SYSTEM 922

PFT for DS1 Robbed Bit
and ISDN PRI

System 922 Reference Document

Covers topics including Robbed Bit and ISDN PRI

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The System 922 Table of Contents

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The System 922

The document describes the System 922 menu system for T1 Robbed Bit, ISDN, and NFAS—Dual Interface, version 1.02, dated 20-Feb-2002.

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Introduction to the System 922

The System 922, a completely self-contained backup phone system, extends the concept of power-failure transfer (PFT) to ISDN PRI or T1 Robbed Bit circuits. The System 922 goes to work automatically when normal operation of customer-premise equipment is inhibited due to a power failure, software problem, or hardware malfunction.

When such a failure occurs, the System 922 immediately takes control of one or two DS1s. A blue alarm is sent to the central office to disconnect all calls. Personnel at the site are then able to receive inbound calls and place outbound calls with minimal interruption.

When the failure is corrected, the System 922 sends a blue alarm to the central office to disconnect all calls. The system then reconnects the CPE to the central office and resumes normal CPE operation.

A single-cabinet, wall-mounted unit, the System 922 is connected between the customer-premise equipment (CPE DS1) and the DS1 network. It combines the capabilities of a channel bank with integrated channel service unit (CSU), an automatic call distributor (ACD), a 2-channel recorder/announcer, and a 48 port micro-PBX.

Communication to user screens is by RS-232: 9600 BPS, 8-N-1, XON/XOFF. VT-100 terminal emulation is used for display and keyboard operation. Configuration and status screens are selected from the main menu. Online help is available from all screens by pressing <F1>. Screens are quickly configured in real time and shown in real time. Once a screen has been selected, pressing <ESC> <F4> or <ESC> <F3> skips to the next or previous screen without going to the main menu.

Note that the front panel contact alarm status LEDs flash on and off if the factory default condition was set due to a corrupted database. Go to screen 20 and do restore factory defaults and profile database to stop the LEDs from flashing.

The System 922 is designed to work with PRIs that support D-channel backup. Please note that the central office network will route calls to the CPE rather than the System 922 if either primary or secondary PRI is connected to the CPE. When both primary and secondary PRI are disconnected from the CPE the primary PRI will connect to the System 922 and process calls.

The System 922 Help Menu

Abbreviations and Terminology

ACD: Automatic Call Distribution. Routes incoming calls to analog ports as required. The system provides 32 ACD groups, one for each analog port.

Bearer Channel: Contains digital information for delivery to the end user.

Blue Alarm: Pattern sent by T1 carrier to indicate an idle line. The pattern is all ones, including the framing bit. Also known as Alarm Indication Signal (AIS).

Bonding: Pre-ISDN feature that combines multiple calls to increase data transfer rate. Receiver must adjust for multipath delays. Also see multirate.

CAS: Channel Associated Signaling. See E1 CAS.

CPE: Customer Premise Equipment. Equipment connected to network.

Call by call: Calls are routed by their called number, not the channel they come in on.

DCN: Digital Channel Number.

DNIS: Dialed Number Inbound Service. Inbound calls are routed according to the called number.

DTMF: Dual Tone Multiple Frequency. Tones used for dialing numbers. Also known as touch tones.

Data Channel: Contains signaling information.

E1: Trunk operating at 2.048 MBPS. E1 contains 30 bearer channels, one data channel, and one framing channel.

E1 CAS: E1 Channel Associated Signaling. The data channel contains a set of signaling bits associated with specific bearer channels. DNIS is accomplishing using in-band MF (multi frequency) tones. E1 CAS is not supported by this system.

E1 ISDN: E1 Integrated Services Digital Network. The data channel contains ISDN signaling.

Euro ISDN: European ISDN defined by European Telecommunications Standards Institute (ETSI). Also known as NET5 and V5. Besides allowing 30 bearer channels, there are some subtle differences between Euro ISDN and its North American counterpart. Euro ISDN does not require the user to send a channel ID information element, giving network side full control of channel selection and eliminating glare. Channels are always enabled. Overlap dialing is allowed in the user to network direction, eliminating outbound number configuration on the user side. Provides a sending complete information element that indicates the called number is complete or there is no called number. Does not allow NFAS (non-facility associated signaling) and hence eliminates the need for backup D-channel signaling. Euro ISDN sends calling name using the Display IE where as North American NI-2 did not support calling name and NI-3 uses the Facility IE.

En-bloc: The called number is sent all at once as opposed to overlap dialing which sends the digits one at a time. Dial tone is supplied locally.

FSK: Frequency Shift Keying. A modulation technique used for sending in-band Caller ID and Message Waiting.

Glare: User and network sides simultaneously seize the same channel, creating a conflict.

Layer 2: Provides error-free communication between the network and user. Also known as the data link layer. Layer 2 down indicates that communication has not be established.

Multirate: ISDN feature that uses multiple channels during a single call to increase data transfer rate. This system supports multirate calls through the redirect facility. Also see bonding.

NFAS: Non-facility associated signaling. ISDN feature that allows one D-channel to provide signaling for multiple DS1s.

Overlap: The called number is sent one digit at a time as opposed to en-bloc dialing which sends the digits all at once. Dial tone is supplied by the near end.

The System 922 Help Menu

Abbreviations and Terminology (continued)

PRI: Primary Rate Interface. ISDN over T1 or E1.

Pulse Dialing: Dialing accomplished by breaking of DC current, or the analog or digital equivalent. Pulse dialing is not supported by this system.

QSIG: Switch emulation for linking PBXs on a private network. Similar to Euro ISDN.

RBS: Robbed Bit Signaling. See T1 RBS.

Switch Hook Flash: A method for changing the call state by depressing the receiver hook for one second. Switch hook flash is supported by this system.

T1: Trunk operating at 1.544 MBPS. Contains 24 channels.

T1 ISDN: T1 Integrated Services Digital Network. T1 trunk containing 23 bearer channels and one ISDN signaling channel.

T1 RBS: T1 Robbed Bit Signaling. T1 trunk containing 24 bearer channels and no data channels. Signaling is accomplished by stealing one bit from each bearer channel.

Yellow Alarm: Pattern sent by T1 carrier to indicate loss of frame synchronization.

Standards

The signaling standards used by this system are: Layer-1: ITU-T G.703, G.704, G.706. 4ESS Custom: AT&T TR 41459 ISDN PRI Interface Specification. 5ESS Custom: Lucent 235-900-332 and Lucent 235-900-342 ISDN PRI Specification. DMS100 Custom: Nortel NIS A211-1 ISDN PRI Access User-Network Interface Specification. Integrated Digital Loop Carrier System and Interface. NI-2: ITU-T Q.921 for layer 2 and Q.931 for layer 3. RBS: EIA 464B PBX Switching Equipment for Voiceband Application.

VT-100 Display Standards: The VT-100 display codes used by this system are ^[[2J for clear screen, ^[[0m for normal video, ^[[7m for reverse video, and ^[[row;columnf for row and column screen position. ^[represents ASCII ESC.

VT-100 Keyboard Standards: The VT-100 keyboard codes used by this system are ^[OP for F1, ^[OQ for F2, ^[OR for F3, ^[OS for F4, ^[[A for up, ^[[B for down, ^[[C for right, and ^[[D for left. ^[represents ASCII ESC.

Front Panel

System Power Switch: Select ON or OFF. Provides internal power.

+8V and -8V LEDs: Indicates whether internal power is active. Both LEDs should be on when the system is on and both LEDs should be off when the system is off.

87VAC Active LED: Indicates whether internal alerting voltage is active. To save power, the alerting voltage is active only when needed.

