CONTENTS

SAFETY

Read this manual completely before using the instrument.

1. The EUROSIM is designed to behave like an exchange line therefore only telecommunication apparatus designed to connect to telephone lines must be connected to it.

2. **Under no circumstances** must the EUROSIM be connected to the Public Switched Telephone Network (PSTN) or any PABX extension ports.

3. When using the EUROSIM to test the performance of unapproved telecommunication apparatus, due consideration must be paid to any hazard involved.

4. ⚠**WARNING** The connection sockets have high voltages present during Ringing and Pulse dialling. Although this is not hazardous, it can be painful. ⚠

5. The unit is designed to be powered from a 230 V, 50 Hz source. The IEC Power Lead provided is fitted with a 5 Amp fused mains plug.

6. The Mains Switch at the IEC Socket needs to be in the Off position to isolate the instrument from the mains.

7. There are no user serviceable parts in this unit. Under no circumstances should the user attempt to open the unit. If opened, the warranty will be invalidated.

8. Should the unit require service, repair or calibration, please return it to a recognised dealer or to:

   Tele-Products Limited
   Unit 1D
   Northminster Business Park
   Northfield Lane
   Upper Poppleton

York YO26 6QU
Tel: +44 (0)1904 794200

When returning the unit to Tele-Products, please contact the Repairs Department to receive a Returns Number. The owner of the returned unit will be advised of costs prior to any work commencing.

GETTING STARTED

Before using the EUROSIM, please check that the following items have been included in the shipment:

- EUROSIM Unit
- IEC Power Lead
- 2 x RJ11 Converters
- User Manual

Check for damage in transit. If there is any sign of damage, please report it to your supplier and do not attempt to repair the unit.

The unit is factory set to be powered from a 230 V supply. This is indicated on the rating plate. (If a 110 V unit has been supplied, the rating plate will indicate this). Please ensure that this product is powered from the correct source. The apparatus is CLASS II double insulated construction, so does not require a protective earth connection.

UNDER NO CIRCUMSTANCES SHOULD THIS PRODUCT BE CONNECTED TO THE PSTN

INTRODUCTION

The EUROSIM Exchange Simulator is designed to help in the testing and demonstrating of a wide range of telecommunication apparatus. The EUROSIM offers a no compromise solution to the testing of telephones, faxes, modems, answer machines and auto-diallers. Electronic feeds with full 85 V rms ringing provide realistic conditions and simulate the conditions found in the field. Dual multi-frequency tone generators ensure exact reproduction of tones generated by the exchange. Additional features such as line reversal, current selector, meter pulses and switchable attenuation make it an invaluable tool in design laboratories, service centres and small-scale production facilities.

APPLICATION

EUROSIM can be used to test the many features on the telecommunication apparatus. The following table indicates how the features provided relate to the functional testing of various telecommunication apparatus. It is by no means an exhaustive list of equipment that can be tested using the EUROSIM.

	Pulse and Tone dialling	Response to ringing	Two Way Dialling	Sensitivity to line current	Dial Tone	Feed Reversal	Sensitivity to end to end attenuation	Response to supervisory tones	Response to meter pulses
Telephone	✓	✓		✓	✓	✓			
Answering Machine		✓	✓	✓		✓	✓	✓	
Payphone	✓	✓		✓	✓	✓		✓	✓
Call-logger		✓		✓		✓			✓
Autodialler	✓		✓	✓	✓	✓	✓	✓	
Modem	✓	✓	✓	✓	✓	✓	✓	✓	
Fax Machine	✓	✓	✓	✓	✓	✓	✓	✓	
PBX	✓	✓	✓	✓	✓	✓	✓	✓	

OPERATION

SUPPLY

The unit is designed to be powered from the mains 230 V, 50Hz using the IEC lead supplied. Connect to the IEC socket at the rear of the unit and switch on. The Power LED will light signifying that power is being supplied to the unit.

MASTER SOCKET (357)

This socket will supply a 48 V electronic type feed across A and B to the Unit Under Test (UUT). This supply will be applied as soon as the unit seizes the line. Upon seizing the line the unit is supplied with a dial tone. You can then either dial up any of the built-in options or the Extension by dialling 159. On detecting the first digit the dial tone is cleared. When the Extension is ringing, a ring tone is applied to the Master. The ringing stops either when the Extension comes Off-hook or the Master goes On-hook.

The pin configuration on the telephone plug for the Master is as follows:

A ® pin 2		**E ® pin 3**	
B ® pin 5		**S ® pin 4**	

The Extension does not have an Earth connection, but is otherwise exactly the same.

LINE REVERSAL

The polarity of the feed voltage applied to the Master or the Extension is dependent on the switch position. When positive polarity is selected A is positive with respect to B. This is reversed when the negative polarity is selected.

CURRENT SELECTOR

The current supplied by the electronic feed to the Master can be switched to represent different line lengths. In the High position a line length of approximately 1 km is represented, which is equivalent to normal case. In the

Low position a line length of 7.5 km is represented, which is equivalent to a worst case.

LINE LOOPED INDICATION

Once the UUT seizes the line (i.e. a telephone coming Off-hook), the Line Looped Indicator will light and dial tone will be applied across A and B. There is an indication for both the Master and the Extension.

