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INTEGRATED SERVICES DIGITAL NETWORK (ISDN)
SERVICE CAPABILITIES

MULTIPARTY SUPPLEMENTARY SERVICES:
CONFERENCE CALLING (CONF)

ITU-T Recommendation I.254.1

(Extract from the *Blue Book*)

NOTES

1   ITU-T Recommendation I.254.1 was published in Fascicle III.7 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2   In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation I.254.1

MULTIPARTY SUPPLEMENTARY SERVICES –
CONFERENCE CALLING (CONF)

(Melbourne, 1988)

1 Conference Calling Service Description

1.1 *Definition*

Conference Calling is an ISDN supplementary service which allows a user to communicate simultaneously with multiple parties, which may also communicate among themselves. This description deals primarily with the establishment and manipulation of the connections used to form a conference call and is therefore expected to be applicable to many types of conference calls (e.g. voice, data, video, multi-media). Although provision is made for specifying the conference type, it is recognized that the control of conferencing functions (especially for those other than speech) is beyond the scope of this Recommendation.

This Recommendation describes the operation of the "Add-on" Conference Calling service only. Other forms of Conference Calling (e.g. "Meet-me") are not described.

1.2 *Description*

1.2.1 *General description*

When Conference Calling is invoked, conference resources (e.g. a "bridge") are allocated to the served user, and any calls indicated by the service request are added to the conference. Once a conference is active, parties may be added, dropped, isolated (i.e. prevented from communicating with the conference), reattached, or split (i.e. removed from the conference but remain connected to the conference controller). The controller can place his connection to the conference on hold, retrieve the conference, end the conference, or disconnect himself from the conference.

1.2.2 *Specific terminology*

1.2.2.1 *Served user, conference controller, conferees, parties*

During the invocation phase, the service is under the control of the "served user", i.e. the one for whom the service was subscribed or, in those cases where subscription is not required, the one who invokes the service. Once the conference is in the active state, the service is under the control of the "conference controller" who, in most cases, is the served user but could be a party other than the served user if transfer of control has occurred (an anticipated future extension to this service). Any party other than the conference controller is called a "conferee". All participants in the conference call are considered "parties".

1.2.2.2 *Call ID, Party ID, Connection ID*

Call ID: the served user's (controller's) reference to a call of which he is a party. Examples:

1) the conference call itself,

2) a call which is to be added to the conference,

3) a call which is formed by splitting a party from the conference.

Party ID: the served user's (or controller's) reference to a particular party within the context of a call.

Connection ID: the served user's (or controller's) reference to a particular connection (to a particular party) within the context of a call.

Observe that multiple parties may be associated with a given call, e.g. a conference call. Moreover, there can be multiple connections associated with a single party, e.g. a simultaneous voice and video call.

Note - This service description assumes that there exists only one connection to a given party. Procedures to allow for multiple connection (e.g. multi-media conference calls) to a given party are anticipated future extensions.

1.2.2.3   *Conference states*

Conference Idle: the state prior to the reception of a "conference invocation request", or after a particular conference has ended.

Conference Active: the state in which conference resources have been allocated to the specified conference and at least one party has a connection to the conference. That connection could be either active or held.

Conference Floating: the state in which the conference is active but without a controller. This state is possible when two or more conferees exist on an active conference and the controller successfully disconnects himself (see Figure 1/I.254.1, sheet 7).

1.2.3   *Qualification on the applicability to telecommunication services*

This supplementary service is considered meaningful when applied to the Telephony teleservice and the speech and 3.1 kHz audio bearer services. Furthermore, it may also be meaningful when applied to other services.

1.3   *Procedures*

1.3.1   *Provision/withdrawal*

The Conference Calling supplementary service may be subscribed to by prior arrangements with the service provider. The subscription parameters include the maximum (and, if different, the default) number of conferees allowed in a conference call.

Note - The default will usually be three, but may be six (or some other number).

If the served user has subscribed to more than one size conference service and wishes to establish a conference of a size other than the default size, the served user must request the properly-sized conference before any parties are added to the conference.

Withdrawal of the service is made by the service provider upon request by the subscriber or for service provider reasons.

1.3.2   *Normal procedures*

1.3.2.1   *Activation/deactivation/registration*

None identified.

1.3.2.2   *Invocation and operation*

1.3.2.2.1 Beginning the conference call (see Figure 1/I.254.1, Sheets 1 and 2)

Invocation parameters:

The Conference Calling service must be invoked by the served user. The invocation request must include the "root" Call ID, i.e. the Call ID by which the served user (or controller) will refer to the conference call itself. This Call ID may be either a new Call ID or the Call ID of an existing call which is to be used to form the conference.

