



AT&T Toll Free Transfer ConnectSM Service

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TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	SERVICE OVERVIEW	1
2.1	COURTESY TRANSFER	2
2.2	CONSULT AND TRANSFER	3
2.3	CONFERENCE AND TRANSFER	3
3.	DIALING OPTIONS	3
3.1	DIRECT DIAL	3
3.2	SPEED DIAL CODES	4
4.	IN-BAND TRIGGERS AND DATA FORWARDING	4
4.1	COURTESY TRANSFER -HUMAN --No DATA	5
4.2	COURTESY TRANSFER -HUMAN --DATA	5
4.3	COURTESY TRANSFER -VRU --No DATA	6
4.4	COURTESY TRANSFER -VRU --DATA	6
4.5	CONSULT AND TRANSFER -HUMAN --No DATA	6
4.6	CONSULT AND TRANSFER -HUMAN --DATA	7
4.7	CONSULT AND TRANSFER -VRU --No DATA	7
4.8	CONSULT AND TRANSFER -VRU --DATA	7
4.9	CONFERENCE AND TRANSFER - HUMAN --No DATA	7
4.10	CONFERENCE AND TRANSFER - HUMAN --DATA	7
4.11	CONFERENCE AND TRANSFER-VRU --No DATA	7
4.12	CONFERENCE AND TRANSFER-VRU --DATA	7
4.13	NETWORK RESPONSES TO IB TRIGGERS	8
4.14	DIGIT COLLECTION	8
4.15	DTMF SPECIFICATIONS	9
4.15.1	<i>Pulsing Speed and Duration</i>	9
4.15.2	<i>Frequency Limits</i>	9
4.15.3	<i>Amplitude Limits</i>	9
4.16	PROGRAMMING REDIALS	9
5.	ANNOUNCEMENTS	9
5.1	OUTBOUND	10
5.1.1	<i>Recording Levels</i>	10
5.2	INBOUND	10
6.	OUT-OF-BAND TRIGGERS AND DATA	10
6.1	COURTESY TRANSFER --No DATA	11
6.2	COURTESY TRANSFER --DATA	11
6.3	CONSULT AND TRANSFER --No DATA	12
6.4	CONSULT AND TRANSFER - DATA	12
6.5	CONFERENCE AND TRANSFER --No DATA	13
6.6	CONFERENCE AND TRANSFER --DATA	13
6.7	NETWORK RESPONSES TO OOB TRIGGERS AND DATA FORWARDING	13
7.	OOB TRIGGERS AND DATA FORWARDING ENCODING	14
7.1	OOB SIGNALING - RP TO NETWORK	14

7.2	OOB SIGNALING - NETWORK TO RP.....	19
7.2.1	Network Response to Error Conditions.....	20
8.	DATA FORWARDING - NETWORK TO TP.....	22

APPENDIX A - RECOMMENDED UUI CODING FOR AT&T TOLL-FREE TRANSFER CONNECTSM SERVICE DATA FORWARDING FEATURE.

1.	USER-USER INFORMATION ELEMENT ENCODING FOR THE AT&T TOLL-FREE TRANSFER CONNECT SM DATA FORWARDING FEATURE	A-2
2.	USER-USER APPLICATION IDENTIFIER (OCTET 4).....	A-2
3.	DATA FORWARDING INFORMATION FORMAT (OCTET 5, ETC.)	A-3
3.1	INFORMATION TAG	A-3
4.	DATA FORWARDING INFORMATION CODING EXAMPLES.....	A-7

LIST OF TABLES AND FIGURES

FIGURE 1.	ENCODING REDIRECTION NUMBER OF TP IN THE UEC IE	16
TABLE 1.	TRANSFER CONNECT SERVICE SUPPORTED FEATURES	2
TABLE 2.	IB TRIGGERS AND APPLICABLE FEATURES	5
TABLE 3.	IB TONES PLAYED TO VRU (RP) BY NETWORK	8
TABLE 4.	OOB TRIGGERS AND APPLICABLE FEATURES.....	11
TABLE 5.	OOB RESPONSES, CAUSE CODES AND INTERPRETATIONS.....	14
MESSAGE 1.	FACILITY - RP CALL REDIRECTION REQUEST.....	15
MESSAGE 2.	FACILITY - RP DATA FORWARDING REQUEST	17
MESSAGE 3.	FACILITY - RP REQUEST TO PUT CP ON HOLD	17
MESSAGE 4.	FACILITY - RP REQUEST TO RETRIEVE CP FROM HOLD	18
MESSAGE 5.	FACILITY - RP REQUEST TP BE DROP FROM THE CALL.....	18
MESSAGE 6.	FACILITY - CALL REDIRECTION CONFIRMATION FROM NETWORK	19
MESSAGE 7.	FACILITY- NETWORK TO RP: CP OFF HOLD OR CALL WILL BE DROPPED IN 30 SEC.	19
MESSAGE 8.	FAC - NETWORK TO RP INDICATING SERVICE ERROR	20
MESSAGE 9.	FACILITY - NETWORK TO RP INDICATING FLOW CONTROL PROBLEMS	20
MESSAGE 10.	FACILITY - NETWORK TO RP INDICATING INCORRECTLY CODED FIE.....	21
MESSAGE 11.	FACILITY REJECT - NETWORK TO RP: OpVAL BUT PARAM. NSF ABSENT.....	21
MESSAGE 12.	SETUP - NETWORK TO TP WITH FORWARDED DATA	22
MESSAGE 13.	FACILITY - NETWORK TO TP WITH FORWARDED DATA.....	23

APPENDIX A - RECOMMENDED UUI CODING FOR AT&T TOLL-FREE TRANSFER CONNECTSM SERVICE DATA FORWARDING FEATURE.

TABLE 1.	SUGGESTED UUI IE, OCTET 4 ENCODING FOR CURRENT AND POTENTIAL AT&T UUI APPLICATIONS.....	A-2
TABLE 2.	DATA FORWARDING INFORMATION FORMAT.....	A-3
TABLE 3.	MULTIPLE OCTET INFORMATION TAG FORMAT	A-4
TABLE 4.	SUGGESTED ENCODING FOR AT&T TOLL-FREE TRANSFER CONNECT SERVICE DATA FORWARDING INFORMATION TAGS	A-5

FIGURE 1. SUGGESTED UUI ENCODING FOR AT&T TOLL-FREE TRANSFER CONNECT SERVICE DATA
FORWARDINGA-2

FIGURE 2. DATA FORWARDING INFORMATION ENCODING EXAMPLE - SINGLE OCTET INFORMATION TAGS.A-7

FIGURE 3. DATA FORWARDING EXAMPLE - SINGLE AND MULTIPLE OCTET INFORMATION TAGSA-8

1. INTRODUCTION

This document provides information for integrating Voice Response Units (VRUs) with the AT&T Toll Free Transfer ConnectSM Service. VRUs are call-handling devices used by AT&T's Toll Free Services subscribers to answer calls. These units can typically detect touch-tones and play announcements to callers so calls may be properly handled without human intervention. In addition, the document discusses the human interface to the service. Specifically, the human interface is provided through telephone keypad entries which are required to be sent to the AT&T Network as Dual Tone Multi-Frequency (DTMF) signals.

2. SERVICE OVERVIEW

Transfer Connect is an AT&T service which enables AT&T Toll Free subscribers to transfer or redirect a Calling Party (CP) to another location. The party (the Toll Free subscriber) that receives the incoming call and wishes to transfer it is designated the Redirecting Party (RP), and the party who is the recipient of the transferred call is referred to as the Target Party (TP). In addition to call redirection, the service supports data forwarding from the RP to the TP. A prerequisite for Data Forwarding is that the RP and the TP have an Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI) connection to the AT&T network. This interface is described in AT&T Technical Reference TR41459.¹ Data Forwarding allows the RP to send data to the TP using the Message-Associated User-to-User Information (MAUUI) signaling procedure described in TR41459. More specifically, for the Data Forwarding feature, the RP must incorporate the data to be transferred to the TP in the User-user Information Element (IE) of the ISDN DISCONNECT or FACILITY message sent from the RP.

