



APPENDIX **B**

Appendix: ISDN Switch Types, Codes, and Values

This appendix contains a list of the supported switch types. It also contains the ISDN cause codes, cause values, bearer capability values, and progress description field values that are valid within the **debug** commands for ISDN.



Note

The ITU-T carries out the functions of the former Consultative Committee for International Telegraph and Telephone (CCITT).

ISDN Switch Types

Table 420 lists the ISDN switch types supported by the ISDN interface.

Table 420 Supported ISDN Switch Types

Identifier	Description
basic-1tr6	German 1TR6 ISDN switches
basic-5ess	AT&T basic rate switches
basic-dms100	NT DMS-100 basic rate switches
basic-net3	NET3 ISDN and Euro-ISDN switches (UK and others), also called E-DSS1 or DSS1
basic-ni1	National ISDN-1 switches
basic-nwnet3	Norway Net3 switches
basic-nznet3	New Zealand Net3 switches
basic-ts013	Australian TS013 switches
none	No switch defined
ntt	Japanese NTT ISDN switches (ISDN BRI only)
primary-4ess	AT&T 4ESS switch type for the U.S. (ISDN PRI only)
primary-5ess	AT&T 5ESS switch type for the U.S. (ISDN PRI only)
primary-dms100	NT DMS-100 switch type for the U.S. (ISDN PRI only)
primary-net5	NET5 ISDN PRI switches (Europe)

Table 420 Supported ISDN Switch Types (continued)

Identifier	Description
primary-ntt	INS-Net 1500 for Japan (ISDN PRI only)
primary-ts014	Australian TS014 switches (ISDN PRI only)
vn2	French VN2 ISDN switches (ISDN BRI only)
vn3	French VN3 ISDN switches (ISDN BRI only)
vn4	French VN4 ISDN switches (ISDN BRI only)

ISDN Cause Code Fields

Table 421 lists the ISDN cause code fields that display in the following format within the **debug** commands:

```
i=0x y1 y2 z1 z2 [a1 a2]
```

Table 421 ISDN Cause Code Fields

Field	Value—Description
0x	The values that follow are in hexadecimal.
y1	8—ITU-T standard coding.
y2	0—User 1—Private network serving local user 2—Public network serving local user 3—Transit network 4—Public network serving remote user 5—Private network serving remote user 7—International network A—Network beyond internetworking point
z1	Class (the more significant hexadecimal number) of cause value. Refer to Table 422 for detailed information about possible values.
z2	Value (the less significant hexadecimal number) of cause value. Refer to Table 422 for detailed information about possible values.
a1	(Optional) Diagnostic field that is always 8.
a2	(Optional) Diagnostic field that is one of the following values: 0—Unknown 1—Permanent 2—Transient

The following is sample output of this form of the **debug isdn q931** command:

```
Cause i = 0x8790
```

ISDN Cause Values

Table 422 lists descriptions of the cause value field of the cause information element. The notes referred to in the Diagnostics column follow the table. For the **debug isdn q931** command output, drop the highest bit of the cause value before using this table. For example, a cause value of 0x90 becomes 0x10.

Table 422 ISDN Cause Values

Decimal Value	Hex Value	Cause	Diagnostics	Explanation
1	01	Unallocated (unassigned) number	Note 10	ISDN number was sent to the switch in the correct format; however, the number is not assigned to any destination equipment.
2	02	No route to specified transit network	Transit network identity (Note 9)	ISDN exchange is asked to route the call through an unrecognized intermediate network.
3	03	No route to destination	Note 10	Call was routed through an intermediate network that does not serve the destination address.
6	06	Channel unacceptable		Service quality of the specified channel is insufficient to accept the connection.
7	07	Call awarded and being delivered in an established channel		User is assigned an incoming call that is being connected to an already-established call channel.
16	10	Normal call clearing	Note 10	Normal call clearing has occurred.
17	11	User busy		Called system acknowledges the connection request but is unable to accept the call because all B channels are in use.
18	12	No user responding		Connection cannot be completed because the destination does not respond to the call.
19	13	No answer from user (user alerted)		Destination responds to the connection request but fails to complete the connection within the prescribed time. The problem is at the remote end of the connection.
21	15	Call rejected	Note 10—User supplied diagnostic (Note 4)	Destination is capable of accepting the call but rejected the call for an unknown reason.
22	16	Number changed		ISDN number used to set up the call is not assigned to any system.
26	1A	Non-selected user clearing		Destination is capable of accepting the call but rejected the call because it was not assigned to the user.