RINGING

Ringing can be applied to both ports by operating the Start/Stop button. The ringing can be terminated, either by coming Off-hook and seizing the line or by operating the Start/Stop button. The Country Selector sets the cadence and the level of the ringing can be selected by the user via an adjustment on the rear of the unit (the factory default is 70 V rms).

ATTENUATOR

This is used to attenuate signals from and to the Master (357). When the Extension (159) is On-hook the level of exchange tones applied to the Master is controlled by the Attenuator. When the Extension (159) is Off-hook signals between it and the Master are affected by the Attenuator position. The two switches give a range of nine possible values. These values enable the user to set examples of best, normal and worst cases as found in the real network (See Fig 1).

	0	5	10
0	0	5	10
15	15	20	25
30	30	35	40

Fig 1: Values of attenuation

EXTENSION SOCKET (159)

The Extension (159) is supplied by an electronic feed and operates in exactly the same way as the Master. The Extension can call the Master by dialling 357 (Pulse, Tone or mixed). When the Master is ringing a ring tone is simultaneously applied to the Extension. The ringing stops either when the Master comes Off-hook or the Extension goes On-hook. The Attenuator switch controls the attenuation to speech or signals between the Master and Extension.

COUNTRY SELECTOR

The user can select which country they wish the EUROSIM to simulate via this switch. By selecting the corresponding number for the country from the list below, and adjusting the switch so that it displays the relevant number, the EUROSIM will provide the correct tones and frequencies for the selected country.

Please note: The country can only be changed whilst the simulator is in its dormant state, i.e. not providing feed, tones or ringing.

00	Austria	07	Greece	13	Norway
01	Belgium	08	Iceland	14	Portugal
02	Cyprus	09	Ireland	15	Spain
03	Denmark	10	Italy	16	Sweden
04	Finland	11	Luxembourg	17	Switzerland
05	France	12	Netherlands	18	U. Kingdom
06	Germany				

Additional country codes outside Europe: (*Appendix 9* specifies signals provided)

19	South Africa	23	Hong Kong
20	United States	24	New Zealand
21	Canada	25	Turkey
22	Australia	26	Singapore

Other tests: (*Appendix 9* specifies signals provided)

27, 28	Additional ring signals
29, 30, 31, 32	UK Distinctive ring cadences
33	16 Hz continuous ring, 50 Hz continuous meter pulse

34	25 Hz continuous ring, 12 kHz continuous meter pulse
35	50 Hz continuous ring, 16 kHz continuous meter pulse

REAR PANEL FEATURES

RING LEVEL CONTROL

Level control is provided via a multi-turn pot mounted on the rear panel. This control allows the operator to set the ring voltage from 0 V to 85 V rms. To check that the required voltage has been set, the operator will have to measure the ringing signal when it is generated.

AC SIGNAL INPUT

The AC signal input is provided via a BNC socket, which allows the operator to input signals direct on to the line from an external source, such as a noise or tone generator. The signals injected are fed through to the Master terminal via the Attenuator. This means that the Attenuator can be used to affect the externally generated signal level in the same manner as it affects the internal signal level. The signal input has 24 dB of gain and a maximum input level, before distortion of 450 mV p-to-p.

DIAL UP OPTIONS

TONE DIGIT DETECTION

The EUROSIM assumes that any Tone digit dialled originates from the first port to go Off-hook regardless of which port actually sent the digit. With pulse dialling the EUROSIM can distinguish the origin of the digit.

EXCHANGE TONE GENERATION

By dialling the relevant code, e.g. 301, the EUROSIM will generate the required tone. The tone generated will depend on which country you have selected via the Country Selector switch. The next digit dialled after the 3 selects between primary, secondary and tertiary options.

For example, with Denmark selected which has two busy tones, dialling 312 will produce the secondary tone and 302 will produce the primary tone. For a complete break down of frequencies, cadences and levels please refer to the appropriate appendix. The EUROSIM will generate the correct frequency and cadence, but the user has to select the desired level via the Attenuator.

On dialling 258 for Ring Back the user should drop the line. After a short pause the EUROSIM will apply ringing to the UUT.

Dialling 9 will generate the secondary dial tone if the selected country has one e.g. United Kingdom 350 Hz + 450 Hz, 750 mS ON, 750 mS OFF.

Some countries have secondary dial tones, which can be generated by dialling either 9 or 310 as explained above. However, there may be an instance were it is necessary to have the secondary dial tone generated as the line is seized. To enable you to do this the EUROSIM can Lock the dial tone selected. To Lock a dial tone, first dial up the tone required as described above then dial 101. To recover the default settings dial 100.

The Lock feature also has a second function, which is to disable the detection of dial up options once a call has been established. Dialling 101 will prevent dial up tones from being generated once a call been established, dialling 100 will clear this feature.

The EUROSIM is capable of generating a series of 16 kHz, 12 kHz and 50 Hz meter pulses the number of pulses can be set by the operator. To generate Meter Pulses a dial-up code of 5## is provided, where ## is the number of meter pulses required, e.g. dialling 523 will generate 23 meter pulses.

