



A Division of SCARECROW BIO-ACOUSTIC SYSTEMS LIMITED

A REVIEW OF A RANDOM SELECTION OF WELL KNOWN LINE VOLUME CONTROLS READILY AVAILABLE IN THE UK COMMERCIAL AUDIO MARKET

INTRODUCTION

Since 100V line volume controls became 'popular' around 30+ years ago they have been a target for importers wanting to offer cheaply made, high profit margined, versions.

The initiative of John Woodgate F.inst. S.C.E. in the ISCE Engineering Note N°6 suggesting Standards of test (and comparison!) was appropriate though we do not agree that his tests identify all failings; we test more deeply.

The Standards do not highlight mechanical and aesthetic problems; these affect the amount of time taken to install, their vulnerability to 'public' abuse once installed, the appearance of the final installation, including compatibility with other switches or wallplates.

Five years ago we made the following observations to our Industry:

Many (100V line volume controls) products sourced from the Far East and on the European market, fall short of expectations typically for the following reasons:

- a) volume control switch contacts do not take the maximum rated power of the volume control, so they can fail.
- b) cheap transformer laminations, or not enough of them, cause the control at low frequencies to absorb up to 10 times the rated load, so they use a great deal of amplifier power, often making its protection circuit intermittently operate, shutting down the system.
- c) control knobs can be pulled off - even by the innocent (but always curious) public!
- d) some products have to be partially dismantled before they can be installed; that costs time and money too.
- e) they don't fit standard UK backboxes, so the electrician who pre-wired the system might not have had access to the one they *should have* fitted. Anyone got a chisel? Where's the plasterer?
- f) there is no facility for fitting matching decor/lightswitch front panels; most architects and interior designers hate this omission, even if they don't use it, so why compromise the possibility of getting an Order?

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THERE ARE SOME VOLUME CONTROLS WITH ALL OF THESE FEATURES!!

What is common is that they can cost you time and money; the customer will reflect on the cost of system ownership and failures, the installer the cost of service call-outs and loss of profit and turnover.

There is always a cost; cheap is rarely cheap.

NOW TO THE COMPARATIVE ELECTRICAL TESTS

We will not name our Competitors, that's not our business; ours is to state the facts as we see them.

Tests were carried out using our own production test procedures as well as those suggested by John Woodgate.

JOHN WOODGATE'S SUGGESTED TESTS (a full methodology can be obtained from ISCE)

- a) insertion loss; this reflects signal loss, i.e. efficiency at 1KHz
- b) effective frequency range; at low frequency this is determined as the point at which the transformer magnetizing current increases by 11%, i.e., 1dB
- c) input impedance at 'surveillance' frequencies; those selected are 31.5Hz and 20KHz.

ADDITIONAL TESTS BY COMMUNICATION TECHNOLOGY (CT)

- a) step attenuation
- b) current drawn, reflecting amplifier power wastage, at frequencies of 1KHz and below. 100v RMS connected to input, no load on the output.

FIRST, THE RESULTS OF THE JOHN WOODGATE PARAMETERS:

N.B. CT = PRODUCT OF COMMUNICATION TECHNOLOGY

“25 watt” CONTROLS

N.B. One manufacturer (D) claims a 50 watt load capacity.

“25 watt”	CT LVC025	A	B	C	D
Insertion loss	0.2 dB	0.2 dB	1 dB	0.2 dB	0.1 dB
Frequency (low end) response	N/A	~ 41Hz	N/A	57Hz	68 Hz
Frequency (High end) response	>20KHz	>20KHz	>20KHz	>20KHz	>20KHz
Input impedance @ 31.5KHz	7.46K	14.7K	5.9K	20.0K	7.4K
Input impedance @ 20KHz	33.3K	71.5K	11.3K	12.5K	16.7K

“100 watt” CONTROLS

N.B. One manufacturer (C) claims only 80 watt load usage.

“100 watt”	CT LVC100	A	B	C
Insertion loss	0.35dB	0.4dB	0.1dB	0.2dB
Frequency (low end) response	N/A	~ 60Hz	40Hz	~55Hz
Frequency (High end) response	>20KHz	>20KHz	>20KHz	>20KHz
Input impedance @ 31.5KHz	12.5K	5.1K	833R	5.55K
Input impedance @ 20KHz	12.5 K	14.7 K	10.0 K	12.5 K

NOW, THE COMMUNICATION TECHNOLOGY ADDITIONAL PRODUCTION TESTS:

“25 watt”

TEST FREQUENCY	CURRENT DRAWN, REFLECTING AMPLIFIER POWER WASTAGE			
	CT	A	B	C
1KHz	0.5mA	0.8mA	2mA	0.8mA
100Hz	1.4mA	1.9mA	200mA (20 watts)	2.6mA
70Hz	4.0mA	4.5 mA	!!!	41 mA
60Hz	10.4 mA	10.4 mA	!!!	78 mA
50Hz	24 mA (2.4 watts)	26.0 mA (2.6 watts)	!!!	195 mA (19.5 watts)

“100 watt”

TEST FREQUENCY	CURRENT DRAWN, REFLECTING AMPLIFIER POWER WASTAGE			
	CT LVC100	A	B	C
1KHz	1.3mA	2.3mA	6.4mA	2.4mA
100Hz	3.14mA	8.0mA	16mA	7.2mA
70Hz	11.2mA	112 mA	24.5mA	57 mA
50Hz	76.8 mA (7.6 watts)	500 mA (50 watts)	54mA (5.4 watts)	600 mA (60 watts)

CONCLUSION

Overall, these tests do identify that “you get what you pay for”. Of course, it is worrying to see that 5 volume controls from the “wrong” manufacturer purchased for one installation employing a 250 watt amplifier absorb all the amplifier power at 50Hz. *This could cause amplifier shut-down or break down, even though the amount of ‘50Hz’ in programme material is not continuous, probably sparse.*

FOR YOUR FURTHER INFORMATION: **CT LVC300 SERIES, 300 watt volume control.**

John Woodgate parameters	
Insertion loss	0.27 dB
Frequency response, lower end	~ 30 Hz
Frequency response, high end	> 20 KHz
Input impedance @ 31.5 Hz	5.35 K
Input impedance @ 20 KHz	8.0 K

COMMUNICATION TECHNOLOGY PRODUCTION TESTS			
Test frequency current drawn, reflecting amplifier power wastage			
40 Hz	87 mA (8.7 watts)	70 Hz	6.8 mA
50 Hz	25 mA	100 Hz	4.9 mA
60 Hz	9.3 mA	1 KHz	2.6 mA 200 mW