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(71) Applicant(s)
GPT Limited

(Incorporated in the United Kingdom)

PO Box 53, New Century Park, Telephone Road, COVENTRY, CV3 1HJ, United Kingdom

(72) Inventor(s)
John Standaloft
Brian Francis Murch

(74) Agent and/or Address for Service
Henry Anthony Branfield
The General Electric Company p l c,
GEC Patent Department, Waterhouse Lane,
CHELMSFORD, Essex, CM1 2QX, United Kingdom

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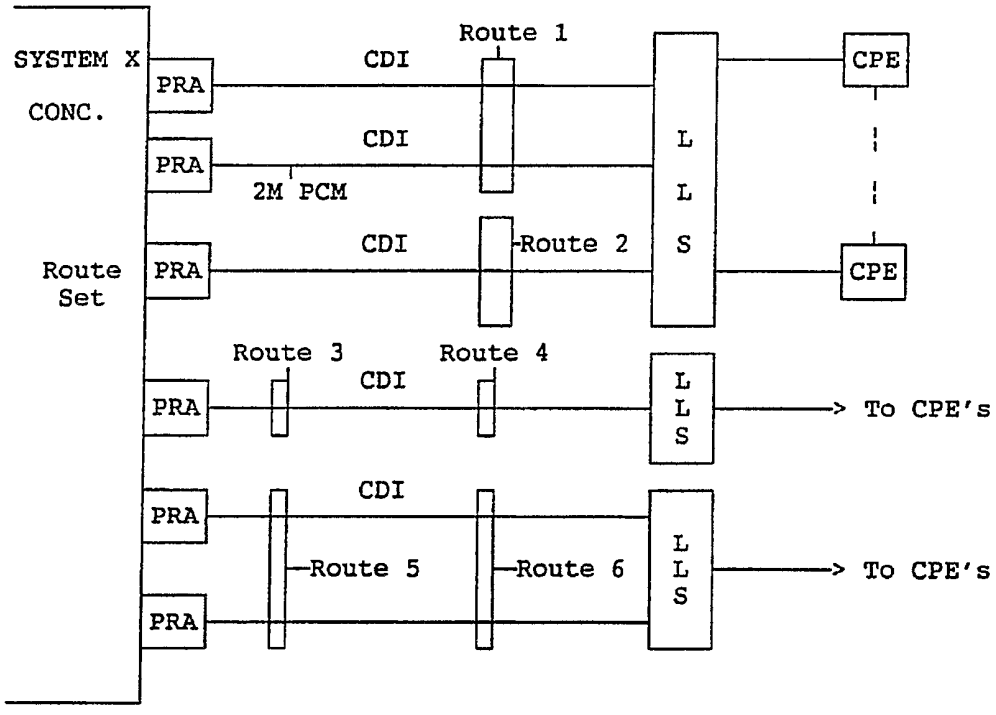
(54) Concentrating interface for telecommunications

(57) An enhancement to a telecommunication concentrator is provided to allow it to support new Local Loop Systems LLS. New concentrating DASS2 interfaces (CDI) are provided based upon a standard signalling protocol using a supplementary addressing capability to identify terminations. As shown Routes 1 to 6 may each encompass part or all of one or more CDI's. The CDI's differ from standard DASS2 interfaces only by the layer 3 protocol employed.



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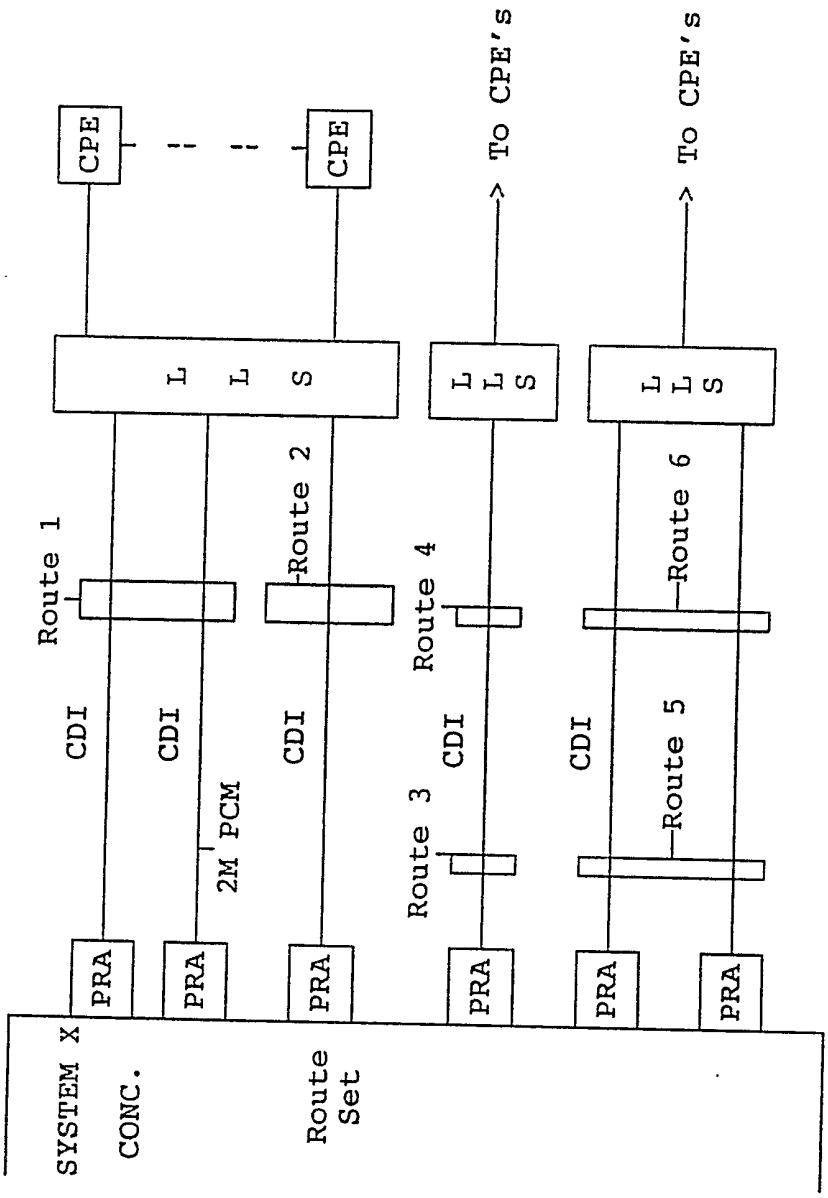
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PRA
SYSTEM X
CONC.
Route Set