CODE	EXCHANGE TONE
3#0	DIAL TONE
3#1	RING TONE
3#2	BUSY TONE
3#3	CONGESTION TONE
3#4	NUMBER UNOBTAINABLE TONE
3#5	SPECIAL INFORMATION TONE
5##	METER PULSES

SPECIAL CODES

CODE	EXCHANGE TONE
258	RING BACK
9	SPECIAL DIAL TONE
101	LOCK
100	UNLOCK

APPENDICES

Appendices 1 to 8 list the different country specifications for Dial Tone, Busy Tone etc. It is meant as a guide for designers and is not a feature of the EUROSIM. Only those countries listed in the NET 4 are reproduced in the following tables.

APPENDIX 1.0

Table 1.1 DIAL TONE (300)

COUNTRY	F min (Hz)	F max (Hz)	Level max (dBm)	Level min (dBm)	Default (Hz)	Cadence (S) on/off
Austria 00	400	500	-6.5	-26	450	Continuous
Belgium 01	420	455	-4	-14	440	Continuous
Cyprus 02	325+425	375+475	-7	-22	350+450	Continuous
Denmark 03	400	450	-6.5	-26	425	Continuous
Finland 04	325	525	-6	-25	425	Continuous
France 05	425	455	-10	-25	440	Continuous
Germany 06	380	490	-4	-27	440	Continuous
Greece 07	400	475	-4	-25	440	Continuous
Iceland 08	400	450	-7	-30	425	Continuous
Ireland 09			0	-16	400	Continuous
Italy 10	410	440	-6	-25	425	0.2/0.2/0.6/1.0
Luxembourg 11	380	490	-4	-27	440	Continuous
Netherlands 12	340	550	-3.8	-25.7	425	Continuous
Norway 13	410	440	-3.2	-30	425	Continuous
Portugal 14	300	450	-5	-30	375	Continuous
Spain 15	410	440	-5	-20	425	Continuous
Sweden 16	400	450	-10	-30	425	Continuous
Switzerland 17	400	450	-6.5	-18	425	Continuous
UK 18	325+425	375+475	0	-27	350+450	Continuous

Table 1.2 OTHER DIAL TONES (310, 320, 330)

COUNTRY	F min (Hz)	F max (Hz)	Level max (dBm)	Level min (dBm)	Default (Hz)	Cadence (S) on/off
Austria 00	400	500	-6.5	-26	450	1.2/ 0.66/0.3/0.24
Belgium 01 (310)			-4	-19	900/1020/ 1140	330/330/330
Belgium 01 (320)	420	455	-4	-14	440	1.0/0.25
France 05			-10	-25	330+440	Continuous
Ireland 09			0	-16	450	Continuous
Italy 10	410	440	-6	-25	425	Continuous
Netherlands 12	340	550	-3.8	-25.7	425	0.5/0.055
Norway 13 (310)			-8	-30	470/425	400/400
Norway 13 (320)	400	440	-8	-30	425	0.6/0.015
Portugal 14	300	450	-5	-30	375	1.0/0.2
Spain 15 (310)	570	630	-5	-21	600	Continuous
Spain 15 (320)	410	440	-6	-35	425	1.0/0.1
Sweden 16	400	450	-10	-25	425	0.32/0.040
Switzerland 17			-6.5	-18	350+440 / 440	1.1/1.1
UK 18	325+425	375+475	0	-27	350+450	0.750 /0. 750

APPENDIX 2.0

Table 2.1 RING TONE (301)

COUNTRY	F min (Hz)	F max (Hz)	Level max (dBm)	LEVEL min (dBm)	DEFAULT (Hz)	Cadence (S) on/off
Austria 00	400	500	-6.5	-43	450	1/5
Belgium 01	420	455	-8	-18	440	1/3
Cyprus 02	400	450	-10	-25	425	1.5/3
Denmark 03	400	450	-6.5	-43	425	0.75/7.5
Finland 04	325	525	-11	-35.5	425	1/4
France 05	425	455	-10	-38	440	1.5/3.5
Germany 06	380	490	-4	-43	440	1/4
♦ Greece 07	400	475			440	1/4
Iceland 08	400	450	-7	-43	425	1.2/4.7
Ireland 09			0	-16	400	0.4/0.2
Italy 10	410	440	-6	-43	425	1/4
Luxembourg 11	380	490	-6.5	-43	440	1/4
Netherlands 12	340	550	-3.8	-25.7	425	1/4
Norway 13	410	440	-8.2	-30	425	1/4
Portugal 14	300	450	-5	-30	375	1/5
Spain 15	410	440	-5	-37	425	1.5/3
Sweden 16	400	450	-10	-43	425	1/5
Switzerland 17	400	450	-6.5	-33	425	1/4
UK18			0	-37	400	0.4/0.2/0.4/2

♦ The signal levels for Greece are still under study and were not available at time of print.