The invocation request may include the following additional information:

–   Conference size: the intended maximum number of parties for the conference (if different from the default).

–   Existing call/party information (Call IDs/Party IDs/disposition of related B-channel connections): in order to initially include one or more parties from an existing call in the conference, the invocation request must include the Call ID, and optionally the Party ID and information as to how the B-channel associated with that call is to be handled.

–   New party information (called party address, other "set-up" information): in order to initially include a party for which there is no existing call, the invocation request must include the desired party's address, and optionally other information contained in a normal call request.

    Note - Some information which is mandatory in a normal call request (e.g. "bearer capability") can be inferred (e.g. from the conference type) and hence may not be mandatory here.

–   Connection request: either active or held. This request defines the served user's initial connection to the conference. Possible values follow:

Active state specified:

i) Specific B-channel: a specified preferred/exclusive B-channel shall be used to immediately establish a connection to the conference.

ii) Any available B-channel may be used.

Held state specified:

i) Reserved B-channel: a B-channel is to be reserved for (later) connection to the conference.

ii) No reserved B-channel: in this case no B-channel is allocated or reserved; the served user may have to free up a B-channel later when participation in the conference is desired.

– Conference type: in general, the bearer capability compatibility check during context arbitration can be used to infer the type of conference required. It is assumed to be "speech". Other conference types may require special bridging facilities and/or higher layer control.

– Conference bridge location: it should be possible to request the conference bridge to be at a specified location, e.g. close to some grouping of conferees. Procedures for remote location of conference bridge facilities are anticipated future extensions.

Defaults for invocation parameters

If any of the information described above is not included in the invocation request, the following defaults will occur:

– Conference size: the size defaults to the subscribed default conference size specified at subscription time (if the served user specified a default conference size at subscription time) or the subscribed maximum conference size (if a default conference size was not specified), or the default conference size specified by the service provider (if the served user did not subscribe to the service).

– Existing call/party information:

i) Call IDs: if no Call ID other than the root Call ID is specified, no existing calls will be initially included in the conference.

ii) Party IDs: if not specified, each party (other than the served user) of the indicated Call ID(s) will be initially included in the conference.

iii) Disposition of related B-channel connections: if disposition information is not included, the related B-channel connections will be deallocated, unless the service provider chooses to use them for connection of the served user to the conference call (e.g. in a multi-media conference).

– New party information:

i) Called party address: if not specified, no new parties will be initially included in the conference.

ii) Other "set-up" information: for further study.

– Connection request: if no connection information is included, it is assumed that the served user wishes to be initially connected to the conference in the active state and any available B-channel may be used.

i) If the served user indicates that he wishes to be connected to the conference in the active state but does not indicate "specific B-channel" or "any available B-channel", it is assumed that any available B-channel may be used.

ii) If the served user indicates that he wishes his resulting connection to the conference to be in the held state, but does not indicate "reserved B-channel" nor "no reserved", it is assumed that a B-channel is to be reserved for (later) connection to the conference.

– Conference type: if not specified, the service provider will attempt to derive the appropriate conference type from the bearer capabilities of the call(s) involved. If no calls are known by the service provider to be involved in the call, the default conference type shall be "speech".

– Conference bridge location: if not specified, the service provider will attempt to place the conference bridge(s) in the most appropriate location, considering the call(s) known by the service provider to be involved at the time the request is made.

Procedures

When a conference request is made, a conference call is set up.

When the service provider receives the request to allocate resources for the conference call, it checks to see that the requested conference can be established. This procedure is termed "context arbitration". Context arbitration includes a bearer capability compatibility check, a supplementary services compatibility check, a check to see that the state of each connection to be added is acceptable, and a check for the availability of conference/network resources. Upon successful completion of the context arbitration, the resources needed are allocated.

If the conference request is successful, all existing appropriate call(s) referenced in the conference request are added to the conference.

Note - Adding parties from an existing call may not be successful in all cases due to remote bridging and rerouting limitations.

Upon successful joining of the specified parties to the conference, any unused B-channels are deallocated and any single party calls are released.

The service provider checks the conference request for additional information (optional parameters). For those optional parameters not included in the conference request, the default values will be used. In addition, if the connection request parameter is not included and no additional parties are indicated (i.e. m = 0, n = 0) the service provider will prompt the served user for further actions.

