjective Quality, Even With Very Noisy Channels
- 35 dB Midband Separation in BTSC-TV Applications

APPLICATIONS

- Broadcast TV Modulators
- Cable TV Modulators
- BTSC Monitor Receivers
- Satellite Communications
- Terrestrial Microwave Links
- Cable Transmission Links
- Fiber Optic Links
- Digital Encoders (A/D/A)

DESCRIPTION

The THAT 525CH and 525EH cards are broadcast-quality circuit boards originally developed to conveniently implement the dbx-TV noise-reduction portion of the BTSC Multichannel Television Sound system. In a properly designed modulator, the cards offer performance exceeding FCC requirements for separation, dynamic range, frequency response and distortion of BTSC signals. Based on a highly effective combination of wideband and spectral companding algorithms, the system is also applicable to any analog or digital audio channel with an uncompanded signal-to-noise ratio as low as 26dB.

Basic Operation

The dbx-TV system operates by compressing the dynamic range of the program audio before transmission, and then expanding the dynamic range upon reception. In the compression cycle, a 2:1 (wideband) compression ratio is applied across the entire audio spectrum while a spectral compressor simultaneously varies the signal preemphasis based on the high frequency content of the program material. The spectrum of the resulting compressed signal resembles white noise, which provides optimal masking of channel noise in FM transmission systems.

In the expansion cycle, the processing is inverted. The signal is expanded by a (wideband) ratio of 1:2, while the spectral expander varies the deemphasis to complement the compressor's dynamic preemphasis characteristic. When program signal is absent or low in level, channel noise is thus drastically reduced. During higher level passages the 525 cards use the signal itself to effectively mask channel noise.

The result is a system which delivers CD-like audio quality with a channel dynamic range as low as 40 dB.

Compressors and Expanders

The 525CH is the compressor, used to encode signals before transmission. It is typically used in broadcast television and CATV transmitters to ensure the highest quality encoding possible. The 525EH is the complementary expander for decoding signals after reception. It is typically used in monitor receivers.

Other applications of the 525 Series noise reduction cards include reduced bit-rate digital encoders and low-dynamic range analog transmission systems.

SPECIFICATIONS¹

Absolute-Maximum Ratings (T_A = 25°C)

Positive Supply Voltage (V _{CC})	+18 V	Power Dissipation (P _D)	3.6 W
Negative Supply Voltage (V _{EE})	-18 V	Operating Temperature Range (TOP)	10 to 40°C
Supply Current (I _{CC})	100 mA	Storage Temperature Range (TST)	-20 to +75°C

Recommended Operating Conditions

Parameter	Symbol	Conditions	<u>525CH</u>			<u>525EH</u>			Units
			Min	Typ	Max	Min	Typ	Max	
Positive Supply Voltage	V _{CC}		11.95	12.00	12.05	11.95	12.00	12.05	V
Negative Supply Voltage	V _{EE}		11.95	12.00	12.05	11.95	12.00	12.05	V

Electrical Characteristics²

Parameter	Symbol	Conditions	<u>525CH</u>			<u>525EH</u>			Units
			Min	Typ	Max	Min	Typ	Max	
Supply Current	I _{CC}	No Signal	—	56	100	—	56	100	mA
Input Impedance	R _{IN}		19.8	20.0	20.2	19.8	20.0	20.2	kΩ
Output Impedance	R _{OUT}				1			1	Ω
Input Level		300 Hz, 100% EIM ³	3.535	3.540	3.544	1.328	1.330	1.332	Vrms
Output Level		300 Hz, 100% EIM ³	1.328	1.330	1.332	3.535	3.540	3.544	Vrms
Swept Sine Wave Response ⁴		20 ~ 100 Hz	-0.15	0	+0.15	-0.3	0	+0.3	dB
		100 ~ 8,000 Hz	-0.07	0	+0.07	-0.2	0	+0.2	dB
		8,000 ~ 14,000 Hz	-0.2	0	+0.2	-0.6	0	+0.6	dB
Total Harmonic Distortion	THD	300 mV, 15 kHz Bandwidth Measured through encode/decode cycle	—	0.1	0.2	—	0.1	0.2	%
Equivalent Input Noise	e _{n in}	15 kHz Bandwidth	—	200	—	—	—	200	μV
0dB-Gain Input Level	Unaffected Level	300 Hz	—	500	—	—	500	—	mV
Dimensions	L x W			4 x 5.5			4 x 5.5		inches
Component Height		Above Board	—	—	0.7	—	—	0.7	inches
		Below Board	—	—	0.25	—	—	0.25	inches
Connectors (optional)			4-pin & 6-pin Molex			4-pin & 6-pin Molex			

1. All specifications subject to change without notice.

2. Unless otherwise noted, T_A=25°C, V_{CC} = +12V, V_{EE}= -12V.

3. 100% EIM (*Equivalent Input Modulation*) is that level which would cause 100% modulation of the L-R subcarrier if the 525CH were replaced with a 75-μsec preemphasis network. See the EIA's *BTSC Recommended Practices* for more details.

4. Response is given in deviation from the theoretical ideal curves for dbx-TV (BTSC) compression/expansion.