



## **Customer Interface Publication: KCOM (Hull CIP002**

### **Public Switched Telephone Network (PSTN)**

#### **Technical Characteristics of the Private Branch Exchange (PBX) Analogue Multi-Line Interface**

**Issue: 1.2  
April 2016**

The information in this document is provided in accordance with the requirements of the Telecommunications (Voice Telephony) Regulations 1997 and Radio Equipment and Telecommunications Terminal Equipment Regulations 2000 to publish (in accordance with the EC Voice Telephony Directives 95/62/EC & 98/10/EC and Radio and Telecommunications Terminal Equipment Directive 99/05) technical characteristics of interfaces to the public fixed telephone network.

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*Note: this document replaces KCL CIP002 and TCH CIP001 on the same subject – see document history.*

## 1 Scope

This document specifies the technical characteristics of a Private Branch Exchange (PBX) multi-analogue line interface of the Public Switched Telephone Network (PSTN) operated by KCOM Group PLC and known commonly as a PBX line, delivered to a customer at the Network Terminating Point (NTP).

Much of the information contained in this document has been published previously in various documents such as ETSI and BSI standards.

Changes to the network that affect the correct working of approved terminal equipment will be published by KCOM Group PLC in various documents made available from the address below. If the changes impact on this document then it will be updated.

Enquiries relating to the technical content of this document and the availability of other publications should be directed to:

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## 2 The Network Termination Point

The PBX line interface conforms to ETSI ETS 300 001<sup>[1]</sup> § 1.4.3 however for completeness the interface is detailed below.

The PBX line interface consists of two conductors designated as the “A” and “B” wires. The customer access to the PBX line interface can either be by a Insulation Displacement Connection (IDC) or Screw Terminal cable termination.

### 2.1 Insulation Displacement Connectors

Where the PBX line interface is terminated on insulation displacement connectors they will support the connection of copper conductors having diameter between 0.35 mm and 0.65 mm.

### 2.2 Screw Terminal Connectors

Where the PBX line interface is terminated with screw terminal connectors they will support the connection of copper conductors having diameter of 0.35 mm and 0.9 mm.

Note: New installations will not normally be terminated with this type of connection

### 3 Line Conditions

Line conditions are fully detailed in ETSI ETS 300 001.

#### 3.1 On-Hook (Off-Line) condition

The On-Hook condition is as per ETSI ETS 300 001 § 1.4.5.1 (GB) .

The maximum DC current drawn from the interface to remain in the “On-Hook” condition is given in ETS 300 001 § 2.2.1 (GB) 4.

#### 3.2 Off-Hook (On-Line) condition

The Off-Hook condition is as per ETSI ETS 300 001 § 1.4.5.3

The PBX line interface provides a constant current linefeed of 40mA nominal (36.8mA to 42mA) into lines with a loop resistance of up to 1150 ohms including the phone. Thereafter a constant voltage linefeed (-48V nominal) is provided into higher resistance loops maintaining:

- >25mA into loops < 1840 ohms (inc. phone)
- >20mA into loops < 2300 ohms (inc. phone)

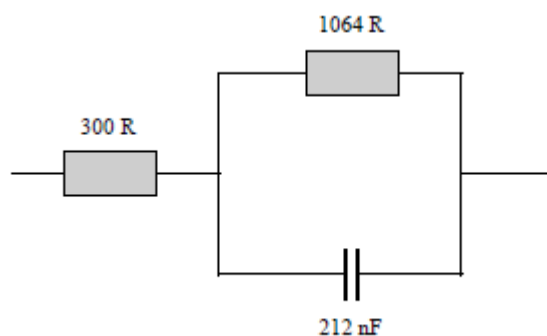
The maximum DC current sourced by the exchange line circuit is therefore 42mA under normal operating conditions.

#### 3.3 Line Polarity

The polarity of the PBX line interface will normally be negative to the ‘B’ wire and earth to the ‘A’ wire in the ‘On-Hook’ condition. During call progress the polarity may be reversed.