Table 2.2 SECONDARY RING TONES (311)

COUNTRY	F min (Hz)	F max (Hz)	LEVEL max (dBm)	LEVEL min (dBm)	DEFAULT (Hz)	Cadence (S) on/off
Denmark 03	400	450	-6.5	-43	425	1/4
Ireland 09			0	-16	450	0.4/0.2
Norway 13	360	380	-8.2	-30	375	1/0.4

APPENDIX 3.0

Table 3.1 BUSY TONE (302)

COUNTRY	F min (Hz)	F max (Hz)	LEVEL max (dBm)	LEVEL min (dBm)	DEFAULT (Hz)	Cadence (S) on/off
Austria 00	400	500	-6.5	-43	450	0.3/0.3
Belgium 01	420	455	-8	-18	440	0.5/0.5
Cyprus 02	400	450	-10	-25	425	0.5/0.5
Denmark 03	400	450	-6.5	-43	425	0.45/0.45
Finland 04	325	525	-11	-35.5	425	0.3/0.3
France 05	425	455	-10	-38	440	0.5/0.5
Germany 06	380	490	-4	-43	440	0.48/0.48
Greece 07	400	475			440	0.3/0.3
Iceland 08	400	450	-7	-43	425	0.25/0.25
Ireland 09	395	405	0	-16	400	0.5/0.5
Italy 10	410	440	-6	-43	425	0.5/0.5
Luxembourg 11	380	490	-6.5	-43	440	0.48/0.48
Netherlands 12	340	550	-3.8	-25.7	425	0.25/0.25
Norway 13	410	440	-8.2	-30	425	0.5/0.5
Portugal 14	300	450	-5	-30	375	0.5/0.5
Spain 15	410	440	-5	-37	425	0.2/0.2
Sweden 16	400	450	-10	-43	425	0.25/0.25
Switzerland 17	400	450	-6.5	-33	425	0.5/0.5
UK 18	320	480	0	-37	400	0.375/0.375

Table 3.2 SECONDARY BUSY TONES (312)

COUNTRY	F min (Hz)	F max (Hz)	LEVEL max (dBm)	LEVEL min (dBm)	DEFAULT (Hz)	Cadence (S) on/off
Austria 00	400	500	-6.5	-43	450	0.4/0.4
Denmark 03	400	450	-6.5	-43	425	0.25/0.25
Netherlands 12	340	550	-3.8	-25.7	425	0.5/0.5
Switzerland 17	400	450	-6.5	-33	425	0.25/0.25

APPENDIX 4.0

Table 4.1 CONGESTION TONE (303)

COUNTRY	F min (Hz)	F max (Hz)	LEVEL max (dBm)	LEVEL min (dBm)	DEFAULT (Hz)	Cadence (S) on/off
Austria 00	400	450	-16	-43	425	0.2/0.2
Belgium 01	420	455	-8	-18	440	0.167/0.167
Cyprus 02	400	450	-10	-25	425	0.25/0.25
Denmark 03	400	450	-6.5	-43	425	0.45/0.45
Finland 04	325	525	-11	-20.5	425	0.225/0.225
France 05	425	455	-10	-38	440	0.5/0.5
Germany 06	380	490	-4	-43	440	0.24/0.24
♦ Greece 07	400	475			440	0.3/0.3
Iceland 08	400	450	-7	-43	425	0.25/0.25
Ireland 09	not used					
Italy 10	410	440	-6	-43	425	0.2/0.2
Luxembourg 11	380	490	-6.5	-43	440	0.24/0.24
Netherlands 12	340	550	-3.8	-25.7	425	0.25/0. 25
Norway 13	410	440	-8. 2	-30	425	0.2/0.2
Portugal 14	300	450	-5	-30	375	0.2/0.2
Spain 15	410	440	-5	-35	425	0.2/0.2/0.2/0.2/0. 2/0.6
Sweden 16	400	450	-10	-43	425	0.25/0.75
Switzerland 17	400	450	-6.5	-33	425	0.5/0.5
UK 18	320	480	0	-43	400	0.4/0.35

♦ The signal levels for Greece are still under study and were not available at time of print.

Table 4.2 SECONDARY CONGESTION TONES (313)

COUNTRY	F min (Hz)	F max (Hz)	LEVEL max (dBm)	LEVEL min (dBm)	DEFAULT (Hz)	Cadence (S) on/off
Denmark 03	400	450	-16	-43	425	0.25/0.25
Switzerland 17	400	450	-6.5	-33	425	0.25/0.25

APPENDIX 5.0

Table 5.1 UNOBTAINABLE TONE (304)

COUNTRY	F min (Hz)	F max (Hz)	LEVEL max (dBm)	LEVEL min (dBm)	DEFAULT (Hz)	Cadence (S) on/off
Austria 00	not used					
Belgium 01	not used					
Cyprus 02	400	450	-10	-25	425	2.5/0.5
Denmark 03			-10	-25	950/1400/ 1800	0.33/0.03/0.33/0.03/0.33/0.03/1.0
Finland 04	not used					
France 05	not used					
Germany 06	not used					
Greece 07	not used					
Iceland 08	not used					
Ireland 09	not used					
Italy 10	not used					
Luxembourg 11	not used					
Netherlands 12	not used					
Norway 13	not used					
Portugal 14	not used					
Spain 15	410	440	-6	-35	425	0.2/0.2/0.2/1.0
Sweden 16	not used					
Switzerland 17	not used					
UK 18	320	480	0	-37	400	Continuous

APPENDIX 6.0

Table 6.1 INFORMATION TONE (305)