Contact Input 1-2 LEDs: Indicates the contact status before any time delays. Lit if alarm is active and extinguished if alarm is not active. The contact inputs contain a checksum and if not valid flash the contact input and carrier loss LEDs on and off and inhibit the network from connecting to the system. This condition is cleared by changing the contact input configuration. The contact input LEDs also flash on and off if the factory default condition was set due to a corrupted database. Go to screen 20 and do RESTORE FACTORY DEFAULTS AND PROFILE DATABASE to stop the contact input LEDs from flashing.

CPE DS1 A-B Fail LEDs: Indicates the carrier status before any time delays. Lit if alarm is active and extinguished if alarm is not active. The carrier loss operations contain a checksum and if not valid flashes the LEDs on and off and inhibit the network from connecting to the system. This condition is cleared by changing the contact input configuration.

The System 922 Help Menu

Front Panel (continued)

Network DS1 A-B Status LEDs: Indicates transfer relay status. Lit when network is connected to system and extinguished when network is connected to CPE. LED flashes on and off when network is connected to system but incoming DS1 is not synchronized.

Network DS1 A-B Manual Operation Switches: Select SEIZE NETWORK DS1 or RETURN NETWORK DS1 TO CPE DS1. Seize network DS1 forces the system into transfer mode. Return network DS1 to CPE DS1 allows the transfer relays to return to pass-through mode if no other alarms are present.

Left Side Panel

The left side panel contains analog port connections

Analog Port 1 & 2 are two 6-pin RJ11 jacks. They are wired in parallel to analog ports 1-2 below.

Analog Port 1-24 and Analog Port 25-48 are two 50-pin jacks wired for connection to two 25-port telephone blocks. The last port on each block is not used.

Right Side Panel

The right side panel contains connections for the digital interface, configuration port, contact input and outputs, and power supply.

DS1A network is an 8-pin jack wired for connection to the central office. DS1A CPE is an 8-pin jack wired for connection to the customer premise equipment. Normally the system connects the two together in by-pass mode. When a problem is detected, the system breaks the connection and connects itself to the central office, sending a keep alive signal to the CPE.

DS1B network and DS1B CPE is a second digital interface.

Configuration port is a 25 pin RS-232 female connector for connection to a DCE (data communication equipment) running at 9600 baud, 8-N-1.

The 8-pin terminal strip is for connection to contact input and outputs. Status contact DS1B is pins 7-8. It is controlled by a relay that closes when digital interface B is in transfer mode. Status contact DS1A is pins 5-6. It is controlled by a relay that closes when digital interface A is in transfer mode. Contact input 2 is pins 3-4. Contact input 1 is pins 1-2. Contact inputs force the system into transfer mode (when configured).

48 Volt DC is delivered to a 3 pin jack. –48 VDC is pin 3. +48 VDC is pin 2. Ground is pin 1.

A safety ground screw is provided at the panel bottom.

Card Slots

The system contains eight card slots. The backplane connectors are mechanically keyed so that cards cannot be inserted into the wrong slot.

From left to right:

Card Slots 1-6: Analog Cards

Card Slot 7: Processor Card

Card Slot 8: Digital Interface Card

Robbed Bit Signaling

There are three types of RBS protocols: E&M, ground start, and loop start. E&M is the preferred method for PBXs. Loop start is what a plain old telephone (POTS) uses. The following tutorial describes the differences between each.

E&M Signaling

E&M stands for ear and mouth, as one side's ear is the other's mouth. Network and user side are symmetrical. DID (direct inward dial), DOD (direct outward dial), and Tie Trunk utilize forms of E&M signaling. The A and B bits are identical and represent status: on and off.

E&M Signaling: User Initiated Call

	User to Network (User Output)		Network to User (Network Output)	
	A	B	A	B
Idle	0	0	0	0
User off hook	1	1-SETUP	0	0
If wink start is in effect:				
Wink setup (1)	1	1	1	1-RESERVED
Wink on (2)	1	1	1	1-WINK
End of wink	1	1	0	0-SETUP ACK
Dialing follows				
Await answer	1	1	0	0
Network answer (3)	1	1	1	1-CONNECT
Network disconnect (4)	1	1	0	0-DISC
User hangup (4)	0	0-DISC	0	0

Note: (1) Wink setup time is normally 100ms.
Note: (2) Wink duration is normally 200ms.
Note: (3) Start billing.
Note: (4) User hangup may come before or after network disconnect.

E&M Signaling: Network Initiated Call

	User to Network (User Output)		Network to User (Network Output)	
	A	B	A	B
Idle	0	0	0	0
Network seizure	0	0	1	1-SETUP
If wink start is in effect:				
Wink setup (1)	1	1-RESERVED	1	1
Wink on (2)	1	1-WINK	1	1
End of wink	0	0-SETUP ACK	1	1
Dialing follows				
Await answer	0	0	1	1
User answer (3)	1	1-CONNECT	1	1
User hangup (4)	0	0-DISC	1	1
Network disconnect (4)	0	0	0	0-DISC

Note: (1) Wink setup time is normally 100ms.
Note: (2) Wink duration is normally 200ms.
Note: (3) Start billing.
Note: (4) User hangup may come before or after network disconnect.

Robbed Bit Signaling (continued)

Ground Start Signaling

Ground start is very complex. Network and user side are not symmetrical. Status information is carried in both directions. Ring request information is carried in one direction. User A bit represents loop current (LC) used to detect off-hook. User B bit represents ring (outer) conductor. Network A bit represents tip (inner) conductor. Network B bit represents alerting current (AC) used to ring a bell. The ring conductor is the outer conductor of a bantum plug. It has nothing to do with alerting (ringing) a phone and is a source of confusion.

There are four types of ground start signaling:
FXS: Foreign Exchange Subscriber. What the user side sends to FXO.
FXO: Foreign Exchange Office. What the network side sends to FXS.
SAS: Special Access Subscriber. What the user side sends to SAO.
SAO: Special Access Office. What the network side sends to SAS.

A foreign exchange is a remotely located exchange that the subscriber is connected to. This normally will be a central office. Special access is a dedicated line through the central office connected directly to a long distance carrier. Note that FXO/SAO and FXS/SAS are similar except that some bits are inverted.

Ground Start Signaling: User Initiated Call

	User to Network (User Output) FXS/SAS		Network to User (Network Output) FXO/SAO	
	A (LC)	B (ring)	A (tip)	B (AC)
Idle	0	1/0	1/0	1
User grounds ring	0	0/1-SETUP	1/0	1
Network grounds tip (1)	0	0/1	0/1	1-SETUP ACK
User closes loop Dialing follows	1	1/0-CONNECT	0/1	1
Connected state	1	1/0	0/1	1
User hangup (2)	0	1/0-DISC	0/1	1
Network disconnect (2)	0	1/0	1/0	1-DISC

Note: (1) User should close loop within 50msec of network grounding tip.
Note: (2) User hangup may come before or after network disconnect.

Ground Start Signaling: Network Initiated Call

	User to Network (User Output) FXS/SAS		Network to User (Network Output) FXO/SAO	
	A (LC)	B (ring)	A (tip)	B (AC)
Idle	0	1/0	1/0	1
Network grounds tip	0	1/0	0/1	1-RESERVED
User alerted (1)	0	1/0	0/1	0-SETUP
Call present (1)	0	1/0	0/1	1
User answer (2)	1	1/0-CONNECT	0/1	1
Network disconnect (3)	1	1/0	1/0	1-DISC
User hangup (3)	0	1/0-DISC	1/0	1

Note: (1) Alternates between user alerted and call presentation.
Note: (2) Start billing.
Note: (3) User hangup may come before or after network disconnect.