#### 3.4 Network Termination Impedance

The input impedance presented at the NTP is a combination of the impedance presented by the local exchange and the impedance characteristics of the local cable types. The local exchange impedance is nominally 300 ohms in series with a 1064 ohms / 212nF parallel combination i.e.



The values are subject to production tolerances, however a minimum return loss of 16dB can be expected.

## 4 Outgoing Calls

### 4.1 Call Initiation

The PBX line interface will respond to the application of an 'Off-Hook' condition (described in 3.2 above) by the calling terminal.

### 4.2 Proceed Indication

When the PBX line interface is ready to receive routing information a proceed indication (Dial Tone) will be given to the calling terminal. This Dial Tone is in accordance with ETSI ETS 300 001 § 1.7.1.

Note: Remarks 1.7.1 (GB) 3 and 1.7.1 (GB) 4 do not apply within the KCL network.

### 4.3 Routing information

The PBX line interface will respond to routing information received from the calling terminal either in Multi-Frequency Tone format ( as per ETS 300 001 § 5.4) or Decadic (Loop Disconnect) format (as per ETS 300 001 § 5.3).

### 4.4 Call Progress information

#### 4.4.1 Ringing Tone

Ringing Tone will be applied to the interface when the call has been established and the called Customer is being alerted. The tone will conform to ETS 300 001 §1.7.2.

#### 4.4.2 Busy Tone

Busy Tone will be applied to the interface when the call to the dialled number cannot be connected due to the called customers line being engaged. The tone will conform to ETS 300 001 § 1.7.3.

#### 4.4.3 Congestion Tone

Congestion Tone will be applied to the interface when the network cannot connect the dialled call. The tone will conform to ETS 300 001 § 1.7.4.

#### 4.4.4 Number Unobtainable Tone

Number Unobtainable tone will be applied to the interface when the dialled number is not obtainable due to reasons other than the line or network being engaged. Information messages may replace N.U. tone in certain circumstances. The tone will conform to ETS 300 001 § 1.7.7.

## 5 Incoming Calls

### 5.1 Call Arrival Indication

The call arrival indication (Ringing) is as per ETSI ETS 300 001 § 1.4.5.2 with the signal conforming to ETSI ETS 300 001 § 1.7.9. This signal will be presented to any 'On-Hook' line.

*Note: At the present time KCOM Group PLC service does not support "No Ring Call" operation. However if and when this is supported the details will be published.*

### 5.2 Called Customer Answer

When the called customer answers the PBX line interface responds to the 'Off-Hook' condition and may under certain circumstances present a reversal of the 'A' and 'B' wire polarity to the calling customer for the duration of the call.

### 5.3 Ring Trip

In normal operation ringing current may continue to be applied for typically 110 ms to 510 ms after the 'Off-Hook' state is established.

## 6 Call Clearing

### 6.1 Terminal Initiated Clearing

#### 6.1.1 By A Calling Terminal

The PBX line will detect a calling terminal returning to an 'On-Hook' state and initiate a "Network Initiated Clearing" sequence (described in 6.2 below) with the addition of an information message being sent to the called customer indicating the 'Caller' has cleared.

#### 6.1.2 By A Called Terminal

When the called terminal returns to the 'On-Hook' state the PBX line will detect the change of condition and initiate a time-out process lasting up to two minutes. After the time-out period has expired a "Network Initiated Clearing" sequence (described in 6.2 below) is offered to the calling terminal

### 6.2 Network Initiated Clearing

The PBX line interface will offer a sequence of clearing signals at the NTP as a result of terminals ending the call or a failure to send valid routing digits during call set-up.

## 7 Additional Information

BS 6305<sup>[2]</sup> provides a variety of additional information which may or may not be covered in ETSI ETS 300 001 covering topics such as:

Positive Battery; Voltage transients; Verbal announcements; Private Meter Pulses; Noise, induced voltages and line surges; End to End insertion loss; and Relative group delay

Note: Values applicable to End to End Characteristics apply only to calls connected wholly within networks operated by KCOM Group PLC.

## 8 Safety and EMC Information

### 8.1 Safety

The normal working voltage of the interface is defined in section 3.2 above.

