



## Specification For The MSB Design Supervisory Tone Generator STG-1

### Introduction

During operation of the Public Switched Telephone Network (PSTN) certain tones are produced which indicate the various states of the network, such as engaged tone, call arrival and dial tone. Apparatus connected to this network may have to respond to these tones, such as auto-diallers and modems, or ignore them, and therefore it is necessary when developing or testing such apparatus to subject it to these tones.

In addition, there are tests laid down in BS specifications, and others, such as BS6450, which call for testing with some of the tones as part of the general procedure for approval for connection to the network. It is plain that to generate these tones by continuous dialling up of a PSTN line would be both inconvenient and expensive, so the Supervisory Tone Generator STG-1 was designed to provide these tones 'off-line'. All tones generated resemble closely those found on the network, considerable care having been taken to reproduce them faithfully so as to ensure that testing apparatus reaction with them will give a true indication of the real-life situation.

### Features

The tones generated by the STG-1 are those defined in BS6305 Appendix C.2, all common tones being featured except for the timing pips which are to be phased out of the system.

Of particular note is the simulation of what is called 'old dial tone'. It will be seen from the definition that this is a tone of either 33Hz or 50Hz quoted as being "rich in harmonics". This has given rise to designs in the past that use a square wave at the appropriate frequencies to derive the tone, but a listening test will soon show that this is not at all an accurate representation of the actual tone. Careful monitoring of a real live tone has enabled that found in the STG-1 to be synthesised as nearly as possible, notwithstanding that in real life it is hard to define this tone as the harmonics are treated variously by different exchange situations. In the event, it will be found that from an aural point of view the tone is quite accurate, and from a waveform point of view it does closely match that monitored on a line.

All the tones are generated by analogue circuitry so there is no digitising error found when microprocessor synthesis is used. This is a preferable approach when test equipment is concerned, where accuracy is desired, and the tones more accurately conform to those found on the PSTN.

The output is continuously variable via a front panel control from zero to 0dBm, and the unit is floating with respect to earth so connection to earth conscious apparatus will not be a problem. The output appears both on a line jack socket and a pair of 4mm screw terminals.

The operation of the unit is necessarily straightforward, and the only point to note is that it is good practice to allow the unit to 'warm up' for a period of about 10 minutes before serious use as the frequencies of the oscillators take a little time to stabilise.

## Uses

Clearly the use to which the unit is put will depend on the particular requirements of the user, but there follow a few suggestions :-

- a) BS6450 Part 1 appendix F - correct PBX operation
- b) BS6450 Part 5 appendix A1 - general tests
- c) BS6450 Part 6 appendix A1 - general tests
- d) modem response testing
- e) answer machine response testing
- f) fax machine response testing

etc.

## Specification

Listed below are the tones available with the STG-1 :-

Dial 1	33Hz continuous ( old dial tone )
Dial 2	50Hz continuous ( old dial tone )
Dial 3	350Hz + 440Hz continuous ( new dial tone )
Dial 4	350Hz cadenced 750mS + 440Hz continuous
Busy 1	400Hz cadenced 375mS
Busy 2	400Hz cadenced 400mS,350mS,275mS,525mS
N.O.	400Hz continuous ( number unobtainable )
Pay 1	400Hz cadenced 125mS ( insert money )
Pay 2	800Hz cadenced 125mS,1.5S, then 1200Hz ditto ( this is the payphone identification tone )
Ring 1	400Hz modulated by 17Hz, cadenced PSTN
Ring 2	400Hz modulated by 25Hz, cadenced PSTN
Ring 3	400Hz modulated by 50Hz, cadenced PSTN
Ring 4	450Hz modulated by 17Hz, cadenced PSTN
Ring 5	450Hz modulated by 25Hz, cadenced PSTN
Ring 6	50Hz modulated by 50Hz, cadenced PSTN
Ring 7	400Hz + 450Hz cadenced PSTN
Record	1400Hz cadenced 400mS every 16S
Info.	950Hz then 1400Hz then 1800Hz, all cadenced 330mS,30mS ( this is the information tone )
Echo	2100Hz ( echo suppression tone )
Output	variable to 0dBm via front panel control
Outputs	1 off line jack 1 pair 4mm screw terminals

The unit is housed in a steel / aluminium enclosure, with all switches and connectors on the front and rear panels. It is mains powered, via an IEC connector on the rear panel. Enclosure dimensions are 220mm x 220mm x 70mm.