1) Prompting procedures detected: if the number of referenced existing calls (other than the root Call ID) in the conference request is zero and the controller connection request is not included, then the conference is put on hold from the served user's point of view and the served user is prompted for further actions (i.e. the add-party procedure is automatically started).

2) No prompting procedures detected: if the number of referenced existing calls (other than the root Call ID) in the conference request is larger than zero, or if the controller connection request is specified, the referenced calls are automatically connected to the conference, which is now in an active state. The served user's connection to the conference will also be active unless the controller has indicated that his connection to the conference should be held.

The decision to put the conference on hold or not (from the served user's point of view) is based on the information received in the Conference request, independent of the number of referenced existing calls.

1.3.2.2.2 *Managing individual parties* (see Figure 1/I.254.1, Sheets 2 and 3)

When managing a party, the controller needs to specify the pair Call ID/Party ID. If no party(s) is specified, the service provider will typically assume that the request applies to all parties associated with the indicated Call ID. (Exception: if Party ID is not specified in the drop party command, the last party added to conference is dropped.)

In the active state of the conference, the conference controller has the following options for managing parties in association with a conference:

Add new party

The conference controller can request that a new party be added to an existing conference call using procedures analogous to those used to start the conference call.

Upon a request for the addition of a new party, the conference controller automatically puts the conference on hold. The service provider checks the Add Party request for additional information, i.e. whether or not the conference controller is to keep the conference on hold after the addition of a new party. If no information is received, the service provider will use the service default value.

When on hold, the conference controller can either indicate the address of a new party or indicate a Call ID of an already existing call. (See Figure 1/I.254.1, Sheet 2.)

a) New call: the service provider will establish a connection with the new party indicated by the address provided by the controller. Upon call establishment, the controller will be connected to this new active call. (If call establishment fails or if the active call is disconnected, the controller may or may not return to the active conference based on the connection request parameter within the Add Party request).

Note - By establishing this connection via the conference bridge, the service provider may avoid problems associated with remote bridging and rerouting.

b) Existing call: if a Call ID exists, the controller indicates a call Call ID to be added directly to the conference. The party (parties) on the indicated call are immediately joined to the conference.

If a Party ID is given in conjunction with the Call ID, then the specified party is split from the specified call and added to the conference. If no Party ID is given then all parties on the specified call are added to the conference.

Note - Adding parties from an existing call may not be successful in all cases due to remote bridging and rerouting limitations.

Drop party

The conference controller can request that a specified party be disconnected from the conference and the conference controller's association with that party be eliminated completely. If no Party ID is specified, it is assumed that the last party (if identifiable) added to the conference should be dropped. After the party is dropped, if there are no other conferees (a conferee being a party *other* than the conference controller), then the conference remains in the Conference Active state (with only the conference controller attached). If, after the party is dropped, there is only one other conferee, then the service provider could, at its option, form an "ordinary" two-party call and release the conference resources, or remain in the Conference Active state (with only the conference controller and the one conferee attached). (See Figure 1/I.254.1, Sheet 3.)

Split party

The conference controller can request that a specified party be removed from the conference but remain connected to the conference controller. Execution of this request requires that the network establish a new Call ID for the call between the conference controller and the specified party, since that party is no longer associated with the conference call. Two parameters must appear in the Split Party request:

1) Call ID (conference call), and

2) Party ID (specified party).

The Split Party request will put the controller's connection to the conference in the held state and the controller's connection to the specified party in the active state (see Figure 1/I.254.1, Sheet 3).

Isolate party

The conference controller can request that a specified party be prevented from communicating with the conference but not removed from it. This does not affect the state (e.g. active or held) of the specified party's access channels (e.g. B-channels) which are nominally under the control of the specified party. (See Figure 1/I.254.1, Sheet 3.)

Reattach party

The conference controller can request that the specified party be reattached to the conference. Successful execution of this command permits a previously isolated party to again converse with all other parties that are connected to the conference. (See Figure 1/I.254.1, Sheet 3.)

1.3.2.2.3 *Managing the conference* (see Figure 1/I.254.1, Sheets 4 and 5)

In addition to the foregoing, the conference controller can manage the complete conference in any of the following ways:

Hold conference: the conference controller can request that his own connection to the conference be held, using procedures as described in the Call Hold service. Successful execution of this command retains the existing state of conferees in relation to the conference, i.e. those who could communicate with each other can still do so and those who were in an isolated state remain in that state. (See Figure 1/I.254.1, Sheet 4.)