The RP can request the redirection of an answered call by entering an in-band DTMF touch-tone command (In-Band Trigger) or by signaling on the ISDN PRI D-channel (Out-Of-Band Trigger). Once the trigger has been entered, the CP will be placed on hold by the Network. The RP can then redirect the call via either direct dialing or speed dialing. The AT&T Network will then attempt to transfer the call to the Target Party based on the dialed number or Speed Dial Code (SDC) entered. For Data Forwarding applications, the RP enters the data after the trigger and the redirection number of the TP.

There are three offerings of the AT&T Toll Free Transfer Connect Service. They are tariffed under the descriptions Courtesy Transfer, Consult and Transfer, and Conference and Transfer. Each offering supports a number of provisionable options. The options are outlined in Table 1. The following interpretations are to be applied: IB is an In-Band Trigger; OOB(DISC) is Out-Of-Band data sent from the RP to the TP in a DISCONNECT message, and OOB(FAC) is an Out-Of-Band Trigger or Data issued using a FACILITY message. Finally, **IB(***9)** is an In-Band Trigger **supported only for Conference and Transfer** and enables the RP to send data in-band to the TP. The *****9** IB trigger toggles the Network's DTMF detectors. The *****9 IB** trigger should be used when sending IB data that includes the "*" character. For example, after sending the *****9 IB** trigger, the RP may forward data which include the "*" character, which would normally be interpreted as the start of a trigger by the Network.

¹Refer to AT&T Network Integrated Services Digital Network Primary Rate Interface and Special Application Specification, User-Network Interface Description, document no. TR41459, June 1999. This document can be obtained at the following site on the World Wide Web: <http://www.att.com/cpetesting>.

Item #	Feature Type*	Trigger Type (IB / OOB)	Data (None/IB/OOB)
01	Courtesy Transfer-H	IB	None
02	Courtesy Transfer-H	IB	OOB (DISC)
03	Courtesy Transfer-V	IB	None
04	Courtesy Transfer-V	IB	OOB (DISC)
05	Courtesy Transfer-V	OOB (FAC)	None
06	Courtesy Transfer-V	OOB (FAC)	OOB (FAC)
07	Consult and Transfer-H	IB	None
08	Consult and Transfer-V	IB	None
09	Consult and Transfer-V	OOB (FAC)	None
10	Consult and Transfer-V	OOB (FAC)	OOB (FAC)
11	Conference and Transfer-H	IB	None
12	Conference and Transfer-H	IB (***)	IB
13	Conference and Transfer-V	IB	None
14	Conference and Transfer-V	IB (***)	IB
15	Conference and Transfer-V	OOB (FAC)	None
16	Conference and Transfer-V	OOB (FAC)	OOB (FAC)

* H -Agent is a Human Operator

V -Agent is a VRU

Table 1. Transfer Connect Service Supported Features

The RP can redirect the incoming call to a toll free number, a Speed Dial number, or a POTS number. However, OOB data will not be forwarded to the POTS number, nor to the Speed Dial Code if it maps to a POTS number. The RP is allowed a total of four redirection attempts.

This Technical Reference contains complete information on IB signaling for the Human agent. With the exception of Courtesy Transfer-H OOB(DISC), Table 1 item 02, OOB signaling is not supported for the Human agent. **The focus of this Technical Reference** is on the Transfer Connect Service features which support the RP VRU interface and OOB ISDN PRI signaling. More precisely, as designated in Table 1, those features are Courtesy Transfer-V, Consult and Transfer-V, and Conference and Transfer-V. For these features, all interactions between the RP and the Network will be accomplished using DMTF tones and/or ISDN D-channel signaling.

2.1 Courtesy Transfer

This is the most basic form of the Transfer Connect Service. An incoming toll free call is routed to the RP. If the RP determines that the call should be redirected, it proceeds with the transfer using in-band DTMF

tones (IB-triggers) and/or out-of-band (OOB triggers/data) ISDN signaling. If the customer subscribes to IB Triggers and no OOB Data Forwarding, once a valid TP number has been entered, the Network drops the RP and connects the CP and TP. Note that if the TP is busy, the Network will play a busy tone or an announcement to the CP and terminate the call after the appropriate timer expiry.

If the customer subscribes to IB Triggers and OOB Data Forwarding (i.e., data forwarded using the DISCONNECT message), once a valid TP number has been entered, the network starts a 3-second timer and waits for the DISCONNECT message containing data from the RP before dropping the RP from the call. The network will drop the RP and connect the CP and TP if the timer expires.

2.2 Consult and Transfer

Unlike the case of the Courtesy Transfer, for Consult and Transfer, the RP remains on the redirected call until a successful connection is established between the CP and the TP.

2.3 Conference and Transfer

Conference and Transfer allows 3-way connections between the CP, RP, and TP. In addition, Conference and Transfer also supports private conversation between the RP and the TP while the CP is on hold.

3. Dialing Options

As suggested in the previous sections, there are two dialing options available for redirecting a call:

1. Direct dialing - the standard method of dialing. To direct dial a TP, the RP issues *T followed by the direct dial telephone number of the TP.
2. Speed dialing – this method allows the subscriber (RP) to use pre-determined codes to replace direct dial telephone numbers. The direct dial telephone numbers and associated Speed Dial Codes will be agreed to between the subscriber (RP) and AT&T prior to service turn-up. To use Speed Dial Codes to redirect a call, the RP issues *T followed by the associated pre-provisioned Speed Dial Code for the TP.

All RP redirection Speed Dial Code entries can be followed by an # (octothorpe). Use of the # character expedites the start of call processing, as it results in the immediate expiry of the last digit timer. Use of the # character with Speed Dial Code is recommended.

3.1 Direct Dial

The direct dial telephone number can be toll free 8YY or POTS. To direct dial the Target Party, the Redirecting Party can enter the toll free number of the Target Party in the format 1-8YY-NXX-XXXX or 8YY-NXX-XXXX. The POTS number of the Target Party can be entered in the format NXX-NXX-XXXX or 1-NXX-NXX-XXXX.

3.2 Speed Dial Codes

As discussed above, the RP may chose to use a Speed Dial Code in call redirection to the TP. Speed Dial Codes can be from 1 to 5 digits in length. The number of codes required by the subscriber will determine the length of the Speed Dial Code. For example, a Speed Dial Code that is 2 digits long will support 100 codes. The length of the Speed Dial Code may be between 1 and N digits long where N is the subscribed length. That is, if the subscribed length is 3, the RP may use a length of 1, 2, and/or 3 digits. The # terminator is recommended for the use with Speed Dial Codes.

If the RP has subscribed only to the Speed Dial Code redirection option, the Network will begin call processing upon receipt of the last digit of the speed dial code. If Speed Dial Code and direct dialing are provisioned, it is recommended that the # terminator be entered following the Speed Dial Code.

4. IN-BAND TRIGGERS AND DATA FORWARDING

The in-band form of the service supports both Human and VRU RPs (agents). Both types of agents will interact with the Network by issuing DTMF tones. However, the Network will provide updates and call progress information to the human RP via announcements while for the VRU call states and call progress updates are provided via DMTF tones.

The default network-side provisioning is for a human RP. Hence, for the VRU, a provisioning request should be made to ensure the delivery of the IB services tones.

Table 2 summarizes the in-band triggers (commands) and the features which use them. The triggers are discussed further in the subsequent sections.