COUNTRY	DEFAULT (Hz)	LEVEL max (dBm)	LEVEL min (dBm)	Cadence (S) each tone on / pause
Austria 00	950/1400/1800	-9.5	-43	0.33/0.33/0.33/1.0
Belgium 01	900/1380/1860	-8	-24	0.33/0.33/0.33/1.0
Cyprus 02	not used			
Denmark 03	950/1400/1800	-9.5	-43	0.33/0.33/0.33/1.0
Finland 04	950/1400/1800	-16	-25.5	0.33/0.03/0.33/0.03/0.33/1.0
France 05	950/1400/1800	-10	-40	0.33/0.03/0.33/0.03/0.33/1.0
Germany 06	not used			
Greece 07	not used			
Iceland 08	950/1400/1800	-20	-55	0.33/0.33/0.33/1.0
Ireland 09	950/1400/1800	0	-16	0.33/0.03/0.33/0.03/0.33/1.0
Italy 10	950/1400/1800	-15	-32	0.33/0.02/0.33/0.02/0.33/1.0
Luxembourg 11	not used			
Netherlands 12	950/1400/1800	0	-20	0.33/0.03/0.33/0.03/0.33/1.0
Norway 13	950/1400/1800	-8.2	-30	0.33/0.02/0.33/0.02/0.33/1.0
Portugal 14	950/1400/1800	-5	-30	0.33/0.03/0.33/0.03/0.33/1.0
Spain 15	950/1400/1800	-12	-39	0.33/0.33/0.33/1.0
Sweden 16	950/1400/1800	-20	-55	0.33/0.33/0.33/1.0
Switzerland 17	950/1400/1800	-6.5	-33	0.33/0.33/0.33/1.0
UK 18	950/1400/1800	0	-37	0.33/0.03/0.33/0.03/0.33/1.0

APPENDIX 7.0

Table 7.1 RINGING SIGNAL

COUNTRY	F min (Hz)	F max (Hz)	Voltage min (V)	Voltage max (V)	DEFAULT (Hz)	Cadence (S) on/off
♠ Austria 00	40	60	u/s	66	50	1/5
Belgium 01	23	25	75	90	25	1/3
Cyprus 02	23.5	26.5	25	85	25	1.5/3
Denmark 03	22.5	27.5	40	120	25	0.75/7.5
Finland 04	25		35	90	25	1/4
France 05	48	52	25	90	50	1.5/3.5
Germany 06	25		45	75	25	1/4
Greece 07	16		25	90	16	1/4
Iceland 08	22	28	30	90	25	1.2/4.7
Ireland 09	25		40	75	25	0.4/0.2/0.4/2
Italy 10	50		26	80	50	1/4
Luxembourg 11	25		55	75	25	1/4
Netherlands 12	23	27	35	90	25	0.75/3.5/1.25/4.5
Norway 13	22	28	28	90	25	1/4
Portugal 14	25		30	120	25	1/5
Spain 15	20	30	65	90	25	1.5/3
Sweden 16	22	28	64	100	25	1/5
Switzerland 17	22	28	25	90	25	1/4
UK 18	22	26	63	100	25	0.4/0.2/0.4/2

♠ The minimum voltage for Austria is still under study and was not available at time of compilation.

APPENDIX 8.0

Table 8.1 METER PULSES (5XX)

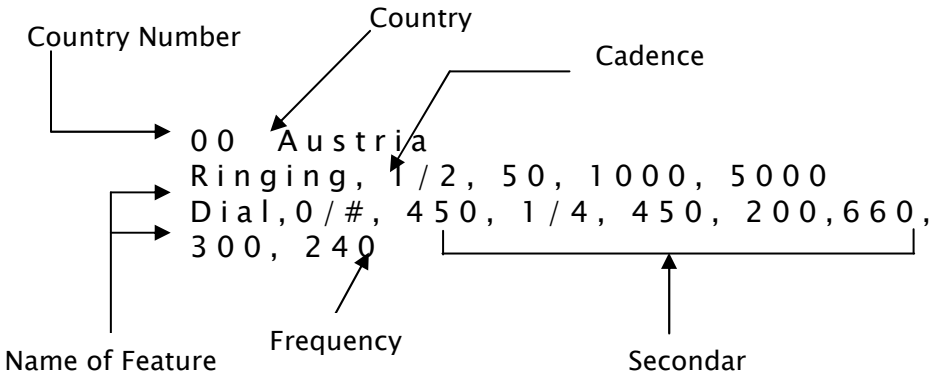
COUNTRY	F min (Hz)	F max (Hz)	LEVEL min (dBm)	LEVEL max (dBm)	DEFAULT (Hz)	Z_1 (Ω)	Cadence (mS) on/off
Austria 00	11 928	12 072	-27	+10	12 000	200	100/100
Belgium 01	15 840	16 160	-18	+17	16 000	200	200/300
Cyprus 02	15 840	16 160	100 mV	4 V	16 000	200	200/500
Denmark 03	11 916	12 084	-27	+15	12 000	200	100/300
Finland 04	15 950	16 050	240 mV	8 V	16 000	200	150/500
France 05	11 880	12 120	-19	+13	12 000	200	125/300
Germany 06	15 920	16 080	-22	+22	16 000	200	200/300
Greece 07	15 250	16 750	-18	+18	16 000	200	50/90
Iceland 08	11 940	11 960	-20	+13	12 000	200	140/140
Ireland 09	11 880	12 100	45 mV	2.6 V	12 000	200	120/500
Italy 10	11 880	12 120	65 mV	2.4 V	12 000	200	125/300
Luxembourg 11	15 920	16 080	3.75 V	8.7 V	16 000	200	150/300
Netherlands 12	48	52	65 mV	100 mV	50	100 k	150/300
Norway 13	15 840	16 160	-25	+7	16 000	200	150/300
Portugal 14	11 880	12 120	-19	+15	12 000	200	150/300
Spain 15	11 880	12 120	3.2 V	4.8 V	12 000	200	100/300
Sweden 16	11 940	12 060	5.5 mV	447 mV	12 000	200	
Switzerland 17	11 880	12 120	100 mV	10 V	12 000	200	100/100
UK 18	50		40 V	45 V	50		300/500

APPENDIX 9.0

SUMMARY OF EXCHANGE FEATURES BY COUNTRY

NOTE:

The cadence is written as the number of frequencies followed by the number of times. i.e. 1/2 means that there is one frequency being turned on and off.