CONCENTRATING INTERFACE FOR TELECOMMUNICATIONS

The present invention is concerned with a concentrating interface, suitable for but not restricted to, a System X telephone system.

System X is a telecommunications switching system used extensively in the United Kingdom and also in other countries.

According to the present invention there is provided a concentrating interface for a telecommunications system, wherein subscriber circuit terminations included in a concentrating Local Loop System (LLS) are grouped into routes, the terminations within a route being identified by the use of a supplementary addressing field contained within the switching protocol.

The present invention will now be described, by way of example, with reference to the accompanying single figure.

An enhancement to the concentrator is provided to allow it to support new Local Loop Systems (LLS). A new interface is provided based upon a standard implementation of Digital Access Signalling System 2 (DASS2) using the supplementary addressing capability to identify terminations for such purposes as routing and charging. The Local Loop System will provide the concentration separately.

The Local Loop System Interface provides a network level interface using a 2048 kbit/s (2Mbit/s) Pulse-Code Modulation (PCM) system supporting the DASS 2 common channel signalling system which conforms to specification BTNR190. This interface allows the support of concentrating Local Loop Systems by using the supplementary addressing capability contained within layer 3 of the DASS2 signalling

system.

The customer features supported across the DASS2 interface used to support the Local Loop Systems are the same as those for the standard DASS2 interfaces.

Means are provided whereby the DASS2 circuits (64 kbit/s PCM channel) can be organised in a flexible manner, allowing circuits to be grouped into 'routes'. A route is defined as a group of one or more circuits which can exist within or across one or more DASS2 PCM systems connected to the Local Loop System. More than one route can exist on a PCM.

Circuits can be allocated, by MML command, to routes as either contiguous or non-contiguous numbered circuits.

The identity of a Local Loop System termination can be allocated to a route via MML command, enabling a comprehensive and flexible system of allocating terminations to routes.

Operation and administration of the attributes of the interface, and hence management of circuits and routes are allowed.

This is necessary for the handling of the interface when used for support of Local Loop Systems. It also supports the message and control functions for maintenance of the interface.

The 'status' request and acknowledgement message across the interface are supported, as defined in DASS2 for use with Integrated Services PBX's (ISPBX).

The product provides the standard means of charging for customers terminated, via this interface, on its Local Loop Systems equipment.

The supplementary addressing field in the DASS2 protocol is used to identity the Local Loop System termination and is then translated to the termination Directory

Number for the standard charging program supported by the concentrator's host exchange.

On a standard (multiplexing) DASS2 interface there are the same number of customer terminations (30) as bearer channels, and the bearer channel directly supports a specific customer termination.

A Concentrating DASS2 Interface (CDI) is one which can support more customer terminations than bearer channels.

The only difference between the CDI and the standard DASS2 interface is at layer 3. Since the CDI does not support a separate bearer channel connection protocol, one CDI is associated with a single PCM link in the same way as for the standard interface.

Groups of bearer channels (or circuits) will be known as routes a definition which is consistent with that defined in CCITT Recommendation E600 if it is considered that the Local Loop System and the concentrator are parts of different switching centres. A route provides the link between a set of customer terminations and the circuits it is allowed to use. There will be more terminations than circuits associated with a route (to provide concentration).

Several routes can be supported by one CDI and/or one route can be spread over several CDI's dependent on network architecture and administration requirements.