DTMF Command	Function	Feature Applicability
*T (*8)	Request Transfer	All
H (4)	Request Help	Courtesy Transfer-H, Consult and Transfer-H Conference and Transfer-H
*H (*4)	Put Caller (CP) on hold	Consult and Transfer-H, Conference and Transfer-H
*R (*7)	Remove Caller (CP) from hold	Consult and Transfer-H, Consult and Transfer-V, Conference and Transfer-H, Conference and Transfer-V
X (9)	Drop Target Party (TP)	Consult and Transfer-H, Consult and Transfer-V Conference and Transfer-H, Conference and Transfer-V
***9	Enable/Disable Triggers (Send data in-band, including data that matches triggers, i.e., *T, **X, etc.). ***9 not permitted as data.	Conference and Transfer-H, Conference and Transfer-V
*D (*3)	Delete partially entered address digits (8YY, POTS, or Speed Dial Code)	Courtesy Transfer-H, Consult and Transfer-H Conference and Transfer-H
# (optional - Note, recommended for Courtesy Transfer to avoid expiry of 3sec timer)	Forces a dial timer in AT&T Network to expire. This also causes Speed Dial digits to be processed sooner, resulting in an expedited SD call. # is recommended for use with Speed Dialing.	All

Table 2. IB Triggers and Applicable Features

4.1 *Courtesy Transfer -Human --No Data*

This is item 01 of Table 1 and uses in-band (IB) signaling. Once the RP has answered the incoming toll free call, *T (*8) is entered to initiate the transfer. *T is followed by the telephone number of the TP. The Network automatically disconnects the RP upon receiving a valid TP number, and attempts to connect the CP and TP. Note, if the Network is unable to complete the redirection (i.e., TP currently on another call), announcements and/or tones will be played to the CP.

4.2 *Courtesy Transfer -Human --Data*

This is item 02 of Table 1 and uses in-band (IB) signaling. Once the RP has answered the incoming toll free call, *T (*8) is entered to initiate the transfer. *T is followed by the telephone number of the TP. Upon receiving a valid TP number from the RP, the Network waits for 3 seconds to receive an ISDN DISCONNECT message from the RP. Upon receiving the DISCONNECT message, the Network releases the RP and parses the DISCONNECT message for the User-to-User Information (UUI) element which contains the data to be forwarded. The Network then forwards the data to the TP in a SETUP message. Note that the redirection is initiated in-band. However, the data transfer occurs out-of-band by use of the UUI in the DISCONNECT and SETUP messages.

The UUI is encoded using Codeset 0 and/or Codeset 7 User-to-User Information Element. The following length restrictions apply and supersede those discussed in TR41459:

- If UUI is included in both Codeset 0 and 7 of the DISCONNECT message, then the combined length of both UUIs cannot exceed 106 octets, 100 of which will be data. If the restriction is violated one or both UUIs may be discarded. However, the redirection is completed.
- If UUI is included in either Codeset 0 or Codeset 7 (but not both) of the DISCONNECT message, the length is restricted to 103 octets, 100 of which will be data. If the restriction is violated the UUI will be discarded and the redirection is completed.

If the Network does not receive the DISCONNECT message within 3 seconds, it simply disconnects the RP.

For this application, Codeset 6 UUI is not supported and will be discarded by the Network. The redirection, however, will be completed. Recall also, **for this form of *Courtesy Transfer-H Data*, data forwarding can only be accomplished through the use of the OOB DISCONNECT message from the RP to the Network.** IB data is not supported.

4.3 *Courtesy Transfer -VRU --No Data*

This is item 03 of Table 1 and uses in-band (IB) signaling. This is similar to the *Courtesy Transfer-H – no data* case. However, for the VRU, the Network provides call progress information through the use of DMTF (IB) tones not network announcements.

4.4 *Courtesy Transfer -VRU --Data*

This is item 04 of Table 1 and uses in-band (IB) signaling. This is similar to the *Courtesy Transfer-H - data* case. However, for the VRU, the Network provides call progress information through the use of DMTF (IB) tones not network announcements.

As in the *Courtesy Transfer-H Data* case above, Codeset 6 UUI is not supported and will be discarded by the Network. The redirection, however, will be completed. Recall also, **for this flavor *Courtesy Transfer-V Data*, data forwarding can only be accomplished through the use of the OOB DISCONNECT message from the RP to the Network.** IB data is not supported.

4.5 *Consult and Transfer -Human --No Data*

This is item 07 of Table 1. Call redirection is initiated by issuing *T followed by the telephone number of the TP. However, for this feature the RP has additional options. The RP may remain on the call to verify the completion of the redirection. If the redirected call encounters ringing, network tones, or the TP is busy, the RP can retry the transfer or return to the CP which was automatically placed on hold when the transfer was initiated. To retry, the RP terminates the existing call by sending **X. The RP then re-enters *T followed by the telephone number of the TP. In re-attempting the redirection, the RP can try the same or a different TP. Once an answer is obtained from the TP, the RP is then removed from the call by the Network. If instead of re-attempting the transfer, the RP wishes to reconnect to the CP, it should follow the **X by *R.

4.6 Consult and Transfer -Human --Data

For the IB form of Consult and Transfer-H, neither IB nor OOB data forwarding is supported.

4.7 Consult and Transfer -VRU --No Data

This is item 08 of Table 1. This is similar to the Consult and Transfer-H feature. However, the RP will monitor call progress through DMTF (IB) tones instead of network announcements.

4.8 Consult and Transfer -VRU –Data

For the IB form of Consult and Transfer-V, neither IB nor OOB data forwarding is supported.

4.9 Conference and Transfer - Human --No Data

This is item 11 of Table 1. This feature supports **3-way calls between the CP, RP, and TP**. The redirection attempt limit is also 4. The RP completes the 3-way call by conferencing on the CP after the redirection sequence is entered. To execute the conference, the RP sends *R to the Network to remove the CP from hold.

This is the most versatile of the Transfer Connect Service features. All others are a subset of this feature. For example, if the RP redirects and immediately disconnects itself from the call, the feature functions as Courtesy Transfer.

4.10 Conference and Transfer - Human –Data

This item 12 of Table 1. This feature is an extension of its No Data counterpart. As such, the above description of *Conference and Transfer-H No Data* is fully applicable. As discussed above, *Conference and Transfer-H Data* enables the RP to forward data to the TP by first entering *****9**.

4.11 Conference and Transfer-VRU --No Data

This is item 13 of Table 1. This feature is similar in operation to its Conference and Transfer-H counterpart. However, here, the Network will interact with the VRU through DTMF tones.

4.12 Conference and Transfer-VRU –Data

This item 14 of Table 1. This feature is an extension of its No Data counterpart. As such, the above description of Conference and Transfer -VRU *No Data* is fully applicable. As discussed above, *Conference and Transfer-V Data* enables the RP to forward data to the TP by first entering *****9**.

NOTE: OOB Triggers and Data Forwarding, Items 5, 6, 9, 10, 15 and 16 from Table 1, are covered in Section 6 of this document.

4.13 Network Responses To IB Triggers

Table 3 indicates the DTMF tones that will be played to the VRU by the Network to indicate certain call conditions. The last column provides suggestions on how the VRU could be programmed to respond to these tones. Note, in the case of the Human RP, the Network will provide call progress information and instruction via announcements. The agent may then take actions similar to those recommended for the VRU RP.

DTMF Tones	Function	Suggested VRU Action
**1	Disconnecting Call due to CP drop off	Disconnect from Network
**5	Network cannot redirect, limits exceeded	Notify caller (CP) to retry or provide additional options
**6	Call being transferred	It is recommended that VRUs await these tones to ensure successful call redirection.
**7	Network did not receive or cannot recognize dialed number	Resend toll free number, POTS number, or SD code. Try different TP.
**8	Network received an Invalid command	Resend *T followed by toll free number, POTS number, or SD code

Table 3. IB Tones Played To VRU (RP) by Network

4.14 DIGIT COLLECTION

Digit collection refers to the collection of DTMF digits from the Redirecting Party. The following illustrates the time out specifications implemented in AT&T Toll Free Transfer Connect Service. The following time-out periods apply to DTMF digit generation.