Robbed Bit Signaling (continued)

Loop Start Signaling

Loop start was developed for telephone handset signaling. Network and user side are not symmetrical. On-hook/off-hook information is carried in one direction, and ring request information is carried in the other. User A bit represents loop current (LC) used to detect off-hook. User B bit is 1 for FXS/FXO, 0 for SAS/SAO. Network A bit represents loop current (LC) used for loop disconnect. Network B bit represents alerting current (AC) used to ring a bell.

There are four types of loop start signaling:
FXS: Foreign Exchange Subscriber. What the user side sends to FXO.
FXO: Foreign Exchange Office. What the network side sends to FXS.
SAS: Special Access Subscriber. What the user side sends to SAO.
SAO: Special Access Office. What the network side sends to SAS.

A foreign exchange is a remotely located exchange that the subscriber is connected to. This normally will be a central office. Special access is a dedicated line through the central office connected directly to a long distance carrier. Note that FXO/SAO and FXS/SAS are similar except that some bits are inverted.

Loop Start Signaling: User Initiated Call

	User to Network (User Output) FXS/SAS		Network to User (Network Output) FXO/SAO	
	A (LC)	B	A (LC)	B (AC)
Idle	0	1/0	0/1	1
User closes loop Dialing follows	1	1/0-CONNECT	0/1	1
Await answer	1	1/0	0/1	1
Network disconnect (1)	1	1/0	1/0	1-DISC
User hangup (1)	0	1/0-DISC	0/1	1

Note: (1) User hangup may come before or after network disconnect.

Loop Start Signaling: Network Initiated Call

	User to Network (User Output) FXS/SAS		Network to User (Network Output) FXO/SAO	
	A (LC)	B	A (LC)	B (AC)
Idle	0	1/0	0/1	1
User alerted (1)	0	1/0	0/1	0-SETUP
Await answer (1)	0	1/0	0/1	1
User answer (2)	1	1/0-CONNECT	0/1	1
Network disconnect (3)	1	1/0	1/0	1-DISC
User hangup (3)	0	1/0-DISC	0/1	1

Note: (1) Alternates between user alerted and await answer. If too much time passes between user alerted states, revert back to idle state.
Note: (2) Start billing.
Note: (3) User hangup may come before or after network disconnect.

The System 922 Main Menu

Configuration and status screens are selected from the main menu. Online help is available from all screens by pressing <F1>. Screens are quickly configured in real time and shown in real time. Once a screen has been selected, pressing <ESC> <F4> or <ESC> <F3> skips to the next or previous screen without going to the main menu.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer              Main 1

                              MAIN MENU

              1. DIGITAL INTERFACE CONFIGURATION
              2. CHANNEL CONFIGURATION
              3. CALLING NUMBER CONFIGURATION
              4. ANALOG PORT CONFIGURATION
              5. RECORDER/ANNOUNCER
              6. INBOUND MATCH CONFIGURATION
              7. ANALOG PORT DIALING CONFIGURATION
              8. ANALOG PORT OUTBOUND CALL CONFIGURATION
              9. ACD CONFIGURATION
             10. REDIRECT CONFIGURATION
             11. CPE DS1 MONITOR INTERFACE CONFIGURATION
             12. CONTACT INPUT CONFIGURATION
             13. DIGITAL INTERFACE CALL STATUS
             14. TRANSMISSION STATUS


             Enter Selection:

             Enter number or press Up/Down Arrow then <ENTER>
                   Press "x" exit, <F1> help, <F4> next
```

```
Gordon Kapes, Inc.          922 Power-Fail Transfer              Main 2

                              MAIN MENU

               15. DATA MONITOR
               16. TONE CONNECT TEST FUNCTIONS
               17. DIGITAL INTERFACE TEST FUNCTIONS
               18. DATA CAPTURE
               19. QUICK SYSTEM STATUS
               20. SAVE/RESTORE SYSTEM CONFIGURATION
               21. RESERVED FOR FUTURE USE
               22. RESERVED FOR FUTURE USE
               23. RESERVED FOR FUTURE USE
               24. TIME & DATE CONFIGURATION
               25. 939 ANALOG CARD CONFIGURATION
               26. SECURITY CONFIGURATION




             Enter Selection:

             Enter number or press Up/Down Arrow then <ENTER>
                Press "x" exit, <F1> help, <F3> previous
```

Digital Interface Configuration—Master

This screen configures the methods used for sending information across both digital interfaces. Press <ENTER> then Y to update both interfaces. Use detailed screens to configure individual interfaces.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 1-1

                DIGITAL INTERFACE CONFIGURATION - MASTER

Interface A Status:  PASS-THROUGH
Interface B Status:  PASS-THROUGH

Framing:           ESF (EXTENDED SUPERFRAME)* ALL DETAILED SCREENS MATCH
Line Coding:       B8ZS (ZERO SUPPRESSION)*   ALL DETAILED SCREENS MATCH
Line Build Out:    0dB*                       ALL DETAILED SCREENS MATCH
Switch Emulation:  NATIONAL ISDN-2*           ALL DETAILED SCREENS MATCH
Location:          MIXED*                     ALL DETAILED SCREENS MATCH
Channel Search:    DESCENDING SEQUENTIAL*     ALL DETAILED SCREENS MATCH









* Indicates factory default.

              Press Space Bar or Backspace then <ENTER>
          Press Arrow Keys, <F1> help, <F2> exit, <F4> next
```

Help for Digital Interface Configuration—Master

Interface Status: Shows CARD NOT PRESENT, PASS-THROUGH, RECEIVING BLUE ALARM, RECEIVING YELLOW ALARM, SYNCHRONIZED, NOT SYNCHRONIZED, or LAYER 2 DOWN. Indicates framing status of digital interface. Layer 2 down is applicable to ISDN digital interfaces only.

Framing: Select ESF (EXTENDED SUPERFRAME)* (default) or D4 (SUPERFRAME). ESF is required for ISDN.

Line Coding: Select B8ZS* (zero suppression) (default), AMI (no zero suppression), or ZCS (jammed bit). B8ZS stands for bipolar 8 zero suppression. B8ZS is the preferred method as it transparently maintains the one's density necessary for accurate clock recovery. AMI stands for alternate mark inversion with no zero suppression performed. ZCS stands for zero code suppression with destructive jammed bit insertion performed.

Line Build Out: Select 0dB* (default), –7.5dB, –15dB, or –22dB. Indicates strength of transmit signal. 0dB provides the strongest signal and –22dB provides the weakest.

Switch Emulation: Select NATIONAL ISDN-2* (default), NATIONAL ISDN-2 WITH NFAS, 4ESS CUSTOM, 4ESS CUSTOM WITH NFAS, 5ESS CUSTOM, 5ESS CUSTOM WITH NFAS, DMS100 CUSTOM, DMS100 CUSTOM WITH NFAS, or T1 ROBBED BIT SIGNALING. As of late 1997, all public switches support NATIONAL ISDN-2. Use National ISDN-2 for GTD5 and DMS250 switch emulation. 5ESS, DMS100, and GTD5 switches are end-node (central office) switches. 4ESS and DMS250 switches are tandem (interoffice) switches. NFAS stands for non-facility associated signaling and indicates that signaling is done on the D-channel of interface 1. Unless NFAS or dual DS1 is used, assume that each interface carries its own signaling. Some selections may not be available depending on how the system is licensed. <ENTER> must be pressed to change this feature. Changing this field causes all calls in progress to disconnect, the system to reboot, and the screen to be cleared.