The interface presented to the customer is classified as exposed as defined in CENELEC Report/ETSI Guide ROBT-002/EG 201 212<sup>[3]</sup>.

### 8.2 EMC

The network equipment and network terminating equipment related to the provision of the interface comply with the current EMC regulations.

Whilst predominantly installed in commercial and light industrial environments, this does not preclude the interface being installed in other environments e.g. residential, industrial. This should be taken into account by the terminal equipment manufacturer when determining the limits of compliance relevant to their equipment in relation to the protection requirements of the EMC directive.

## 9 Recommended Terminal Equipment Standards

The minimum recommended terminal equipment performance specifications are: ETS 300 001 (UK specific parts only).

The minimum recommended terminal equipment EMC specifications are listed in the Official Journal of the European Communities for use under the Electromagnetic Compatibility Directive (89/336). The lists are updated regularly and the terminal manufacturer is recommended to comply with the listed standards applicable to their equipment and the target electromagnetic environment.

The minimum recommended terminal equipment electrical safety specifications are listed in the Official Journal of the European Communities for use under the Low Voltage Directive (73/23/EEC). The lists are updated regularly and the terminal manufacturer is recommended to comply with the listed standards applicable to their equipment.

## 10 Supplementary Services

A range of supplementary services is available on the KCOM (Hull) PBX analogue multi-line interface. Restrictions apply, but the operation of these services is identical to the KCOM Group PLC single analogue line supplementary services described in a separate document: "Technical Characteristics of the Single Analogue Line Supplementary Services" (KCOM (Hull) CIP001a).

For the avoidance of doubt the Supplementary Service set for DDI exchange lines accessed by a single number is provided in the Customer Interface Publication “Technical Characteristics of the Direct Dialling Inward Analogue Multi-Line Interface” (KCOM (Hull) CIP003).

### 10.1 Network Activated Services

- Caller Display - Available
- Withholding Calling Line Identity - Available
- Calling Number Withheld Block – This can be set however there is no Customer Release function

For the avoidance of doubt, Call Barring and “Your Call” are not available.

### 10.2 Customer Activated Services

- Conference Call - Available
- Call Diversion – Available but setting diverts all calls on all lines
- Withholding Calling Line Identity – Available

For avoidance of doubt, Reminder Call, Call Waiting, Ring Back and Call Return (1471) services are not available.

## 11 Glossary

BS – British Standard  
EC – European Community  
ETS – European Telecommunications Standard  
IDC – Insulation Displacement Connector  
NTP – Network Terminating Point  
PBX – Private Branch Exchange Line  
PSTN – Public Switched Telephone Network



## 12 References

Ref	Standard	Title	Date
[1]	ETS 300 001	Attachments to Public Switched Telephone Network (PSTN); general requirements for equipment connected to an analogue subscriber interface in the PSTN	1997
[2]	BS 6305	General requirements for apparatus for connection to public switched telephone networks run by certain public telecommunications operators.	1992
[3]	R0BT- 002/EG 201 212 V.1.2.1 (1998-11)	Electrical Safety ; Classification of interfaces for equipment to be connected to telecommunications networks	1998

The above documents may be obtained from:

British Standards Institution  
Customer Services, Sales Department  
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London W4 4AL

Tel: +44 (0) 208 996 9001  
Fax: +44 (0) 208 996 7001

## 13 History

Date	Issue	Comments	Author
Precursor documents:			
Technical Characteristics of the Direct Dialling Inward Exchange Line Interface [Issue 2.0 May 2000] KCL CIP002			
Technical Characteristics of the Direct Dialling Inward Exchange Line Interface [Issue 2.0 May 2000] TCH CIP002			
Dec 2003	Issue 1.0	Kingston Communications (HULL) PLC publication to replace the above.	M. D. Crowther
Aug 2007	Issue 1.1	KCOM Group PLC publication to replace the above and change of contact information.	M.D.Crowther
Apr 2016	Issue1.2	Change of company name from KC to KCOM and document formatting changes	Amanda Woodard