Command Entry: Inter-digit time out = 3 seconds

The period of time between the initial command digit (i.e., ‘*’) and the next command digit.

Last digit time out = 0 seconds

Last digit time out is the period from the final digit entry until call processing begins. This only applies to 10/11 digit dialing. For the SDC option the Redirection Number Entry inter-digit timer is expired when the valid SDC string is terminated with the # key.

4.15 DTMF SPECIFICATIONS

These specifications are provided to help increase DTMF transmission accuracy. This helps to facilitate VRU and network inter-operability. The DTMF tones specified in this document conform to LATA Switching Systems Generic Requirements (LSSGR).ⁱⁱ This section lists some of the commonly known parameters from that document and also points out some of the differences required for AT&T Toll Free Transfer Connect Service. Note that specifications not explicitly mentioned in this section must conform to the LSSGR.

4.15.1 Pulsing Speed and Duration

For DTMF signaling to the Redirecting Party's VRU, the Network will send DTMF tones with 70ms digit duration and 70ms inter-digit silence.

For DTMF signaling to the Network, the Redirecting Party's VRU must send DTMF tones with at least 80ms of digit duration and 80ms of inter-digit silence.

4.15.2 Frequency Limits

The frequencies for each DTMF tone should be within ± 1.5 percent of nominal.

4.15.3 Amplitude Limits

The DTMF signals should be received in the range of 0 to -25 dBm per frequency with a 900-ohm line termination. The twist (amplitude difference) should be within the following limits: The high frequency amplitude up to 4 dB more or 8 dB less than the low frequency if both are in the 0 to -25 dBm range.

4.16 PROGRAMMING REDIALS

When a Redirecting Party is able to use a redial or autodial function for the redirection of a calling party (i.e.; *T + redirection number) a pause of at least 350ms must be applied between the *T and the redirection number or SD code. (The lower and upper bounds are 300ms - 11sec.)

5. ANNOUNCEMENTS

There are two sources of announcements. Outbound announcements are sent from the VRU (RP) to the CP and TP. Inbound announcements originate in the AT&T Network and are incoming to the RP, CP and/or the TP.

ⁱⁱRefer to Section 6.2.6.2 DTMF Signal detection of the Telcordia Technical Reference - LATA Switching Systems Generic Requirements (LSSGR), TR-NWT-000506, Issue 3, Sept. 1991. This document can be obtained from Telcordia by calling 1-800-521-2673.

5.1 Outbound

Outbound announcements are those that are generated by the VRU while it simultaneously performs a transfer. The use of echo cancelers and sound boosting as voice travels over the AT&T network may result in magnifying the distortion of poorly recorded announcements. Characteristics of poor recordings include: garbled announcements, high background noise, and inconsistent voice levels across multiple recordings.

To ensure the highest quality outbound announcement to your customer, it is important to use clearly recorded messages.

5.1.1 Recording Levels

When announcements are put on the AT&T network, the source level of the announcement should be transmitted at $-18\text{dBm}0 \pm 1\text{dBm}0$. This insures a good clear audible signal is heard by the calling party.

5.2 Inbound

Inbound announcements are those that are received by the CP, RP and/or TP from the AT&T network. These announcements can be in the form of a recorded human voice or DTMF status tones. DTMF tones are specifically designed to interface with VRUs. Refer to Table 3 in Section 4.13 above for more information on DTMF network responses to the VRU.

6. Out-Of-Band Triggers and Data

The Transfer Connect Out-Of-Band (OOB) service applies only to the VRU RP and enables the RP to use ISDN PRI D-channel signaling to accomplish what it previously did using DTMF tones. With the exception of **H (Help) and ***9, there is a one-to-one mapping between ISDN OOB Triggers and DTMF IB Triggers. To this end, the procedures and restrictions that pertain to the IB features apply directly to the OOB approach.

As alluded to above, for Out-Of-Band Triggers, the RP is required to have ISDN PRI, as OOB signaling occurs over the D-channel. For OOB Data Forwarding, both the RP and the TP must have ISDN PRI. The RP and TP must be directly connected to the AT&T Switched Network. The RP and TP also must have subscribed to AT&T Toll-Free MEGACOM Service. For OOB signaling two provisioning options are supported:

- the **RP must be provisioned for OOB Triggers only**, or
- the **RP must be provisioned for OOB Triggers and OOB Data Forwarding**.

If the RP subscribes to the OOB form of the service, the Network will ignore any IB tones issued by the RP for Transfer Connect Service request. That is, if the RP is provisioned for OOB signaling, the Network will ignore all IB Triggers, including ***9. Further, OOB signaling from the RP to the Network will cause the Network to send call progress information and error conditions to the RP out-of-band. OOB signaling between the RP and Network will be performed using the ISDN FACILITY and FACILITY_REJECT messages. The service permits call redirections in which the telephone number of the TP and the data are forwarded in a single FACILITY message. In some instances, two FACILITY

messages are permitted in which the first transports the TP's telephone number and optionally contains data. The second FACILITY transports only data.

For all OOB feature types involving data forwarding, the Network does validation of the TP's telephone number and the length of the data to be forwarded. If the validation fails because the TP's telephone number is a POTS number or because the data length exceeds 100 bytes, the Network still redirects the call and informs the RP of the failure. In doing so, the Network sends the RP FACILITY(Cause=43) to indicate the validation failure followed by FACILITY(ReturnResult) to confirm the redirection (without data).

The Transfer Connect Service initiation at the VRU is governed by its applications. Once the RP has determined that a Calling Party (CP) must be redirected, it initiates the transfer request by issuing a FACILITY message.

Table 4 outlines the Out-of-Band VRU RP commands and the features that use them. Each OOB command is similar to its IB counterpart and will be discussed further in the subsequent sections.

OOB Trigger FAC(OpVal)	Function	Feature Applicability
FAC(Redirect Call)	Request Transfer	All
FAC(put CP on hold)	Put CP on hold	Consult and Transfer-V Conference and Transfer - V
FAC(Retrieve CP from hold)	Reconnect Caller (CP) to Redirecting Party (RP)	Consult and Transfer-V, Conference and Transfer-V
FAC(Drop TP)	Drop Target Party (TP)	Consult and Transfer-V, Conference and Transfer-V
FAC(User Data Transfer)	Send data from RP	All

Table 4. OOB Triggers and Applicable Features

6.1 Courtesy Transfer --No Data

This is item 05 of Table 1. The RP is provisioned for OOB Triggers only. For this service, the RP issues only an OOB Trigger for call redirection. There is no request for data forwarding. The trigger is delivered to the Network in a FACILITY message partially encoded as follows:

FAC(NSF=Netwk Managed Data, OpVal=Redirect Call, UEC=TPNumber)

More complete requirements for message encoding are provided in Section 7.

In this implementation, the 3 second timer to await DISCONNECT from the RP does not apply and the Network disconnects the RP upon receiving the trigger. Prior to disconnecting the RP, the Network sends it a **FAC(Component_Type_Tag=ReturnResult)** confirming the redirection.

6.2 Courtesy Transfer --Data

This is item 06 of Table 1. The RP is provisioned for OOB Triggers and OOB Data Forwarding. Note, in this implementation **the RP is not allowed to send data in the DISCONNECT message**. For *Courtesy Transfer-V Data*, when provisioned for OOB Triggers and OOB Data Forwarding, the RP is required to send all data in the FACILITY message. Further, **the RP is required to include the redirection information and the data in a single FACILITY message**. That is, the RP cannot issue the redirection

information in one FACILITY followed by a second FACILITY containing the data, since the RP will be disconnected after the first FACILITY message as in the *Courtesy Transfer-V No Data* case above. Partial encoding of the FACILITY is indicated:

FAC(NSF=Netwk Managed Data, OpVal=Redirect Call, UEC=TP Number*,UUI=Data)

***Note: The TP's number cannot be POTS, nor can the Speed Dial Code map to a POTS number. If the TP's number is POTS, the call is transferred without data.**

The Network sends the RP a **FAC(Component_Type_Tag=ReturnResult)** confirming the redirection.