Digital Interface Configuration—Master

Help for Digital Interface Configuration—Master (continued)

Channel Search: Select DESCENDING SEQUENTIAL* (default), ASCENDING SEQUENTIAL, COUNTER CLOCKWISE CIRCULAR, or CLOCKWISE CIRCULAR. Used for finding the next outbound idle bearer channel. Descending sequential starts searching from the highest channel. Ascending sequential starts searching from channel one. Counter clockwise circular starts one channel lower than the previously utilized channel, wrapping around from channel one to the highest channel. Clockwise circular starts one channel higher than the previously utilized channel, wrapping around from the highest channel to channel one. To reduce glare, descending sequential is appropriate for the user side.

After most selections the screen displays ALL DETAILED SCREENS MATCH, SOME DETAILED SCREENS MATCH, or NO DETAILED SCREENS MATCH. This indicates whether the selection matches the same field on the detailed screens.

Digital Interface Configuration—Detailed

This screen configures the methods used for sending information across the digital interface. There are two configuration screens, one for each digital interface. Use the master screen to simultaneously configure both interfaces.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 1-2

              DIGITAL INTERFACE 1 CONFIGURATION - DETAILED

Interface Status:   PASS-THROUGH

Framing:            ESF (EXTENDED SUPERFRAME)*
Line Coding:        B8ZS (ZERO SUPPRESSION)*
Line Build Out:     0dB*
Switch Emulation:   NATIONAL ISDN-2*
Channel Search:     DESCENDING SEQUENTIAL*









* Indicates factory default.

                 Press Space Bar or Backspace to select
    Press Arrow Keys, <F1> help, <F2> exit, <F3> previous, <F4> next
```

Help for Digital Interface Configuration—Detailed

Interface Status: Shows CARD NOT PRESENT, PASS-THROUGH, RECEIVING BLUE ALARM, RECEIVING YELLOW ALARM, SYNCHRONIZED, NOT SYNCHRONIZED, or LAYER 2 DOWN. Indicates framing status of digital interface. Layer 2 down is applicable to ISDN digital interfaces only.

Framing: Select ESF (EXTENDED SUPERFRAME)* (default) or D4 (SUPERFRAME). ESF is required for ISDN.

Line Coding: Select B8ZS* (zero suppression) (default), AMI (no zero suppression), or ZCS (jammed bit). B8ZS stands for bipolar 8 zero suppression. B8ZS is the preferred method as it transparently maintains the one's density necessary for accurate clock recovery. AMI stands for alternate mark inversion with no zero suppression performed. ZCS stands for zero code suppression with destructive jammed bit insertion performed.

Line Build Out: Select 0dB* (default), –7.5dB, –15dB, or –22dB. Indicates strength of transmit signal. 0dB provides the strongest signal and –22dB provides the weakest.

Switch Emulation: Select NATIONAL ISDN-2* (default), 4ESS CUSTOM, 5ESS CUSTOM, DMS100 CUSTOM, NFAS (USES INTERFACE A), or T1 ROBBED BIT SIGNALING. As of late 1997, all public switches support NATIONAL ISDN-2. Use National ISDN-2 for GTD5 and DMS250 switch emulation. 5ESS, DMS100, and GTD5 switches are end-node (central office) switches. 4ESS and DMS250 switches are tandem (interoffice) switches. NFAS (USES INTERFACE A) is available only on interface B. NFAS stands for non-facility associated signaling and indicates that signaling is done on the D-channel of interface A. Unless NFAS is used, assume that each interface carries its own signaling. Some selections may not be available depending on how the system is licensed. <ENTER> must be pressed to change this feature. Changing this field causes all calls in progress to disconnect, the system to reboot, and the screen to be cleared.

Digital Interface Configuration—Detailed

Help for Digital Interface Configuration—Detailed (continued)

Channel Search: Select DESCENDING SEQUENTIAL* (default), ASCENDING SEQUENTIAL, COUNTER CLOCKWISE CIRCULAR, or CLOCKWISE CIRCULAR. Used for finding the next outbound idle bearer channel. Descending sequential starts searching from the highest channel. Ascending sequential starts searching from channel one. Counter clockwise circular starts one channel lower than the previously utilized channel, wrapping around from channel one to the highest channel. Clockwise circular starts one channel higher than the previously utilized channel, wrapping around from the highest channel to channel one. To reduce glare, descending sequential is appropriate for the user side.

Channel Configuration—Master

This screen allows all channels on both digital interfaces to be blocked from processing calls. Press <ENTER> then Y to update all channels. Use detailed screens to configure individual channels. This screen may differ, depending on whether the interfaces are ISDN or RBS.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 2-1

                    CHANNEL CONFIGURATION - MASTER

Interface A Status:  PASS-THROUGH
Interface B Status:  PASS-THROUGH

Operation:          ENABLED*                  ALL DETAILED SCREENS MATCH
Service Update:     NONE*                     ALL DETAILED SCREENS MATCH









* Indicates factory default.

          Press Space Bar or Backspace to select then <ENTER>
           Press Arrow Keys, <F1> help, <F2> exit, <F4> next
```

ISDN Channel Configuration–Master Screen

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 2-1

                     CHANNEL CONFIGURATION - MASTER

Interface A Status:  NOT SYNCHRONIZED
Interface B Status:  PASS-THROUGH

Operation:          ENABLED*                  ALL DETAILED SCREENS MATCH
Direction:          TWO WAY*                  ALL DETAILED SCREENS MATCH
Signaling:          E&M WINK*                 ALL DETAILED SCREENS MATCH
Inbound Routing:    INBOUND MATCH*            ALL DETAILED SCREENS MATCH









* Indicates factory default.