00 Austria
Ringing, 1/2, 50, 1000, 5000
Meter, 1/2, 12k, 100, 100
Dial#1 cont., 450
Dial#2 1/4, 450, 1200, 660, 300, 240
Ring, 1/2, 450, 1000, 5000
Busy#1 1/2, 450, 300, 300
Busy#2 1/2, 450, 400, 400
Congestion, 1/2, 425, 200, 200
Unobtainable, none
Info, 3/3, 950, 330, 0, 1400, 330, 0, 1800, 330, 1000

01 Belgium
Ringing, 1/2, 25, 1000, 3000
Meter, 1/2, 16k, 200, 300
Dial#1 cont., 450
Dial#2 3/3, 900, 333, 1020, 333, 1140, 333
Dial #3 1/2, 440, 1000, 250
Ring, 1/2, 450, 1000, 3000
Busy, 1/2, 425, 500, 500
Congestion, 1/2, 425, 167, 167
Unobtainable, none
Info, 3/6, 900, 330, 0, 1380, 330, 0, 1860, 330, 1000

02 Cyprus
Ringing, 1/2, 25, 1500, 3000
Meter, 1/2, 16k, 200, 500
Dial, cont., 350+450
Ring, 1/2, 425, 1500, 3000
Busy, 1/2, 425, 500, 500
Congestion, 1/2, 425, 250, 250
Unobtainable, 1/2, 425, 2500, 500
Info, none

03 Denmark
Ringing, 1/2, 25, 750, 7500
Meter, 1/2, 12k, 100, 300
Dial, cont., 425
Ring#1 1/2, 425, 750, 7500
Ring#2 1/2, 425, 1000, 4000
Busy#1 1/2, 425, 450, 450
Busy#2 1/2, 425, 250, 250
Congestion#1 1/2, 425, 167, 167
Congestion#2 1/2, 425, 250, 250
Unobtainable, 3/6, 943, 330, 30, 1402, 330, 30, 1768, 330, 1000
Info, 3/6, 950, 330, 0, 1400, 330, 0, 1800, 330, 1000

04 Finland
Ringing, 1/2, 25, 1000, 4000
Meter, 1/2, 16k, 150, 500
Dial, cont., 425
Ring, 1/2, 425, 1000, 4000
Busy, 1/2, 425, 300, 300
Congestion, 1/2, 425, 225, 225
Unobtainable, none
Info, 3/6, 950, 330, 30, 1400, 330, 30, 1800, 330, 1000

05 France
Ringing, 1/2, 50, 1500, 3500
Meter, 1/2, 12k, 125, 300
Dial#1 cont., 440
Dial#2 cont., 330+440
Ring#1 1/2, 440, 1500, 3500
Ring#2 1/2, 440, 50, 50
Busy, 1/2, 440, 500, 500
Congestion, 1/2, 440, 500, 500
Unobtainable, none

Info, 3/6, 950, 330, 30, 1400, 330, 30, 1800, 330, 1000

06 Germany
Ringing, 1/2, 25, 1000, 4000
Meter, 1/2, 16k, 200, 300
Dial, cont., 440
Ring, 1/2, 440, 1000, 4000
Busy, 1/2, 440, 480, 480
Congestion, 1/2, 440, 240, 240
Unobtainable, none
Info, none

07 Greece
Ringing, 1/2, 16, 1000, 4000
Meter, 1/2, 16k, 50, 90
Dial, cont., 440
Ring, 1/2, 440, 1000, 4000
Busy, 1/2, 440, 300, 300
Congestion, 1/2, 440, 300, 300
Unobtainable, none
Info, none

08 Iceland
Ringing, 1/2, 25, 1200, 4700
Meter, 1/2, 12k, 140, 140
Dial, cont., 425
Ring, 1/2, 425, 1200, 4700
Busy, 1/2, 425, 250, 250
Congestion, 1/2, 425, 250, 250
Unobtainable, none
Info, 3/6, 950, 330, 0, 1400, 330, 0, 1800, 330, 1000

09 Ireland
Ringing, 1/4, 25, 400, 200, 400, 2000
Meter, 1/2, 12k, 120, 500
Dial#1 cont., 400
Dial#2 cont., 450
Ring#1 1/2, 400, 400, 200
Ring#2 1/2, 450, 400, 200
Busy, 1/2, 400, 500, 500
Congestion, none
Unobtainable, 1/2, 400, 6000, 1000
Info, 3/6, 950, 330, 30, 1400, 330, 30, 1800, 330, 1000