6.3 Consult and Transfer --No Data

This is item 09 of Table 1. A partial coding of the call redirection OOB trigger by the RP is:

FAC(NSF=Netwk Managed Data, OpVal=Redirect Call, UEC=TPNumber)

Here, the Network does not disconnect the RP until it has received a connect indication from the TP.

This feature supports greater application flexibility by enabling the RP to also issue the following OOB Triggers: *Put CP on Hold, Retrieve CP from Hold, Drop TP*. These triggers are partially encoded as:

FAC(NSF=Netwk Managed Data, OpVal=Hold Calling Party)

FAC(NSF=Netwk Managed Data, OpVal=Retrieve Calling Party)

FAC(NSF=Netwk Managed Data, OpVal=Drop Target Party)

Note, these triggers are only applicable prior to the TP's connection to the call, as the Network disconnects the RP once the TP connects. More complete requirements for message encoding are provided in Section 7.

6.4 Consult and Transfer - Data

This is item 10 of Table 1. A partial coding of the call redirection OOB trigger by the RP is:

FAC(NSF=Netwk Managed Data, OpVal=Redirect Call, UEC=TPNumber*,UUI=Data)

***Note: The TP's address digits cannot be POTS, nor can the SDC map to a POTS number. If the TP's number is POTS, the call is transferred without data.**

As in the *Courtesy Transfer-V Data* case, **trigger and data must be sent in a single FACILITY**. Here, however, the Network does not disconnect the RP until it has received a connect indication from the TP.

The following OOB Triggers are also supported:

FAC(NSF=Netwk Managed Data, OpVal=Hold Calling Party)

FAC(NSF=Netwk Managed Data, OpVal=Retrieve Calling Party)

FAC(NSF=Netwk Managed Data, OpVal=Drop Target Party)

Note, these triggers are only applicable prior to the TP's connection to the call, as the Network disconnects the RP once the TP connects. The Network sends the RP a **FAC(Component_Type_Tag=ReturnResult)** confirming each successful request.

6.5 Conference and Transfer --No Data

This is item 15 of Table 1. The RP redirects a toll free call by issuing the following FACILITY message:

FAC(NSF=Netwk Managed Data, OpVal=Redirect Call, UEC=TP Number)

Conference and Transfer (*Conference and Transfer-V No Data*) supports 3-way calls. To create a 3-way call, the RP conferences on the CP after the TP has answered. The RP issues the following for the conference request:

FAC(NSF=Netwk Managed Data, OpVal=Retrieve Calling Party).

If the RP issues the conference request prior to the TP answering, the CP will detect any in-band call progress information (e.g., ringing). Further, recall that it is necessary to conference the CP back onto the call, as the Network automatically places the CP on hold upon receiving the redirection request from the RP. The RP can perform up to three consecutive 3-way calls with a single CP by dropping the current TP, issuing a redirection request, and conferencing back on the CP. The following is the sequence of events:

FAC(NSF=Netwk Managed Data, OpVal=Drop Target Party)

FAC(NSF=Netwk Managed Data, OpVal=Redirect Call, UEC=TPNumber)

FAC(NSF=Netwk Managed Data, OpVal=Retrieve Calling Party)

6.6 Conference and Transfer –Data

This is item 16 of Table 1. The RP redirects a toll free call by issuing the following FACILITY message:

FAC(NSF=Netwk Managed Data, OpVal=Redirect Call, UEC=TP Number,[UUI=Data]*)

***Data may be optionally included in the redirection request.**

Conference and Transfer (*Conference and Transfer-V Data*) supports 3-way calls. To create a 3-way call, the RP conferences on the CP after the TP has answered. The RP issues the following for the conference request:

FAC(NSF=Netwk Managed Data, OpVal=Retrieve Calling Party).

In this case, data may be forwarded in a separate FACILITY message, which appears as follows:

FAC(NSF=Netwk Managed Data, OpVal=User Data Transfer)

6.7 Network Responses to OOB Triggers and Data Forwarding

Table 5 summarizes the call progress and call state information that the Network will provide to the RP. The Network issues a FAC(CT_Tag=RR) to confirm call redirection and the successful completion of other command requests (i.e., Drop TP). To indicate an error in the redirection number, a FAC(CT_Tag=ReturnError,Cause=28) is returned to the RP. If for any reason the Network is unable to

deliver the data (e.g., UUI length violation), a FAC(CT_Tag=ReturnError,Cause=43) will be delivered to RP.

Network Responses/ Cause Codes(CC) sent to RP	Interpretation	Applicable Service
FAC(CT_Tag=RR)	Redirection Launched, or Command Completed Successfully.	All
FAC(OpVal=Appl. Spec. Call Stat, CC=2)	CP has gone off Hold	All
FAC(OpVal=Appl. Spec. Call Stat, CC=3)	Terminating Call in 30 sec. due to CP's disconnect	Conference and Transfer-V
FAC(CT_Tag=RE^, CC=28)	Invalid Redirect Number or SDC	All
FAC(CT_Tag=RE, CC=42)	Redirect Limit exceeded or incomplete billing information	All
FAC(CT_Tag=RE, CC=43)	Unable to forward data	All
FAC(CT_Tag=RE, CC=63)	Invalid Trigger for current Call State	All
FAC_REJect(CC=96)	Mandatory IE missing (e.g., Param NSF or FIE)	All
FAC(CT_Tag=RE, CC=98)	Got OOB Trigger, expected IB Trigger	

Table 5. OOB Responses, Cause Codes and Interpretations

Please refer to TR 41459 for the complete list of ISDN PRI Cause Codes and their encoding as supported by the AT&T Network.

7. OOB Triggers and Data Forwarding Encoding

Described below are the FACILITY messages and their constituent information elements (IEs). It is recommended that the reader supplement this information with that from TR 41459 to develop their RP (VRU) application.

7.1 OOB Signaling - RP to Network

For a recommendation on *Codeset 0/7 User-User Information Element* encoding the user is referred to APPENDIX A in this document.

The following message is encoded to **initiate call redirection**.

- **Protocol Discriminator**
- **Call Reference Value**
- **Message Type = FACILITY**
- **Channel ID (optional)**
- **Network Specific Facilities**
 - **Parameterized/Binary = Parameterized**
 - **Feature/Service = Feature**
 - **Parameterized FACILITY Coding Value = Available Feature Indicator (01001)**
 - **Parameterized Field = Network Managed Data (0001110)**
- **Locking Shift to Codeset 6**
- **FACILITY**
 - **Service Discriminator = Supplementary Service Application (10001)**
 - **Component Type = invoke (10100001)**
 - * **Invoke Id Tag = invoke (00000010)**
 - * **Invoke Id = (odd number from 1-127)**
 - * **Operation Value Tag = invoke(00000010)**
 - * **Operation Value = Redirect Call (11001110)**
 - * **Q.931 IE Tag = 01000000**
 - + **User-User = Data to Forward (optional)**
 - + **Locking Shift to Codeset 6 (optional)**
 - + **User Entered Code = TP DN or SDC (optional) ^**
 - **Type of User Entered Code = Redirection Number (0100010)**
 - **Collect/Collected Indication = Collected**
 - **Value = TP DN or SDC (coded in IA5)**
 - + **Locking Shift Codeset 7 (optional)**
 - + **User-User = Data to Forward (optional)**

^ See below for detailed encoding of Redirection Number

Message 1. FACILITY - RP Call Redirection Request

Coding of Redirection Number

As outlined above, the RP indicates the redirection number of the TP by encoding the Codeset 6 User Entered Code (UEC) IE of the FACILITY message. The UEC is encoded as below:

Octet	Field	Bit(s)	Value	Meaning
1	Bit 8	8	0	Set Value
	IE Id	7-1	0000010	User Entered Code (UEC)
2	Length	8-1	0-255	
3	Bit 8	8	1	Set Value
	Type of UEC	7-1	0100010	Redirection Number
4	Bit 8	8	1	Set Value
	Collect or Collected Ind.	7-6	10	Collected User entered digits contained in the following octets
	T_out Interval	5-1	00000	Timeout Interval
5, etc	Extension	8	0	Multiple Octet Element
			1	Last Octet of Description
	UEC Digits	7-1	IA5 Char	Digits 0-9 (e.g., TP's Num)

Figure 1. Encoding Redirection Number of TP in the UEC IE

The following message is encoded to **request data forwarding**.