           Press Space Bar or Backspace to select then <ENTER>
            Press Arrow Keys, <F1> help, <F2> exit, <F4> next
```

Robbed Bit Channel Configuration–Master Screen

Channel Configuration—Master

Help for Channel Configuration—Master

Interface Status: Shows CARD NOT PRESENT, PASS-THROUGH, RECEIVING BLUE ALARM, RECEIVING YELLOW ALARM, SYNCHRONIZED, NOT SYNCHRONIZED, or LAYER 2 DOWN. Indicates framing status of digital interface.

Operation: Select ENABLED* (default), DISABLED, MAINTENANCE, or EXCLUSIVE. Enabled makes all digital interface channels available for inbound or outbound calls. Disabled and maintenance prevent the digital interface channel from processing inbound or outbound call. Exclusive overrides the channel search method and chooses the outgoing channel based on the calling resource. Calls can originate from analog ports, explicit channel dialing (see Analog Port Dialing Configuration), or redirected channel of the opposite interface. Use exclusive to emulate outgoing channel bank operation. Exclusive enables channels to receive calls. Operation implementation depends on whether switch emulation is ISDN or RBS.

ISDN implements operation by sending an ISDN service message containing change status and channel ID information elements. The ISDN service message is not sent immediately, but rather uses the selected update method configured on detailed screens. Each ISDN service message must be acknowledged by the near end or it will be sent again. If an ISDN channel is blocked from receiving inbound calls, the system reassigns the call to another channel.

RBS uses operation to put channels in disabled and maintenance mode by transmitting the busy state, keeping the receiving channel in the transition state when the digital interface goes from not synchronized to synchronized. Exclusive mode is implemented by using the appropriate channel.

Service Update: Select NONE* (default), or UPON LAYER 2 STARTUP. This selection determines when ISDN service messages containing the B-channel status are sent across the network. Each interface sends a total of 23 service messages, one for each bearer channel. A service message is also sent independent of this selection whenever the status of an individual channel is changed on the channel configuration detailed screen. None indicates that service messages are not sent across the network. Upon layer 2 startup indicates that service messages are sent upon layer 2 startup. B-channel status may be sent by 4ESS custom, 5ESS custom, and DMS-100 custom. B-channel status is not sent by NI-2 although we have seen Nortel central offices running NI-2 that send B-channel status. Shown only when at least one interface is ISDN.

Direction: Select TWO WAY* (default), OUTBOUND, or INBOUND. Two way channels can originate or receive calls. Outbound channels can only originate calls. Inbound channels can only receive calls. Shown only when at least one interface is RBS.

Signaling: Select E&M WINK* (default), E&M IMMEDIATE, GROUND FXS, GROUND SAS, LOOP FXS, or LOOP SAS. Signaling definitions appear later in this text. Shown only when at least one interface is RBS.

Inbound Routing: Select INBOUND MATCH* (default), ACD 1 through ACD 4, CONSECUTIVE ACD, CONSECUTIVE PORTS, REDIRECT 1 through REDIRECT 4, MSG 1 PLAY TWICE, MSG 2 PLAY TWICE, BUSY, or REORDER. Indicates routing of inbound calls. Inbound match routes an incoming call by matching the DNIS-DTMF digits with the match number in the Inbound Match Configuration screen. ACD 1 through ACD 4 route incoming calls to an analog port via an ACD group. The ACD group is configured using the ACD Configuration screen. Incoming DNIS-DTMF digits are ignored. There are more than four ACDs, but for ease of use only the first four are selectable from the master screen. Consecutive ACD means that channel 1 is routed to ACD 1, channel 2 is routed to ACD 2, etc. The ACD group is configured using the ACD Configuration screen. Incoming DNIS-DTMF digits are ignored. Consecutive ports means that channel 1 is routed to port 1, channel 2 is routed to port 2, etc. Incoming DNIS-DTMF digits are ignored. Use consecutive port to emulate inbound channel bank operation. Redirect 1 through redirect 4 route incoming calls to an outgoing digital interface channel via a redirect group. The redirect group is configured using the Redirect Configuration screen. Incoming DNIS-DTMF digits are ignored. Msg 1 play twice and msg 2 play twice route incoming calls to the selected voice message. The message is played twice, followed by a forced disconnect. Incoming DNIS-DTMF digits are ignored. Connect action routes the call to the connect action on the connect action screen. Incoming DNIS-DTMF digits are ignored. Busy routes an incoming

Help for Channel Configuration—Master (continued)

call to the busy progress tone. Incoming DNIS-DTMF digits are ignored. Reorder routes an incoming call to the reorder progress tone. Incoming DNIS-DTMF digits are ignored. Inbound-routing shows hyphens (---) when direction is outbound. Shown only when at least one interface is RBS.

After each selection the screen displays ALL DETAILED SCREENS MATCH, SOME DETAILED SCREENS MATCH, or NO DETAILED SCREENS MATCH. This indicates whether the selection matches the same field on the detailed screens.

There are three types of RBS protocols: E&M, ground start, and loop start. E&M is the preferred method for PBXs. E&M signaling includes E&M WINK and E&M IMMEDIATE. With wink, the receiving side must send an acknowledgment (wink) before dialing can begin. With immediate, dialing can start immediately. Tie trunks use E&M signaling. History buffs note that E&M stands for ear and mouth.

Ground start signaling includes GROUND FXS and GROUND SAS. FXS stands for foreign exchange subscriber, and is what the user side sends to FXO. FXO stands for foreign exchange office, and is what the network side sends to FXS. SAS stands for special access subscriber, and is what the user side sends to SAO. SAO stands for special access office, and is what the network side sends to SAS.

Loop start signaling includes LOOP FXS and LOOP SAS. Loop start is what a plain old telephone (POTS) uses. The definitions are essentially the same as ground start. Loop start is the least preferred method for PBXs, because older loop start FXO and SAO facilities cannot signal the user to disconnect.

Channel Configuration—Detailed

This screen allows individual channels to be blocked from making or receiving calls. There are four detailed screens, two for each digital interface. The screens may differ, depending on whether the interface is configured for ISDN or RBS.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 2-2

        CHANNEL CONFIGURATION - DETAILED - DIGITAL INTERFACE A

Interface Status:  PASS-THROUGH

DCN    Operation       Status
A/1    ENABLED*        IN SERVICE
A/2    ENABLED*        IN SERVICE
A/3    ENABLED*        IN SERVICE
A/4    ENABLED*        IN SERVICE
A/5    ENABLED*        IN SERVICE
A/6    ENABLED*        IN SERVICE
A/7    ENABLED*        IN SERVICE
A/8    ENABLED*        IN SERVICE
A/9    ENABLED*        IN SERVICE
A/10   ENABLED*        IN SERVICE
A/11   ENABLED*        IN SERVICE
A/12   ENABLED*        IN SERVICE


* Indicates factory default.
       Press Space Bar or Backspace to select. Press A for All.
         Press <F1> help, <F2> exit, <F3> previous, <F4> next
```

ISDN Channel Configuration–Detailed Screen 1

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 2-2

        CHANNEL CONFIGURATION - DETAILED - DIGITAL INTERFACE B

Interface Status:  SYNCHRONIZED

DCN    Operation     Direction    Signaling       Inbound Routing
A/1    ENABLED       TWO WAY      E&M WINK*       INBOUND MATCH*
A/2    ENABLED       TWO WAY      E&M WINK*       INBOUND MATCH*
A/3    ENABLED       TWO WAY      E&M WINK*       INBOUND MATCH*
A/4    ENABLED       TWO WAY      E&M WINK*       INBOUND MATCH*
A/5    ENABLED       TWO WAY      E&M WINK*       INBOUND MATCH*
A/6    ENABLED       TWO WAY      E&M WINK*       INBOUND MATCH*
A/7    ENABLED       TWO WAY      E&M WINK*       INBOUND MATCH*
A/8    ENABLED       TWO WAY      E&M WINK*       INBOUND MATCH*
A/9    ENABLED       TWO WAY      E&M WINK*       INBOUND MATCH*
A/10   ENABLED       TWO WAY      E&M WINK*       INBOUND MATCH*
A/11   ENABLED       TWO WAY      E&M WINK*       INBOUND MATCH*
A/12   ENABLED       TWO WAY      E&M WINK*       INBOUND MATCH*


* Indicates factory default.
 Press Space Bar or Backspace to select then <ENTER>. Press A for All.
 Press Tab, Arrow Keys, <F1> help, <F2> exit, <F3> previous, <F4> next
```

Robbed Bit Channel Configuration–Detailed Screen

Channel Configuration—Detailed

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 2-3

         CHANNEL CONFIGURATION - DETAILED - DIGITAL INTERFACE A

Interface Status:  PASS-THROUGH

DCN                      Operation      Status
A/13                     ENABLED*       IN SERVICE
A/14                     ENABLED*        IN SERVICE
A/15                     ENABLED*       IN SERVICE
A/16                     ENABLED*       IN SERVICE
A/17                     ENABLED*       IN SERVICE
A/18                     ENABLED*       IN SERVICE
A/19                     ENABLED*       IN SERVICE
A/20                     ENABLED*       IN SERVICE
A/21                     ENABLED*       IN SERVICE
A/22                     ENABLED*       IN SERVICE
A/23                     ENABLED*       IN SERVICE

Service Update:  NONE*

* Indicates factory default.
       Press Space Bar or Backspace to select. Press A for All.
         Press <F1> help, <F2> exit, <F3> previous, <F4> next
```

ISDN Channel Configuration–Detailed Screen 2

Help for Channel Configuration—Detailed

Interface Status: Shows CARD NOT PRESENT, PASS-THROUGH, RECEIVING BLUE ALARM, RECEIVING YELLOW ALARM, SYNCHRONIZED, NOT SYNCHRONIZED, or LAYER 2 DOWN. Indicates framing status of digital interface.