Table 422 ISDN Cause Values (continued)

Decimal Value	Hex Value	Cause	Diagnostics	Explanation
27	1B	Designation out of order		Destination cannot be reached because the interface is not functioning correctly, and a signaling message cannot be delivered. This might be a temporary condition, but it could last for an extended period of time. For example, the remote equipment might be turned off.
28	1C	Invalid number format		Connection could be established because the destination address was presented in an unrecognizable format or because the destination address was incomplete.
29	1D	Facility rejected	Facility identification (Note 1)	Facility requested by the user cannot be provided by the network.
30	1E	Response to STATUS ENQUIRY		Status message was generated in direct response to the prior receipt of a status enquiry message.
31	1F	Normal, unspecified		Reports the occurrence of a normal event when no standard cause applies. No action required.
34	22	No circuit/channel available		Connection cannot be established because no appropriate channel is available to take the call.
38	26	Network out of order		Destination cannot be reached because the network is not functioning correctly, and the condition might last for an extended period of time. An immediate reconnect attempt will probably be unsuccessful.
41	29	Temporary failure		Error occurred because the network is not functioning correctly. The problem will be resolved shortly.
42	2A	Switching equipment congestion		Destination cannot be reached because the network switching equipment is temporarily overloaded.
43	2B	Access information discarded	Discarded information element identifier(s) (Note 5)	Network cannot provide the requested access information.
44	2C	Requested circuit/channel not available		Remote equipment cannot provide the requested channel for an unknown reason. This might be a temporary problem.

Table 422 ISDN Cause Values (continued)

Decimal Value	Hex Value	Cause	Diagnostics	Explanation
47	2F	Resources unavailable, unspecified		Requested channel or service is unavailable for an unknown reason. This might be a temporary problem.
49	31	Quality of service unavailable	Table 421	Requested quality of service cannot be provided by the network. This might be a subscription problem.
50	32	Requested facility not subscribed	Facility identification (Note 1)	Remote equipment supports the requested supplementary service by subscription only.
57	39	Bearer capability not authorized	Note 3	User requested a bearer capability that the network provides, but the user is not authorized to use it. This might be a subscription problem.
58	3A	Bearer capability not presently available	Note 3	Network normally provides the requested bearer capability, but it is unavailable at the present time. This might be due to a temporary network problem or to a subscription problem.
63	3F	Service or option not available, unspecified		Network or remote equipment was unable to provide the requested service option for an unspecified reason. This might be a subscription problem.
65	41	Bearer capability not implemented	Note 3	Network cannot provide the bearer capability requested by the user.
66	42	Channel type not implemented	Channel Type (Note 6)	Network or the destination equipment does not support the requested channel type.
69	45	Requested facility not implemented	Facility Identification (Note 1)	Remote equipment does not support the requested supplementary service.
70	46	Only restricted digital information bearer capability is available		Network is unable to provide unrestricted digital information bearer capability.
79	4F	Service or option not implemented, unspecified		Network or remote equipment is unable to provide the requested service option for an unspecified reason. This might be a subscription problem.
81	51	Invalid call reference value		Remote equipment received a call with a call reference that is not currently in use on the user-network interface.
82	52	Identified channel does not exist	Channel identity	Receiving equipment is requested to use a channel that is not activated on the interface for calls.

Table 422 ISDN Cause Values (continued)

Decimal Value	Hex Value	Cause	Diagnostics	Explanation
83	53	A suspended call exists, but this call identity does not		Network received a call resume request. The call resume request contained a Call Identify information element that indicates that the call identity is being used for a suspended call.
84	54	Call identity in use		Network received a call resume request. The call resume request contained a Call Identify information element that indicates that it is in use for a suspended call.
85	55	No call suspended		Network received a call resume request when there was not a suspended call pending. This might be a transient error that will be resolved by successive call retries.
86	56	Call having the requested call identity has been cleared	Clearing cause	Network received a call resume request. The call resume request contained a Call Identity information element, which once indicated a suspended call. However, the suspended call was cleared either by timeout or by the remote user.
88	58	Incompatible destination	Incompatible parameter (Note 2)	Indicates that an attempt was made to connect to non-ISDN equipment. For example, to an analog line.
91	5B	Invalid transit network selection		ISDN exchange was asked to route the call through an unrecognized intermediate network.
95	5F	Invalid message, unspecified		Invalid message was received, and no standard cause applies. This is usually due to a D-channel error. If this error occurs systematically, report it to your ISDN service provider.
96	60	Mandatory information element is missing	Information element identifier(s) (Note 5)	Receiving equipment received a message that did not include one of the mandatory information elements. This is usually due to a D-channel error. If this error occurs systematically, report it to your ISDN service provider.
97	61	Message type non-existent or not implemented	Message type	Receiving equipment received an unrecognized message, either because the message type was invalid or because the message type was valid but not supported. The cause is due to either a problem with the remote configuration or a problem with the local D channel.