- **Protocol Discriminator**
- **Call Reference Value**
- **Message Type = FACILITY**
- **Channel ID (optional)**
- **Network Specific Facilities**
 - **Parameterized/Binary = Parameterized**
 - **Feature/Service = Feature**
 - **Parameterized FACILITY Coding Value = Available Feature Indicator (01001)**
 - **Parameterized Field = Network Managed Data (0001110)**
- **Locking Shift to Codeset 6**
- **FACILITY**
 - **Service Discriminator = Supplementary Service Application (10001)**
 - **Component Type = invoke (10100001)**
 - * **Invoke Id Tag = invoke(00000010)**
 - * **Invoke Id = (odd number from 1-127)**
 - * **Operation Value Tag = 00000010**
 - * **Operation Value = User Data Transfer (11010011)**
 - * **Q.931 IE Tag = 01000000**
 - + **User-User = Data to Forward (optional)**
 - * **Locking Shift Codeset 0/7 ^**
 - * **User-User = Data to Forward**

^ For OOB Data Forwarding, data is mandatory in either Codeset 0, 7, or both

Message 2. FACILITY - RP Data Forwarding Request

The following message is encoded to **request that CP be placed on Hold**.

- **Protocol Discriminator**
- **Call Reference Value**
- **Message Type = FACILITY**
- **Channel ID (optional)**
- **Network Specific Facilities**
 - **Parameterized/Binary = Parameterized**
 - **Feature/Service = Feature**
 - **Parameterized FACILITY Coding Value = Available Feature Indicator (01001)**
 - **Parameterized Field = Network Managed Data (0001110)**
- **Locking Shift to Codeset 6**
- **FACILITY**
 - **Service Discriminator = Supplementary Service Application (10001)**
 - **Component Type = invoke (10100001)**
 - * **Invoke Id Tag = invoke(00000010)**
 - * **Invoke Id = (odd number from 1-127)**
 - * **Operation Value Tag = 00000010**
 - * **Operation Value = Hold Calling Party (11001111)**

Message 3. FACILITY - RP request to put CP on Hold

The following message is encoded to **retrieve the CP from Hold**.

- **Protocol Discriminator**
- **Call Reference Value**
- **Message Type = FACILITY**
- **Channel ID (optional)**
- **Network Specific Facilities**
 - **Parameterized/Binary = Parameterized**
 - **Feature/Service = Feature**
 - **Parameterized FACILITY Coding Value = Available Feature Indicator (01001)**
 - **Parameterized Field = Network Managed Data (0001110)**
- **Locking Shift to Codeset 6**
- **FACILITY**
 - **Service Discriminator = Supplementary Service Application (10001)**
 - **Component Type = invoke (10100001)**
 - * **Invoke Id Tag = invoke(00000010)**
 - * **Invoke Id = (odd number from 1-127)**
 - * **Operation Value Tag = 00000010**
 - * **Operation Value = Retrieve Calling Party (11010000)**

Message 4. FACILITY - RP request to retrieve CP from Hold

The following message is encoded to **drop the TP from the call**.

- **Protocol Discriminator**
- **Call Reference Value**
- **Message Type = FACILITY**
- **Channel ID (optional)**
- **Network Specific Facilities**
 - **Parameterized/Binary = Parameterized**
 - **Feature/Service = Feature**
 - **Parameterized FACILITY Coding Value = Available Feature Indicator (01001)**
 - **Parameterized Field = Network Managed Data (0001110)**
- **Locking Shift to Codeset 6**
- **FACILITY**
 - **Service Discriminator = Supplementary Service Application (10001)**
 - **Component Type = invoke (10100001)**
 - * **Invoke Id Tag = invoke(00000010)**
 - * **Invoke Id = (odd number from 1-127)**
 - * **Operation Value Tag = 00000010**
 - * **Operation Value = Drop Target Party (11010001)**

Message 5. FACILITY - RP request TP be drop from the Call

7.2 OOB Signaling - Network to RP

The Network issues the following message to **confirm the launching of a call redirection**.

- **Protocol Discriminator**
- **Call Reference Value**
- **Message Type = FACILITY**
- **Locking Shift to Codeset 6**
- **FACILITY**
 - **Component Type Tag = Return Result (10100010)**
 - **Component Length**
 - **Invoke Id Tag = invoke(00000010)**
 - **Invoke Id Length**
 - **Invoke Id = Value received in FAC from RP**
 - **Sequence Tag = 00110000**
 - **Sequence Length**
 - **Operation Value Tag = 00000010**
 - **Operation Value Length**
 - **Operation Value = Redirect Call**

Message 6. FACILITY - Call Redirection Confirmation from Network

The following message is sent from the Network to the RP to **indicate that the CP is off Hold (CauseCode=2) or that the call will be terminated in 30 seconds because the CP has dropped off the call while on Hold (CauseCode=3)**.

- **Protocol Discriminator**
- **Call Reference Value**
- **Message Type = FACILITY**
- **Channel ID (optional)**
- **Network Specific Facilities**
 - **Parameterized/Binary = Parameterized**
 - **Feature/Service = Feature**
 - **Parameterized FACILITY Coding Value = Available Feature Indicator (01001)**
 - **Parameterized Field = Network Managed Data (0001110)**
- **Locking Shift to Codeset 6**
- **FACILITY**
 - **Service Discriminator = Supplementary Service Application (10001)**
 - **Component Type = invoke (10100001)**
 - * **Invoke Id Tag = invoke(00000010)**
 - * **Invoke Id = (odd number from 1-127)**
 - * **Operation Value Tag = 00000010**
 - * **Operation Value = Application Specific Call Status (11010010)**
 - * **Q.931 IE Tag = 01000000**
 - + **Cause IE**
 - **Coding Standard = Standard Specific to Location (11)**
 - **Location = Public Netwk Serving Remote User (0100)**
 - **Cause Code = 2/3**

Message 7. FACILITY- Network to RP: CP off Hold or Call will be dropped in 30 sec.

7.2.1 Network Response to Error Conditions

The Network returns the following to **indicate a service violation**:

- **Protocol Discriminator**
- **Call Reference Value**
- **Message Type = FACILITY**
- **Locking Shift to Codeset 6**
- **FACILITY**
 - **Component Type Tag = Return Error (10100011)**
 - **Component Length**
 - **Invoke Id Tag = invoke(00000010)**
 - **Invoke Id Length**
 - **Invoke Id = Value received in FAC from RP**
 - **Error Value Tag = 00110000**
 - **Error Value Length**
 - **Error Value = Operation Value received in FAC from RP**
 - **Q.931 IE Tag = 01000000**
 - + **Cause IE**
 - **Coding Standard = Standard Specific to Location (11)**
 - **Location = Public Netwk Serving Remote User (0100)**
 - **Cause Code = 28/42/43/63/98**

Message 8. FAC - Network to RP indicating Service Error

The Network sends the following message to the RP to **indicate a flow control problem**. On a per call basis, the Network utilizes an *octet credit algorithm* to ensure that an RP maintains a reasonable rate of request. The following message is sent when that rate is violated:

- **Protocol Discriminator**
- **Call Reference Value**
- **Message Type = FACILITY**
- **Channel ID (optional)**
- **Locking Shift to Codeset 6**
- **FACILITY**
 - **Service Discriminator = Supplementary Service Application (10001)**
 - **Component Type = reject (10100100)**
 - * **Invoke Id Tag = invoke(00000010)**
 - * **Invoke Id = Value received from RP**
 - * **Problem Tag = Invoke Problem (00000010)**
 - * **Problem Value = ^Resource Limitation (11010000)**

^ Resource Limitation is a new Problem Code in the Codeset 6 FIE.