DCN: Shows digital interface and channel number.

Operation: Select ENABLED* (default), DISABLED, MAINTENANCE, or EXCLUSIVE. Press A to change all channels starting from the current channel on down. Enabled makes the digital interface channel available for inbound or outbound call. Disabled and maintenance prevents the digital interface channel from processing inbound or outbound call. Exclusive overrides the channel search method and chooses the outgoing channel based on the calling resource. Calls can originate from analog ports, explicit channel dialing (see Analog Port Dialing Configuration), or redirected channel of the opposite interface. Use exclusive to emulate outgoing channel bank operation. Exclusive enables channels to receive calls.

Operation implementation depends on whether switch emulation is ISDN or RBS.

ISDN implements operation by sending an ISDN service message containing change status and channel ID information elements. The ISDN service message is sent on the fly and also sent according to the selected update method. Each ISDN service message must be acknowledged by the near end or it will be sent again. RBS uses operation to put channels in disabled and maintenance mode by transmitting the busy state, keeping the receiving channel in the transition state when the digital interface goes from not synchronized to synchronized. Exclusive mode is implemented by using the appropriate channel.

Status: Shows IN SERVICE, OUT OF SERVICE, MAINTENANCE, or LOCAL OUT OF SERVICE. In service indicates channel is available for inbound and outbound calls. Out of service and maintenance indicates channel is disabled. Local out of service indicates channel is disabled and can not be enabled remotely using a service message. However, it can be enabled locally. Shown for ISDN digital interfaces only.

Channel Configuration—Detailed

Help for Channel Configuration—Detailed (continued)

Service Update: Select NONE* (default), or UPON LAYER 2 STARTUP. This selection determines when ISDN service messages containing the B-channel status are sent across the network. Each interface sends a total of 23 service messages, one for each bearer channel. A service message is also sent independent of this selection whenever the status of an individual channel is changed on the channel configuration detailed screen. None indicates that service messages are not sent across the network. Upon layer 2 startup indicates that service messages are sent upon layer 2 startup. B-channel status may be sent by 4ESS custom, 5ESS custom, and DMS-100 custom. B-channel status is not sent by NI-2 although we have seen Nortel central offices running NI-2 that send B-channel status. Shown for ISDN digital interfaces only.

Direction: Select TWO WAY, OUTBOUND, or INBOUND. Press A for all to set all channels on a single digital interface to the current selection. Two way channels can originate or receive calls. Outbound channels can only originate calls. Inbound channels can only receive calls. Shown for RBS digital interfaces only.

Signaling: Select E&M WINK* (default), E&M IMMEDIATE, GROUND FXS, GROUND SAS, LOOP FXS, or LOOP SAS. Press A for all to set all channels on a single digital interface to the current selection. Choices depend on whether interface is configured for network or user. Shown for RBS digital interfaces only. Signaling definitions appear later in this text.

Inbound Routing: Select INBOUND MATCH* (default), ACD 1 through ACD 32, PORT 1 through PORT 48, REDIRECT 1 through REDIRECT 4, MSG 1 PLAY TWICE, MSG 2 PLAY TWICE, BUSY, or REORDER. Press A for all to set all channels on a single digital interface to the current selection. This selection indicates inbound call routing.

Inbound match routes an incoming call by matching the DNIS-DTMF digits with the match number in the Inbound Match Configuration screen.

ACD 1 through ACD 32 routes an incoming call to an analog port via an ACD group. The ACD group is configured using the ACD Configuration screen. Incoming DNIS-DTMF digits are ignored.

PORT 1 through PORT 48 routes an incoming call to an analog port. Incoming DNIS-DTMF digits are ignored. Use PORT 1 through PORT 24 to emulate incoming channel bank operation.

Redirect 1 through redirect 4 routes an incoming call to an outbound digital interface channel via a redirect group. The redirect group is configured using the Redirect Configuration screen. Incoming DNIS-DTMF digits are ignored.

Msg 1 play twice and msg 2 play twice route incoming calls to the selected voice message. The message is played twice, followed by a forced disconnect. Incoming DNIS-DTMF digits are ignored.

Busy routes an incoming call to the busy progress tone. Incoming DNIS-DTMF digits are ignored.

Reorder routes an incoming call to the reorder progress tone. Incoming DNIS-DTMF digits are ignored.

Inbound-routing shows hyphens (---) when direction is outbound. Shown for RBS digital interfaces only.

There are three types of RBS protocols: E&M, ground start, and loop start.

E&M is the preferred method for PBXs. E&M signaling includes E&M WINK and E&M IMMEDIATE. With wink, the receiving side must send an acknowledgment (wink) before dialing can begin. With immediate, dialing can start immediately. Tie trunks use E&M signaling. History buffs note that E&M stands for ear and mouth.

Ground start signaling includes GROUND FXS, GROUND FXO, GROUND SAS, and GROUND SAO. FXS stands for foreign exchange subscriber, and is what the user side sends to FXO. FXO stands for foreign exchange office, and is what the network side sends to FXS. SAS stands for special access subscriber, and is what the user side sends to SAO. SAO stands for special access office, and is what the network side sends to SAS.

Loop start signaling includes LOOP FXS, LOOP FXO, LOOP SAS, and LOOP SAO. Loop start is what a plain old telephone (POTS) uses. The definitions are essentially the same as ground start. Loop start is the least preferred method for PBXs, because older loop start FXO and SAO facilities cannot signal the user to disconnect.

Calling Number Configuration

This screen configures calling party number related parameters. It also configures the called number plan for ISDN digital interfaces and DNIS-DTMF timing parameters for RBS. There are two screens, one for each digital interface. The screens may differ, depending on whether the interface is configured for ISDN or RBS. Digital interface 2 is not used when NFAS signaling is enabled.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 3-1

          CALLING NUMBER CONFIGURATION - DIGITAL INTERFACE A

Calling Number:              --
Calling Number Mode:         NOT SENT*
Calling Presentation:        ALLOWED*
Calling Type of Number:      NATIONAL NUMBER*
Calling Number Plan:         ISDN NUMBERING PLAN*
Called Number Plan:          ISDN NUMBERING PLAN*
Calling Name Method:         DISPLAY IE*
Calling Name Mode:           NOT SENT*
Calling Name:                --
Setup Progress Indicator:    SEND WHEN CALLING NUMBER IS NOT SENT*









* Indicates factory default.

  Enter fixed, sequential, or random number (0-35 digits). Backspace to edit.
           Press Arrow Keys, <F1> help, <F2> exit, <F4> next
```

ISDN Calling Number Configuration Screen

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 3-1

          CALLING NUMBER CONFIGURATION - DIGITAL INTERFACE A

Outbound DTMF Timing:                100/100 MS*
Inbound DTMF First Digit Timeout:    10* SECONDS
Inbound DTMF Interdigit Timeout:     10* SECONDS
Inbound DNIS Calling Number Format:  BETWEEN FIRST AND SECOND ASTERISKS*

* Indicates factory default.

                    Press Space Bar or Backspace
           Press Arrow Keys, <F1> help, <F2> exit, <F4> next
```

Robbed Bit Calling Number Configuration Screen

Help for Calling Number Configuration

then become active again. SEND CALLING NUMBER WITH TWO DIGIT OVERLAY indicates the system sends the calling party number, replacing the last two digits with the last two digits of the extension number of the analog port that generated the call. If the call is generated by the call generator, the last two digits are replaced by the active call number starting from call 01 through the number of active calls on the Call Generator Configuration screen. Initially active call numbers are assigned in ascending sequential order, but in rolling mode may become randomized as calls disconnect and then become active again. Shown for ISDN only.