Table 422 ISDN Cause Values (continued)

Decimal Value	Hex Value	Cause	Diagnostics	Explanation
98	62	Message not compatible with call state or message type non-existent or not implemented	Message type	Remote equipment received an invalid message, and no standard cause applies. This cause is due to a D-channel error. If this error occurs systematically, report it to your ISDN service provider.
99	63	Information element non-existent or not implemented	Information element identifier(s) (Notes 5, 7)	Remote equipment received a message that includes information elements, which were not recognized. This is usually due to a D-channel error. If this error occurs systematically, report it to your ISDN service provider.
100	64	Invalid information element contents	Information element identifier(s) (Note 5)	Remote equipment received a message that includes invalid information in the information element. This is usually due to a D-channel error.
101	65	Message not compatible with call state	Message type	Remote equipment received an unexpected message that does not correspond to the current state of the connection. This is usually due to a D-channel error.
102	66	Recovery on timer expires	Timer number (Note 8)	Error-handling (recovery) procedure was initiated by a timer expiry. This is usually a temporary problem.
111	6F	Protocol error, unspecified		Unspecified D-channel error when no other standard cause applies.
127	7F	Internetworking, unspecified		Event occurred, but the network does not provide causes for the action that it takes. The precise problem is unknown.

Note 1: The coding of facility identification is network dependent.

Note 2: Incompatible parameter is composed of incompatible information element identifier.

Note 3: The format of the diagnostic field for causes 39, 3A, and 41 is shown in the ITU-T Q.850 specification, Table 3b/Q.850.

Note 4: User-supplied diagnostic field is encoded according to the user specification, subject to the maximum length of the cause information element. The coding of user-supplied diagnostics should be made in such a way that it does not conflict with the coding described in [Table 421](#).

Note 5: Locking and non-locking shift procedures described in the ITU-T Q.931 specification apply. In principle, information element identifiers are in the same order as the information elements in the received message.

Note 6: The following coding is used:

- Bit 8—extension bit
- Bit 7 through 5—spare

- Bit 4 through 1—according to Table 4-15/Q.931 octet 3.2, channel type in ITU-T Q.931 specification

Note 7: When only locking shift information element is included and no variable length information element identifier follows, it means that the codeset in the locking shift itself is not implemented.

Note 8: The timer number is coded in IA5 characters. The following coding is used in each octet:

- Bit 8—Spare “0”
- Bit 7 through 1—IA5 character

Note 9: The diagnostic field contains the entire transit network selection or network-specific facilities information element, as applicable.

Note 10: See [Table 421](#) for the coding that is used.

ISDN Bearer Capability Values

[Table 423](#) lists the ISDN bearer capability values that display in the following format within the **debug** commands:

- 0x8890 for 64 kbps or
- 0x8890218F for 56 kbps
- 0x8090A2 for Voice call (mu-law)
- 0x9090A2 for Voice call (mu-law)
- 0x8090A3 for Voice call (a-law)
- 0x9090A3 for Voice call (a-law)

Table 423 ISDN Bearer Capability Values

Field	Value—Description
0x	Indication that the values that follow are in hexadecimal
88	ITU-T coding standard; unrestricted digital information
90	Circuit mode, 64 kbps
21	Layer 1, V.110/X.30
8F	Synchronous, no in-band negotiation, 56 kbps
0x8090A2	Voice call (mu-law)
0x9090A2	Voice call (mu-law), 3.1 kHz Audio
0x8090A3	Voice call (a-law)
0x9090A3	Voice call (a-law), 3.1 kHz Audio

ISDN Progress Field Values

[Table 424](#) lists the values of the Progress description field contained in the ISDN Progress indicator information element.

Table 424 *ISDN Progress Description Field Values*

Bits	Decimal Number	Description
0000001	1	Call is not end-to-end ISDN; further call progress information may be available in-band
0000010	2	Destination address is non-ISDN
0000011	3	Origination address is non-ISDN
0000100	4	Call has returned to the ISDN
0001000	8	In-band information or appropriate pattern now available
0001010	10	Delay in response at destination interface

All other values for the progress description field are reserved.