10 Italy
Ringing, 1/2, 25, 1000, 4000
Meter, 1/2, 12k, 125, 300
Dial#1 1/2, 425, 200, 200,600, 1000
Dial#2 cont., 425
Ring, 1/2, 425, 1000, 4000
Busy, 1/2, 425, 500, 500
Congestion, 1/2, 425, 200, 200
Unobtainable, none
Info, 3/6, 950, 330, 20, 1400, 330, 20, 1800, 330, 1000

11 Luxembourg
Ringing, 1/2, 25, 1000, 4000
Meter, 1/2, 16k, 150, 300
Dial, cont., 440
Ring, 1/2, 440, 1000, 4000
Busy, 1/2, 440, 480, 480
Congestion, 1/2, 440, 240, 240
Unobtainable, none
Info, none

12 Netherlands
Ringing, 1/2, 25, 1000, 4000
Meter, 1/2, 50, 150, 300
Dial#1 cont., 425
Dial#2 1/2, 425.500, 55
Ring, 1/2, 425, 1000, 4000
Busy 1/2, 425, 250, 250
Busy#2 1/2, 425, 500, 500
Congestion, 1/2, 425, 250, 250
Unobtainable, none
Info, 3/6, 950, 330, 30, 1400, 330, 30, 1800, 330, 1000

13 Norway
Ringing, 1/2, 25, 1000, 4000
Meter, 1/2, 16k, 150, 300
Dial#1cont., 425
Dial#2 2/2, 470, 400, 425, 400
Ring#1 1/2, 425, 1000, 4000
Ring#2 1/2, 375, 1000, 400
Busy, 1/2, 425, 500, 500
Congestion, 1/2, 425, 200, 200
Unobtainable, none
Info, 3/6, 950, 330, 20, 1400, 330, 20, 1800, 330, 1000

14 Portugal
Ringing, 1/2, 25, 1000, 5000
Meter, 1/2, 12k, 150, 300
Dial#1 cont., 375
Dial#2 ½, 375, 1000, 200
Ring, 1/2, 375, 1000, 5000
Busy, 1/2, 375, 500, 500
Congestion, 1/2, 375, 500, 500
Unobtainable, 1/2, 400, 200, 200
Info, 3/6, 950, 330, 30, 1400, 330, 30, 1800, 330, 1000

15 Spain

Ringing, 1/2, 25, 1500, 3000
Meter, 1/2, 12k, 100, 300
Dial#1 cont., 425
Dial#2 cont., 600
Dial#3 1/2, 425, 1000, 100
Ring, 1/2, 425, 1500, 3000
Busy, 1/2, 425, 200, 200
Congestion, 1/6, 425, 200, 200, 200, 200, 200,600
Unobtainable 1/4, 425, 200, 200, 200,600
Info, 3/6, 950, 330, 0, 1400, 330, 0, 1800, 330, 1000

16 Sweden
Ringing, 1/2, 25, 1000, 5000
Meter, 1/2, 12k, 100, 100
Dial#1 cont., 425
Dial#2 1/2, 425, 320, 40
Ring, 1/2, 425, 1000, 5000
Busy, 1/2, 425, 250, 250
Congestion, 1/2, 425, 250, 750
Unobtainable, none
Info, 3/6, 950, 330, 0, 1400, 330, 0, 1800, 330, 1000

17 Switzerland
Ringing, 1/2, 25, 1000, 4000
Meter, 1/2, 12k, 100, 100
Dial#1 cont., 425
Dial#2 2/2, 350+440, 1100, 440, 1100
Ring, 1/2, 425, 1000, 4000
Busy, 1/2, 425, 500, 500
Congestion, 1/2, 425, 250, 250
Unobtainable, none
Info, 3/6, 950, 300, 0, 1400, 300, 0, 1800, 300, 1000

18 UK
Ringing, 1/4, 25, 400, 200, 400, 2000
Meter, 1/2, 50, 300, 500
Dial#1 cont., 350+450
Dial#2 1/2, 350+450, 750, 750
Ring, 1/4, 350+450, 400, 200, 400, 2000
Busy, 1/2, 400, 375, 375
Congestion, 1/4, 400, 400, 350, 225, 525
Unobtainable cont., 400
Info, 3/6, 950, 300, 30, 1400, 300, 30, 1800, 300, 1000

19 South Africa
Ringing, 1/4, 16, 400, 200, 400, 2000
Meter, 1/2, 16k, 200, 400
Dial, cont., 400
Ring, 1/4, 400, 400, 200, 400, 2000
Busy, 1/2, 400, 500, 500
Congestion, 1/2, 400/250/250
Unobtainable, 1/2, 400, 2500, 500
Info, none

20 USA
Ringing, 1/2, 25, 2000, 4000
Meter, 1/2, 12k, 200, 400
Dial, cont., 350+450
Ring, 1/2, 440, 2000, 4000
Busy, 1/2, 480+620, 500, 500
Congestion, 1/2, 480+620, 250, 250
Unobtainable, none
Info, none

21 Canada
Ringing, 1/2, 25, 2000, 4000
Meter, 1/2, 12k, 200, 400
Dial, cont., 350+450
Ring, 1/2, 440+480, 2000, 4000
Busy, 1/2, 480+620, 500, 500
Congestion, none
Unobtainable, none
Info, none