Retrieve conference: the conference controller can request that a conference controller's connection to the conference be retrieved (see hold conference description above). Successful execution of this command retains the existing state of conferees, i.e. those who could communicate with each other can still do so between themselves as well as the conference controller, and those who were in an isolated state remain in that state. (See Figure 1/I.254.1, Sheet 4.)

Interrogate: it is an anticipated future extension that the conference controller will be able to request the current status of the conference call (i.e. number of parties, identification of parties, etc.) from the service provider. Information content and procedures for the interrogate request are, as yet, undefined. (See Figure 1/I.254.1, Sheet 4.)

Disconnect: a Disconnect request from the controller will disconnect the controller from the conference, and may, in some cases, result in ending the conference. From the controller's perspective, this disconnect procedure is identical to that outlined in the Basic Call service description.

If:

a)   the number of conferees is greater than or equal to 2; and

b)   the Conference Floating option is subscribed to; and

c)   Floating conditions (e.g. charging) are satisfied;

then the conference goes to the Floating state. Otherwise the conference ends (see End conference). This procedure differs from the disconnect controller procedure in that the normal disconnect procedure can result in either the Conference Active or Conference Idle state. When Conference Floating cannot be performed, instead of notifying the controller, disconnect processing continues with the release of conference resources. (See Figure 1/I.254.1, Sheet 5.)

Disconnect controller: the controller can request that he be disconnected from the conference. If the number of parties is greater than or equal to 3 and if the controller has subscribed to the Conference Floating option, and provided charging or other restrictions are not violated, the connection of the controller will be cleared and the conference will proceed to the Floating state (i.e. the remaining conferees may continue to communicate). Otherwise, the controller will be notified that the Disconnect Controller request is denied and the conference will remain active with the controller still connected.

The remaining parties will stay on the conference without a controller until less than two conferees exist on the conference. In a conference without a controller, conferees can only hold, retrieve or drop their own connections.

If one or two parties (including the controller) exist on the conference at the time disconnect is requested, the controller will be notified that the Disconnect request is denied and the conference will remain active with the controller still connected. (See Figure 1/I.254.1, Sheet 5.)

End conference: the conference controller can request that the conference be terminated, i.e.

1)   that every party associated with a particular conference be disconnected,

2)   that all conference resources be de-allocated, and

3)   that all knowledge of the conference call, including the Call ID, be removed. (See Figure 1/I.254.1, Sheet 5.)

Note - While Disconnect Controller and End Conference provide useful unambiguous functions, it is recommended that all terminals include the Disconnect function, and that this be the request that is sent in response to the normal user action (e.g. hanging up the telephone). This will avoid the problem which arises if the controller "hangs up" and leaves the terminal before receiving notification that a Disconnect Controller request cannot be accomplished. The Disconnect request would allow processing to continue at this point and the conference would be ended.

1.3.2.2.4 *Possible actions by conferees* (See Figure 1/I.254.1, Sheet 6)

In the active state of the conference, the conference can:

Hold/retrieve: put his connection to the conference on hold and later retrieve it. (See Figure 1/I.254.1, Sheet 6.)

Disconnect from the conference: the procedures here are nominally the same as those that occur after a conferee has been dropped from a conference by the conference controller. (See Figure 1/I.254.1, Sheet 6).

Indication of the above actions by any conferee should be provided to the conference controller. Whether conferees also receive indications as to the actions of other conferees is for further study.

1.3.3   *Exceptional procedures*

1.3.3.1   *Activation/deactivation/registration*

None identified.

1.3.3.2   *Invocation and operation*

1.3.3.2.1 *Beginning the conference call*

If a user tries to invoke Conference Calling and the service provider cannot comply with that request, the service provider will deny the request and explain the reason for denial. Possible reasons for non-compliance are:

- service not subscribed;

- resources cannot be allocated;

- served user (or intended conferee) restrictions not met;

- context arbitration check failed;

- more than one party in an alerting state.

If multiple conferees are specified in the conference request and if the context arbitration failed for only a subset of the intended conferees, the service provider has the option of permitting the subset of conferees which passed the context arbitration to form the initial conference call. If this is not permitted, the failure of any of the requested parties to pass the context arbitration check causes the conference request to be denied.

1.3.3.2.2 *Managing individual parties*

Add new party: if the service provider cannot satisfy an Add New Party request (e.g. if the conference call has been cleared or if the maximum number of conferees allowed has already been reached) the conference controller will receive indication that the request is denied, with the reason for failure.

Note - It is an anticipated future extension to allow for conference re-sizing when there is an attempt to exceed the maximum conference size allowed.

Failure to pass any of the checks associated with the context arbitration results in the return of a failure message to the conference controller with appropriate cause(s).