Full flexibility is provided allowing any customer termination to be associated with any route under administration control. This flexible allocation provides the administration with the ability to accommodate variations within their network infrastructure by individually tailoring CDI applications.

PCM link security is provided by means of route diversity; each CDI carrying the signalling associated with the circuits it supports. This means that PCM sparing with signalling link changeover is not required and allows a simpler implementation with enhanced bandwidth utilisation.

The CDI will use the layer 3 supplementary address field to transport the required additional routing information. This field is mandatory for DASS2 multiplexing or concentrating interfaces. The supplementary address consists of a 14 bit free format field which can be set up by the administration to their own network requirements. It would typically contain the customer's identity on the route.

The following examples illustrated in the figure show ways in which the CDI may be used to realise different routing strategies.

The examples are illustrative only and there is no intention to suggest that this would be a typical Local Loop System environment or that the Local Loop System would use all of the route types described. Any transmission network (Synchronous Digital Hierarchy) (SDH) ring etc) has been omitted for simplicity as it does not affect the operation of the interface.

Route 1

This is a route which encompasses two complete CDI's and which would incorporate 60 circuits.

Route 2

This route is constrained within a single CDI and would incorporate 30 circuits. No route diversity is provided.

Routes 3 and 4

Each of these routes encompasses part of a single CDI and incorporates less

than 30 circuits. The maximum number of circuits on a single CDI is 30 and it follows that if there were no other routes on this CDI the sum of the circuits associated with routes 3 and 4 must not exceed 30.

Routes 5 and 6

Each of these routes encompass part of two CDI's and hence incorporate less than 60 circuits. The maximum number of circuits on a pair of CDI's is 60 and it follows that if there were no other routes on these CDI's the sum of the circuits associated with routes 5 and 6 must not exceed 60. This is similar to routes 3 and 4 except that route diversity is available.

Typically, DASS2 2Mbit/s streams from a base Station controller will be fed to a System X Concentrator Interface Card.

The base station controller will have the ability to send a station identity to the concentrator. The concentrator will have a 'front end' translation table to convert the station identity number to a concentrator equipment number (1 of 2048). Subsequently the call will be treated as a standard call. Charging and billing will be carried out against the directory number allocated by the administration to the concentrator equipment number, again as for a standard call.

The use of telecommunications features and facilities will be charged to customers connected to the base station controller in the normal way. It is envisaged that in addition to the existing base platform services, the new residential feature packages and Centrex packages will also be available.

Incoming calls will be treated as standard by the system until the concentrator is instructed to distribute the call to a particular termination. The concentrator will then, using the translation table, translate the equipment number received from the

System X Call Processing Subsystem to the base station number. The concentrator will then determine if a free route and circuit is available between itself and the base station controller.

If a free route circuit is available the call will be passed to the base station controller and ring tone will be sent to the calling customer.

If no free route and circuit is available due to congestion in the access network, then the call will be rejected and a network congestion tone sent to the calling customer.

For security purposes the base station controller may be accessed by more than one 2Mbit/s link and hence the need for route and circuit selection.

New System X Maintenance Control Subsystem (MCS) resources will be required to allocate customers (base station identities) to particular concentrator routes and circuits.

The base station controller may have a PABX or a radio system connected thereto.

The interface may also provide facilities for "radio in the local loop" operation.

CLAIMS

1. A concentrating interface for a telecommunications system, wherein subscriber circuit terminations included in a concentrating Local Loop System (LLS) are grouped into routes, the terminations within a route being identified by the use of a supplementary addressing field contained within the switching protocol.

2. A concentrating interface as claimed in Claim 1, wherein the telecommunications system conforms to System X.

3. A concentrating interface as claimed in Claim 2, wherein the switching protocol is Digital Access Signalling System 2 (DASS2).

4. A concentrating interface as claimed in Claim 3, wherein the supplementary addressing field is implemented at Layer 3.

5. A concentrating interface substantially as hereinbefore described, with reference to and as illustrated in the accompanying drawing.

6. A telecommunications system including concentrating interfaces as claimed in any preceding claim, wherein a route includes a plurality of interfaces.

7. Concentrating interfaces as claimed in any one of Claims 1 to 5, wherein a route includes part of one or more interfaces.

Patents Act 1977 **Examiner's report to the Comptroller under Section 17** **(The Search report)**	Application number GB 9325488.6
Relevant Technical Fields (i) UK Cl (Ed.M) H4K (KTM and KTA) H4P (PPEC, PPBB and PPBC) (ii) Int Cl (Ed.5) H04Q (3/60, 5/14 and 11/04) H04L (12/56 and 12/66)	Search Examiner KEN LONG Date of completion of Search 15 MARCH 1994
Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii) ONLINE DATABASE: WPI	Documents considered relevant following a search in respect of Claims :- 1 TO 7

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
A	GB 2207835 A	(STC) see particulaly page 1 line 24 to page 2 line 3, page 3 line 17, page 5 lines 4 to 9 and page 6 line 23 to page 7 line 8.	
A	GB 1557302	(ISEC)	
A	GB 1531190	(HASLER)	

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).