Calling Presentation: Select ALLOWED* (default) or RESTRICTED. Calling presentation is sent in the calling party number information element of the ISDN setup message. ALLOWED indicates that the called party is allowed to retrieve the calling party number. RESTRICTED indicates that the calling party number is sent, but that only law enforcement may retrieve it. Shown for ISDN only.

Calling Type of Number: Select NATIONAL NUMBER* (default), INTERNATIONAL NUMBER, SUBSCRIBER NUMBER, ABBREVIATED NUMBER, or UNKNOWN NUMBER. Calling type of number is sent in the calling party number information element of the ISDN setup message.
NATIONAL NUMBER includes a national area code. Example: 3125551212.
INTERNATIONAL NUMBER includes a country code. Example: 443125551212.
SUBSCRIBER NUMBER includes a local exchange number. Example: 5551212.
ABBREVIATED NUMBER is 3 to 5 digits long. Example: 1212 or 51212.
UNKNOWN NUMBER is either not identified or contains prefix digits that are not part of the calling party number. Example: *70 to disable call waiting. Shown for ISDN only.

Calling Number Plan: Select ISDN NUMBERING PLAN* (default), TELEPHONY NUMBERING PLAN, PRIVATE NUMBERING PLAN, or UNKNOWN NUMBERING PLAN. Calling number plan is sent in the calling party number information element of the ISDN setup message. Select ISDN NUMBERING PLAN if the system is emulating a public network. Shown for ISDN only.

Called Number Plan: Select ISDN NUMBERING PLAN* (default), TELEPHONY NUMBERING PLAN, PRIVATE NUMBERING PLAN, or UNKNOWN NUMBERING PLAN. Called number plan is sent in the called party number information element of the ISDN setup message. Select ISDN NUMBERING PLAN if the system is emulating a public network. Shown for ISDN only.

Calling Name Method: DISPLAY IE* (default), or FACILITY IE. This selection indicates how the system will send the calling party name. DISPLAY IE indicates Display IE (information element) is used to send the calling party name. In North America, Display IE is sent in codeset 6 (network specific) because it is a proprietary method. This works for names originating from the network or user side. In Europe, ETSI recommends sending Display IE in codeset 0 (normal). The Display IE is sent from the network to user side only. In either case, calling name is sent in the setup message whether or not the calling number is present or the calling number presentation is restricted. FACILITY IE indicates that Facility IE is used to send the calling party name. This follows the Telcordia GR-1367-CORE recommendation and is available on National and 5ESS Custom PRIs. This is a two-step process. The first step is to send a setup message with a facility IE indicating information following. A facility message with a facility IE containing the calling name is sent at a later time so as not to delay call setup. However, if the calling number is not present a facility IE is sent in the setup message indicating that the name is not available. If the calling number presentation is restricted a facility IE is sent in the setup message indicating that the calling number is restricted. See the calling name tutorial on the main help screen for more details. Shown for ISDN only.

Calling Name Mode: Select NAME* (default), or NAME WITH NUMBER OVERLAY. NOT SENT indicates that the calling party name is not sent. SEND NAME sends the calling name only if the calling number is present and calling number presentation is allowed. SEND NAME WITH CALLING NUMBER APPENDED is similar to SEND NAME except the calling number is appended to the end of the calling name. See the calling name tutorial on the main help screen for more details. Shown for ISDN only.

Calling Name: Enter up to 17 digits. All alphanumeric characters are allowed. This is the calling party name to be sent by way of an ISDN digital interface. Shown for ISDN only.

Calling Number Configuration

Help for Calling Number Configuration (continued)

Setup Progress Indicator: Select SEND WHEN CALLING NUMBER IS NOT SENT* (default) or DO NOT SEND. This selection indicates when the system will send a progress indicator information element in the ISDN setup message indicating that the origination address is non-ISDN. SEND WHEN CALLING NUMBER IS NOT SENT sends the progress indicator when the calling number is not sent. DO NOT SEND indicates the progress indicator is not sent. This selection does not apply to redirected calls which always pass the progress indicator information element from the incoming to the outgoing setup message. Shown for ISDN only.

Outbound DTMF Timing: Select 100/100 MS* (default) or 50/50 MS. Determines on/off time, in milliseconds, when dialing outbound numbers. Shown for RBS only.

Inbound DTMF First Digit Timeout: Select 1 through 10* (default) in seconds. If the first DNIS-DTMF digit of the inbound number is not received within configured time, the call is routed to reorder progress tone. Shown for RBS only.

Inbound DTMF Interdigit Timeout: Select 1 through 10* (default) in seconds. Determines maximum time allowed between DNIS-DTMF digits, and how long the system will wait before the inbound number sequence is considered to be complete. Shown for RBS only.

Inbound Calling Number Method: Select BETWEEN FIRST AND SECOND ASTERISK* (default) or NONE. Between first and second asterisk indicates that DTMF calling number digits are expected to be between the first and second asterisk. The called number follows the second asterisk. None indicates that DTMF calling number digits are not expected and that all incoming DTMF digits are part of the called number. Shown for RBS user side only.

Sidenote: When the digital interface is configured for ISDN and the call is redirected by the system's redirect feature, the original calling party number is sent using the calling party number information element. The system calling party number is sent using the redirecting number information element. This is to assist law enforcement in identifying calls that are redirected through a third party.

Analog Port Configuration—Master

This screen allows configuration of all analog ports. Press <ENTER> then Y to update all analog ports. Use detailed screens to configure individual ports. This screen also sets the audio coding and signaling method used by all analog ports.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 4-1

                  ANALOG PORT CONFIGURATION - MASTER

Extension Digit Length:     4*                ALL DETAILED SCREENS MATCH
Base Extension Number:      1001              ALL DETAILED SCREENS MATCH
ACD Assignment:             ACD 1*            ALL DETAILED SCREENS MATCH
Outbound Access:            ENABLED*          ALL DETAILED SCREENS MATCH
936/938 Signaling Method:   LOOP START*       ALL DETAILED SCREENS MATCH
Call Transfer:              DISABLED*
Audio Compression:          G.711 MU-LAW*
936/938 Ring Fault Action:  CONTINUE RINGING*
Maximum Alert Time:         NONE*
936/938 Receive Loss:       -6 dB*
936/938 Reference Tone:     OFF*
936 Analog Caller ID:       SEND TIME/NUMBER/NAME*
936 Private Numbers:        SEND PRIVATE NUMBERS*
936 Alerting Cadence:       1000/3000 MS*
Call Waiting:               DISABLED*

* Indicates factory default.