Message 9. FACILITY - Network to RP indicating Flow Control Problems

Upon receiving this message, if provisioned for Data Forwarding, it is recommended that the RP adjust its rate to an average no greater than 10 octets per FACILITY IE per 100 millisecond. Otherwise, if not provisioned for Data Forwarding, the RP is recommended to adjust its rate to an average no greater than 2

octets per FACILITY IE per 100 millisecond. Note, **the Network does not act upon the request that resulted in the issuance of this message.**

The Network sends the following message to the RP to **indicate an incorrectly coded FACILITY IE.**

- **Protocol Discriminator**
- **Call Reference Value**
- **Message Type = FACILITY**
- **Channel ID (optional)**
- **Locking Shift to Codeset 6**
- **FACILITY**
 - **Service Discriminator = Supplementary Service Application (10001)**
 - **Component Type = reject (10100100)**
 - * **Invoke Id Tag = invoke (00000010)**
 - * **Invoke Id = Value received from RP**
 - * **Problem Tag = General Problem (10000000)**
 - * **Problem Value = Unrecognized Component (00000000)**

Message 10. FACILITY - Network to RP indicating incorrectly coded FIE

The Network responds with the following **FACILITY REJECT** message upon receipt of a FACILITY message with an **Operation Value but missing a Parameterized NSF IE:**

- **Protocol Discriminator**
- **Call Reference Value**
- **Message Type = FAC_REJ**
- **Cause IE**
 - **Coding Standard = Standard Specific to Location (11)**
 - **Location = Public Network Serving Remote User (0100)**
 - **Cause Code = 96 (Mandatory IE Missing)**

Message 11. FACILITY REJECT - Network to RP: OpVal but Param. NSF Absent

NOTE: See AT&T TR 41459 for a complete description of ISDN PRI Cause Codes.

8. Data Forwarding - Network to TP

For completeness, data forwarding between the Redirecting Party (RP) and the Target Party (TP) is discussed in this section. Data to be sent from the RP to the TP is first forwarded to the Network in FACILITY messages as discussed above. When the Network receives a single FACILITY message containing both the redirection number and the data to be forwarded (e.g., as in *Courtesy Transfer* or *Consult and Transfer*), the data is sent to the TP in the following SETUP message:

- **Protocol Discriminator**
- **Call Reference Value**
- **Bearer Capabilities**
- **Channel ID**
- **Calling Party Number = CP's DN (SID) [optional]**
 - Presentation Indicator = "presentation allowed" or "presentation restricted"
 - Numbering Plan ID = "ISDN Telephony numbering plan" or "private numbering plan"
 - Screening Indicator = "user provided, not screened," "user provided, verified and passed," "user provided, verified and failed" or "network provided"
- **Called Party Number = TP's DN (Redirection Number)**
 - Numbering Plan ID = "ISDN Telephony numbering plan" or "private numbering plan"
 - Type of Number = "national"
- **User-User IE**
- **Locking Shift to Codeset 6**
- **FACILITY IE**
 - Service Discriminator = "Supplementary Service Application"
 - Component = invoke (10100001)
 - Invoke ID tag = 00000010
 - Invoke ID = Odd Number (from 1-127)
 - Operation Value tag = 00000010
 - Operation Value = "Information Forwarding" [no response required]
 - Q.931 tag = 01000000
 - + User-User = User Data to forward
 - + Locking Shift to Codeset 7
 - + User-User IE

Message 12. SETUP - Network to TP with Forwarded Data

If the Network receives a FACILITY message from the RP containing data, as in the case of *Conference and Transfer*, the Network encodes the following FACILITY message to the TP:

- **Protocol Discriminator**
- **Call Reference Value**
- **Message Type = FACILITY**
- **Channel ID (optional)**
- **Locking Shift to Codeset 6**
- **FACILITY**
 - **Service Discriminator = Supplementary Service Application (10001)**
 - **Component Type = invoke (10100001)**
 - * **Invoke Id Tag = invoke (00000010)**
 - * **Invoke Id = (odd number from 1-127)**
 - * **Operation Value Tag = invoke(00000010)**
 - * **Operation Value = User Data Transfer (11010011)**
 - * **Q.931 IE Tag = 01000000**
 - + **User-User = Data to Forward**

Message 13. FACILITY - Network to TP with Forwarded Data

APPENDIX A - Recommended UII Coding for AT&T Toll-Free Transfer ConnectSM Service Data Forwarding Feature.

This appendix provides a suggested ISDN PRI User-user information (UII) element encoding format for use with the AT&T Toll-Free Transfer ConnectSM Service Data Forwarding feature.

Although the purpose of this suggested encoding format is to enhance the interoperability of various CPE when implementing this feature, its implementation is optional. As stated in AT&T Technical Reference TR 41459, the User-user information element, used as the data transport mechanism for this feature, is not interpreted by the AT&T network.

1. User-user Information Element Encoding for the AT&T Toll-Free Transfer ConnectSM Data Forwarding Feature

The User-user Information Element is used as the data transport mechanism for the AT&T Toll-Free Transfer ConnectSM Data Forwarding feature. The Protocol Discriminator (Octet 3) is encoded as User-specific protocol. Octet 4 shall be used as a User-user Application Identifier, in this case Toll-Free Transfer ConnectSM information. Octet 5, etc. consist of the data forwarding information associated with this feature.

Figure 1 provides an example of the User-user IE coding for this feature.

OCTET	FIELD	BITS	VALUE	MEANING
1	Extension	8	0	Multiple octet element
	Identifier	7-1	111 1110	User-user Information Element
2	Length	8-1	Binary	Length of UUI contents
3	Protocol Discriminator	8-1	0000 0000	User-specific protocol
4	User-user Application ID	8-1	0000 0001	Toll-Free Transfer Connect information
5, etc.	Data Forwarding Information	8-1		Data Forwarding Information

Figure 1. Suggested UUI Encoding for AT&T Toll-Free Transfer Connect Service Data Forwarding

Note: For the Toll-Free Transfer ConnectSM Data Forwarding application, the maximum length of the Codeset 0 or Codeset 7 User-user Information Element cannot exceed 103 octets (100 octets of data). The combined length of the Codeset 0 and Codeset 7 User-user IE cannot exceed 106 octets (100 octets of data).

2. User-User Application Identifier (Octet 4)

Octet 4 of the User-user information element is used to define the specific AT&T application associated with the data being forwarded. Table 1 provides the suggested Octet 4 codings for the Toll-Free Transfer ConnectSM Data Forwarding Feature as well as potential AT&T user-user applications.

Octet	User-user Application ID	Value	Meaning
4		0000 0000	Reserved for future AT&T user-user applications
	AT&T Toll-Free Transfer Connect	0000 0001	AT&T Toll-Free Transfer Connect information
		0000 0010 thru 0011 1111	Reserved for future AT&T user-user applications
		0100 0000 thru 1111 1111	User defined

Table 1. Suggested UUI IE, Octet 4 Encoding for Current and Potential AT&T UUI Applications

3. Data Forwarding Information Format (Octet 5, etc.)

Each specific item of information to be exchanged between users consists of an Information Tag, User Information Length and the User Information. An example of the Data Forwarding information format is provided in Table 2.