Split isolate party: if no Party ID is included in a Split Party or Isolate Party request, notification of failure is returned to the conference controller. If the controller sends an Isolate Party request concerning a party which is already isolated, or a Re-attach Party request concerning a party which is already attached, the network will ignore the request.

1.3.3.2.3 *Managing the conference*

No exceptional procedures identified.

1.3.4 *Alternative procedures*

None identified.
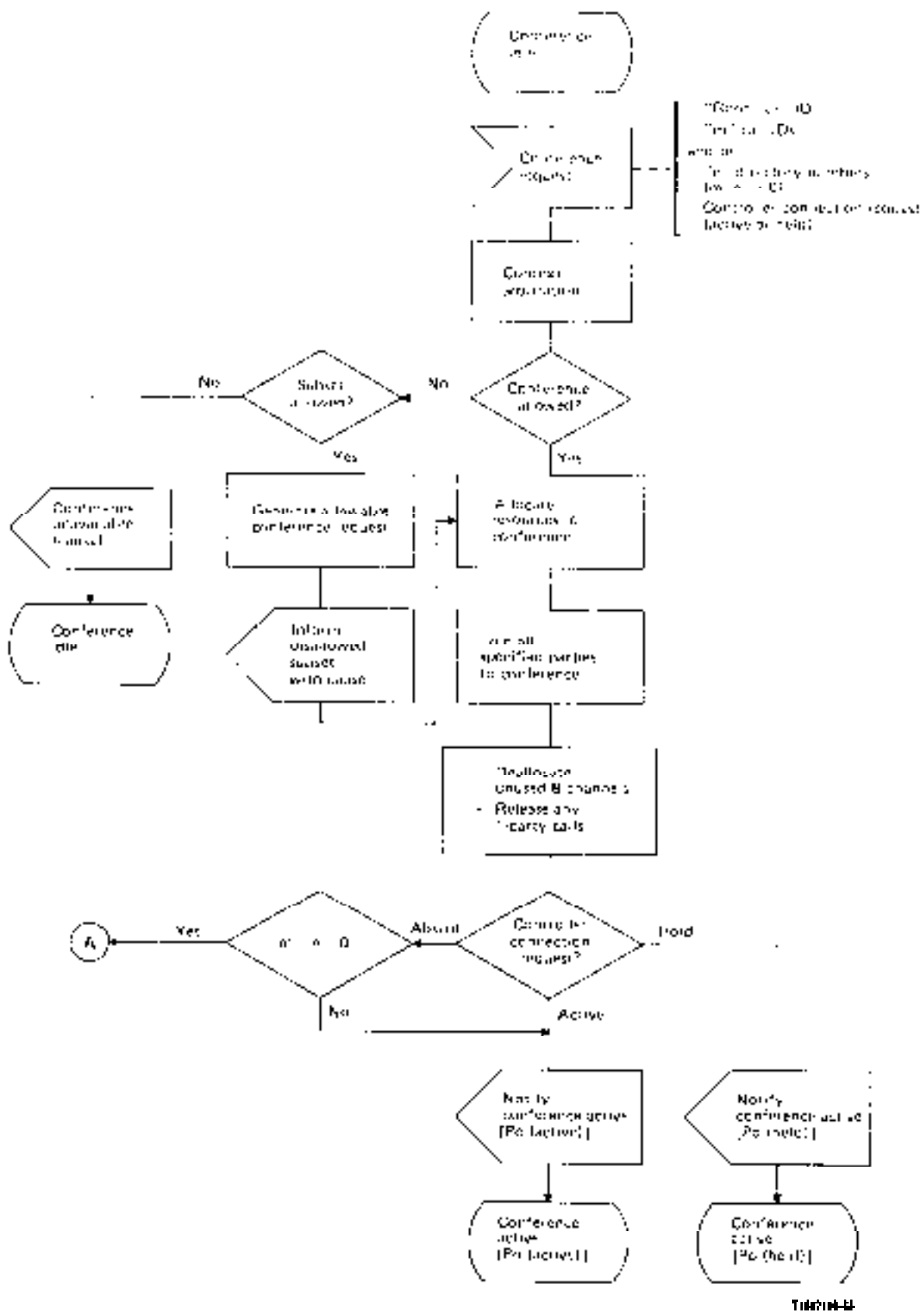
Note – Indication of change in state (i.e. held, disconnect, etc.) of the conferee should be provided to the conference controller.

FIGURE 1/I.254.1 (sheet 1 of 7)

Conference calling