22 Australia
Ringing, 1/4, 16, 400, 200, 400, 2000
Meter, 1/2, 12k, 200, 400
Dial, cont., 425
Ring, 1/4, 400+450, 400, 200, 400, 2000
Busy, 1/2, 425, 375, 375
Congestion, 1/2, 425, 375, 375
Unobtainable, 1/2, 425, 2500, 500
Info, none

23 Hong Kong
Ringing, 1/4, 25, 400, 200, 400, 3000
Meter, 1/2, 12k, 200, 400
Dial, cont., 350+450
Ring, 1/4, 440, 400, 200, 400, 3000
Busy, 1/2, 480+620, 500, 500
Congestion, 1/2, 480+620, 250, 250
Unobtainable, cont., 480+620
Info, none

24 New Zealand
Ringing, 1/4, 25, 400, 200, 400, 2000
Meter, 1/2, 12k, 200, 400
Dial, cont., 400
Ring, 1/4, 400, 400, 200, 400, 2000
Busy, 1/2, 400, 500, 500
Congestion, 1/2, 400, 250, 250
Unobtainable, 1/2, 400, 75, 100
Info, none

25 Turkey
Ringing, 1/2, 25, 2000, 4000
Meter, 1/2, 12k, 200, 400
Dial, cont., 350+450
Ring, 1/2, 440, 2000, 4000
Busy, 1/2, 400, 750, 750
Congestion, 1/2, 400, 750, 750
Unobtainable, cont., 400
Info, none

26 Singapore
Ringing, 1/4, 25, 400, 200, 400, 2000
Meter, 1/2, 12k, 200, 400
Dial, cont., 400
Ring, 1/4, 440, 400, 200, 400, 2000
Busy, 1/2, 400, 750, 750
Congestion, 1/2, 400, 250, 250
Unobtainable, 1/2, 400, 2500, 500
Info, none

27 Ring#1
Ringing, 1/2, 50, 1000, 4000
Meter, none
Dial, none
Ring, none
Busy, none
Congestion, none
Unobtainable, none
Info, none

28 Ring#2
Ringing, 1/4, 16, 400, 200, 400, 2000
Meter, none
Dial, none
Ring, none
Busy, none
Congestion, none
Unobtainable, none
Info, none

29 UK type 1
Ringing, 1/2, 25, 1000, 2000
Meter, none
Dial, none
Ring, none
Busy, none
Congestion, none
Unobtainable, none
Info, none

30 UK type 2
Ringing, 1/6, 25, 250, 250, 250, 250, 250, 1750
Meter, none
Dial, none
Ring, none
Busy, none
Congestion, none
Unobtainable, none
Info, none

31 UK type 3
Ringing, 1/2, 25, 400, 800
Meter, none
Dial, none
Ring, none
Busy, none
Congestion, none
Unobtainable, none
Info, none

32 UK type 4
Ringing, 1/2, 25, 2000, 4000
Meter, none
Dial, none
Ring, none
Busy, none
Congestion, none
Unobtainable, none
Info, none

33 Calibration#1
Ringing, cont., 16
Meter, cont., 50
Dial, cont., 400
Ring, none
Busy, none
Congestion, none
Unobtainable, none
Info, none

34 Calibration#2
Ringing, cont., 25
Meter, cont., 12k
Dial, cont., 480
Ring, none
Busy, none
Congestion, none
Unobtainable, none
Info, none

35 Calibration#3
Ringing, cont., 50
Meter, cont., 16k
Dial, cont., 950
Ring, none
Busy, none

Congestion, none
Unobtainable, none
Info, none

REFERENCES

1. **European Telecommunication Standard ETS 300 001**

   Chapter 1: General - Attachments to Public Switched Telephone Network (PSTN)

   Aug 1992

   Route des Lucioles

   Sophia Antipolis

   Valbonne

   France

2. **The International Telegraph and Telephone Consultative Committee**

   Blue Book Vol II - Fascicle II.2

   Nov 1988

   Telephone Network and ISDN - Operation, Numbering, routing and Mobile Service

3. **Suppliers Information Note**

   SIN 249 - Issue 1

   Call arrival indication from particular supplementary services (Distinctive ringing)

SPECIFICATION

MASTER SOCKET	DC Voltage	48 V ± 5%
	Feed Bridge	2 x 200 Ω ± 10%
	DC Resistance	180 Ω ± 10% (= 1 km line)
		1380 Ω ± 10% (= 7.5 km line)
EXTENSION SOCKET	Voltage	48 V ± 5%
	SC Current	40 mA ± 10%
DIAL TONE	Type	See Appendix 1.0
	Level @ 0 dB Att.	-4 dBm @ 1 kHz
RINGING	Voltage	70 V ± 10% rms (factory default)
	User Level	Adjustable from 0 V to 85 V rms
	Frequency	16 Hz
		25 Hz
		50 Hz
	Type	AC (near sinusoid), DC backed
PULSE DIALLING	Make	26-41 mS
	Break	55-82 mS
	IDP	>200 mS
	On-hook	>300 mS
	Off-hook	>200 mS
TONE DIALLING	Tone Time	>40 mS
	Accept Frequency	± 1.5%
	Reject Frequency	± 3.5%
ATTENUATION		To and from Master Socket 0 to 40 dB in 5 dB steps
TOLERANCE unless otherwise specified	Frequency	± 10%
	Timing	± 10%
	Level	± 3 dB
POWER	Mains	230 V, 50 Hz, 50 mA