Octet 5, etc. - Data Forwarding information format:

Octet 5	Information Tag (see Table 4)
Octet 6	User Information Length (binary length of information in octets)
Octet 7	User Information (IA5 characters)
•	•
•	•
•	•
Octet 103	•

Table 2. Data Forwarding Information Format

Note: For the Toll-Free Transfer Connect Data Forwarding application, the maximum length of the Codeset 0 or Codeset 7 User-user Information Element cannot exceed 103 octets (100 octets of data). The combined length of the Codeset 0 and Codeset 7 User-user IE cannot exceed 106 octets (100 octets of data).

3.1 Information Tag

A single or multiple octet Information Tag may be used to define the type of information being forwarded. A listing of the Information Tags currently defined by AT&T for use with this feature is provided in Table 4.

Currently, only single octet Information Tags have been defined for use with this feature. As the need arises and all single octet Information Tag codepoints have been allocated, an extension mechanism shall be implemented to allow for multiple octet Information Tags. The eight bit Information Tag Extension used to indicate a multiple octet Information Tag shall be encoded as 0000 0000. This extension value will be followed by the binary length of the Information Tag in octets. An example of the use of this extension procedure is provided in Table 3. Examples of data forwarding using single and multiple octet Information Tags are provided in Figures 2 and 3 respectively.

Octet 5, etc. - Data Forwarding information format using multiple octet Information Tags.

Octet (5)	Information Tag Extension (0000 0000)
Octet (6)	Information Tag Length (binary - N octets)
Octet (7)	Information Tag
•	•
•	•
Octet (7+N)	User Information Length (binary length in octets)
Octet (8+N)	User Information
•	•
•	•
Octet 103	•

Table 3. Multiple Octet Information Tag Format

AT&T Toll-Free Transfer Connect SM Information Tag	BITS							HEX	
	8	7	6	5	4	3	2		1
Reserved by AT&T	0	0	0	0	0	0	0	0	00
			t	h	r	u			3F
User Defined	0	1	0	0	0	0	0	0	40
			t	h	r	u			7F
Continuation	1	0	0	0	0	0	1	0	82
Called Address	1	0	0	0	0	0	1	1	83
Accumulated Digits	1	0	0	0	1	0	0	0	88
Calling Address	1	0	0	0	1	0	1	1	8B
Reason	1	0	0	0	1	1	0	0	8C
Calling Party Name	1	0	0	0	1	1	0	1	8D
Original Called Name	1	0	0	0	1	1	1	1	8F
Redirecting Party Name	1	0	0	1	0	0	0	0	90
Originating Restrictions	1	0	0	1	0	0	1	0	92
Date	1	0	0	1	0	0	1	1	93
Target Party Name	1	0	0	1	0	1	1	0	96
Target Party Number	1	0	0	1	0	1	1	1	97
Redirecting Number	1	0	0	1	1	0	0	0	98
Original Called Number	1	0	0	1	1	0	0	1	99
Text	1	0	0	1	1	1	1	0	9E
Address	1	0	1	0	0	0	0	0	A0
Street	1	0	1	0	0	0	0	1	A1
City	1	0	1	0	0	0	1	0	A2
State	1	0	1	0	0	0	1	1	A3
Country	1	0	1	0	0	1	0	0	A4
Zip Code	1	0	1	0	0	1	0	1	A5
Time	1	0	1	0	0	1	1	0	A6
Number of Hops	1	0	1	0	0	1	1	1	A7
Account Number	1	0	1	0	1	0	0	0	A8
Social Security Number	1	0	1	0	1	0	0	1	A9
Confirmation Number	1	0	1	0	1	0	1	0	AA
Product Registration Number	1	0	1	0	1	0	1	1	AB

**Table 4. Suggested Encoding for AT&T Toll-Free Transfer Connect Service
Data Forwarding Information Tags**

1All other values are reserved.

Definitions of Information Tags

Continuation: Text which is associated with the previously tagged information.

Called Address: Text regarding the Called Number.

Accumulated Digits: Text regarding digits input by the Calling Party.

Calling Address: Text regarding the Calling Party's number.

Reason: Text regarding the reason for the call transfer.

Calling Party Name: Text regarding the Calling Party's name.

Original Called Name: Text regarding the original called party's name (i.e., first redirecting name).

Redirecting Party Name: Text regarding the Redirecting party's name.

Originating Restrictions: Text regarding restricting conditions that may apply to the Calling Party.

Date: Text in the form of mm-dd-yy

Target Party Name: Text regarding the Target Party's name.

Target Party Number: Text regarding the Target Party's number.

Redirecting Number: Text regarding the Redirecting Party's number.

Original Called Number: Text regarding the number originally dialed by the Calling Party.

Text: ASCII Text that does not have a specific tag.

Address: Address

Street: Street Name

City: City Name

State: State

Country: Country

Zip Code: Zip Code

Time: Text in the form of hh:mm am (or pm).

Number of Hops: Number of times a call was transferred after initial termination.

*NOTE: All Data Forwarding information should consist of IA5 characters.

4. Data Forwarding Information Coding Examples

Account Number (1234) and Calling Party Name (Ed Smith) included in User-user Information Element.

OCTET	FIELD	BITS	VALUE	MEANING
1	Extension	8	0	Multiple octet element
	Identifier	7-1	111 1110	User-user Information Element
2	Length	8-1	0001 0010	Length of contents (18 octets)
3	Protocol Discriminator	8-1	0000 0000	User-specific protocol
4	User-user Application ID	8-1	0000 0001	Toll-Free Transfer Connect information
5	Information Tag	8-1	1010 1000	Account Number
6	User Information Length	8-1	0000 0100	Four Octet Account Number
7	User Information	8-1	0011 0001	1
8			0011 0010	2
9			0011 0011	3
10			0011 0100	4
11	Information Tag	8-1	1000 1101	Calling Party Name
12	User Information Length	8-1	0000 1000	Eight Octet Name
13	User Information	8-1	0100 0101	E
14			0110 0100	d
15			0010 0000	space
16			0101 0011	S
17			0110 1101	m
18			0110 1001	i
19			0111 0100	t
20			0110 1000	h

Figure 2. Data Forwarding Information Encoding Example - Single Octet Information Tags

Use of a single octet Information Tag (Account Number) with four octets of user information, two octet Information Tag X (Hex 0101) with one octet of user information, and three octet Information Tag Y (Hex 010001) with two octets of user information.

OCTET	FIELD	BITS	VALUE	MEANING
1	Extension	8	0	Multiple octet element
	Identifier	7-1	111 1110	User-user Information Element
2	Length	8-1	0001 0110	Length of contents (22 octets)
3	Protocol Discriminator	8-1	0000 0000	User-specific protocol
4	User-user Application ID	8-1	0000 0001	Toll-Free Transfer Connect information
5	Information Tag	8-1	1010 1000	Account Number
6	User Information Length	8-1	0000 0100	Four Octet Account Number
7	User Information	8-1	0011 0001	1
8			0011 0010	2
9			0011 0011	3
10			0011 0100	4
11	Information Tag Extension	8-1	0000 0000	Information Tag Extension
12	Information Tag Length	8-1	0000 0010	Two octet Information Tag
13	Information Tag	8-1	0000 0001	Example Information Tag X
14			0000 0001	
15	User Information Length	8-1	0000 0001	One octet of User Information
16	User Information	8-1	IA5	User Information
17	Information Tag Extension	8-1	0000 0000	Information Tag Extension
18	Information Tag Length	8-1	0000 0011	Three octet Information Tag
19	Information Tag	8-1	0000 0001	Example Information Tag Y
20			0000 0000	
21			0000 0001	
22	User Information Length	8-1	0000 0010	Two octets of User Information
23	User Information	8-1	IA5	User Information
24			IA5	User Information

Figure 3. Data Forwarding Example - Single and Multiple Octet Information Tags