              Press Space Bar or Backspace then <ENTER>
          Press Arrow Keys, <F1> help, <F2> exit, <F4> next
```

Help for Analog Port Configuration—Master

Extension Digit Length: Select 3, 4* (default), or 5. Number of digits assigned to an analog port extension number. Press <ENTER> after selecting the number. Changing the number of digits causes all analog port extensions to be renumbered sequentially starting from the base extension number.

Base Extension Number: Enter a 3, 4, or 5-digit number. Digits 0123456789 are allowed. Starting number used to sequentially number all analog port extensions. The number of digits must agree with the analog port extension digit length. Press <ENTER> after entering the number. The system renumbers all analog port extensions after <ENTER> is pressed. The base extension number is automatically adjusted so as to not conflict with outbound access digits and the ACD call pickup digit.

If the calling number mode in the Calling Number Configuration screen is set for send calling number with analog port extension overlay, it is recommended that the base extension number be set to match the last few digits of the calling number. If, for example, the assigned calling number in the Calling Number Configuration screen is 3125556600, and the extension digit length is 4, set the base analog port extension number to 6600.

ACD Assignment: Select ACD 1* (default) through ACD 4, CONSECUTIVE ACD, or NONE. Assigns analog ports to an ACD group. The system supports more than four ACD groups, but for ease of use only the first four are assignable from this screen. Consecutive ACD means that analog port 1 is assigned to ACD 1, analog port 2 is assigned to ACD 2, etc., up to the maximum number of ACD groups. Use it when one-to-one mapping between the analog ports and the ACD groups is desired. None restricts all analog ports from ACD assignment.

Outbound Access: Select ENABLED* (default) or DISABLED. Enables or disables analog port access to digital interface channels for making outbound calls.

Analog Port Configuration—Master

Help for Analog Port Configuration—Master (continued)

936/938 Signaling Method: Select LOOP START* (default) or GROUND START. Supported by 936/938 analog card only. The 939 analog card uses loop start only. This assigns the signaling method used by the analog ports. Loop start is used by plain old telephones (POTS). Ground start is used by trunks.

Call Transfer: Select DISABLED* (default), INTERNAL ONLY, or INTERNAL & OUTSIDE. Internal only allows incoming or outgoing calls to be transferred to an analog extension. Call transfer is activated by depressing the receiver hook for one second. Upon releasing the receiver hook, a stutter dial tone is sent, indicating the call is on hold and the system is ready to accept dialed digits of an analog port extension number. The user dials the extension, hangs up, and the call is transferred to that extension. Enabling call transfer increases analog on-hook detection time from 0.4 second to 1.4 seconds. If the station user disconnects while a party is still on hold, the station user is automatically rung back and, upon answer, is connected to the held party. Internal & outside allows incoming or outgoing calls to be transferred to an analog extension or an outside call. When making an outside call, signaling is accomplished by sending a switchhook flash across the digital interface. If the network side is configured to accept outside call transfer, the network returns a dial tone and accept dialed digits. If the network side is not configured to accept outside call transfer, the network will probably disconnect the call. This feature works only with T1 Robbed Bit Signaling and GR-303 and only from the user (RDT) to network (IDT) direction. Internal and outside increases robbed bit signaling disconnect time from 0.3 seconds to 1.4 seconds. Outside call transfer works only when the transferred call is routed to ACD, port, message, busy, and reorder on the Inbound Match Configuration screen. All other choices are routed to reorder. Outside call transfer is also known as DID two way call transfer or Centrex call transfer. This feature is not selectable from detailed screens.

Audio Compression: Select G.711 MU-LAW* (default) or G.711 A-LAW. Supported by 936, 938 and 939 analog cards only. Mu-law is normally used with T1. A-law is normally used with E1. This setting selects the audio compression used by the analog ports. ISDN sends a code representing the compression method in the bearer capability information element. This selection has no effect on voice messages or the audio monitor which use mu-law compression on T1 systems. This feature is not selectable from detailed screens.

936/938 Ring Fault Action: Select CONTINUE RINGING* (default), SEND REORDER, or REMOVE FROM ACD. Action to be taken when analog port fails to sense ring current during alerting. This condition occurs when no device is connected to the analog port. Supported by 936/938 analog card only. The 939 analog card contains FXS circuits and does not use this selection. Continue ringing indicates that an analog port will continue ringing even though a current load is not detected. Send reorder indicates that the caller is sent reorder progress tone when ring current is not detected. Remove from ACD indicates that an analog port is temporarily removed from ACD selection when ring current is not detected. In addition, the caller is sent reorder progress tone. Once an analog port is removed from ACD selection it is automatically reinstated upon power up, reboot, or whenever that analog port goes off-hook. This feature is not selectable from detailed screens.

Maximum Alert Time: Select NONE* (default), or 15 SECONDS through 120 SECONDS in 15 second increments. Amount of time analog port should alert (ring) before returning reorder progress tone. None means there is no maximum time. Applies to calls originated from analog ports as well as from digital interfaces. If a digital interface uses ISDN, returns disconnect message with cause code 19, user alerted no answer. This feature is not selectable from detailed screens.

936/938 Receive Loss: Select –6dB* (default) or 0dB. –6dB reduces the audio level sent to all 936/938 card analog ports. 0dB sends the audio level unattenuated. 939 analog cards are selected on a different screen. This feature is not selectable from detailed screens.

936/938 Reference Tone: Select OFF* (default) or ON. Sends a 1kHz 1 milliwatt (0dB) reference tone to all 936/938 card analog ports. 939 analog ports are selected on a different screen. This feature is not selectable from detailed screens.

Analog Port Configuration—Master

Help for Analog Port Configuration—Master (continued)

936 Analog Caller ID: Select SEND TIME/NUMBER/NAME* (default), SEND SINGLE DATA MESSAGE FORMAT, DO NOT SEND, SEND NUMBER, SEND NUMBER/NAME, or SEND TIME/NUMBER. Supported by 936 analog card only. Most of the selections use MDMF (Multiple Data Message Format) to send time, calling party number, and calling party name. The exception is SDMF (Single Data Message Format) which is an obsolete method for sending time and calling party number. Do not send disables analog Caller ID.

936 Private Numbers: Select SEND PRIVATE NUMBERS* (default) or DO NOT SEND PRIVATE NUMBERS. Send private numbers allows the calling party number to be sent, regardless of the caller's wishes. Used by law enforcement. Do not send private numbers sends a private indicator instead of the calling party number when the sender wishes to remain private. Supported by 936 analog card only.

936 Alerting Cadence: Select 1000/3000 MS* (default) or 400/200/400/3000 MS. 1000/3000 ms causes the analog port to alert for one second on and three seconds off. 400/200/400/3000 ms alerts for 400 ms on, 200 ms off, 400 ms on, and three seconds off. Also known as English ringing. Supported by 936 analog card only. The 938 analog card always alerts for one second on and three seconds off.

Call Waiting: Select DISABLED (default) or INTERNAL ONLY. Disabled sends reorder to incoming calls attempting to connect to an active analog extension. Internal only allows incoming calls from analog extensions to wait for a specific analog extension to become available. Call Waiting is a terminal feature which operates on the terminating portion of a call. The Call Waiting feature gives a station user, engaged in a telephone conversation, an audible 440Hz alert tone for 0.3 seconds indicating that an incoming call is attempting to terminate to their line. The station user that receives the audible alert tone can flash the switchhook for one second to put the first call on hold and answer the incoming call or can go on hook and allow the terminal to ring and answer the incoming call. The alert tone is only audible to the Call Waited station user; the originating station has audible ringing. The Call Waiting feature also provides a hold function that is activated by a switchhook flash. Consecutive flashes allow the station user to alternately talk to the original caller or to new calling party. If the station user disconnects while a party is still on hold, the station user is automatically rung back and, upon answer, is connected to the held party. Enabling this feature increases analog on-hook detection time from 0.4 second to 1.4 seconds. This feature is not selectable from detailed screens.

After some selections the screen displays ALL DETAILED SCREENS MATCH, SOME DETAILED SCREENS MATCH, or NO DETAILED SCREENS MATCH. This indicates whether the selection matches the same field on the detailed screens.

936 Analog Card Description
Contains eight FXO loop start or ground start circuits with FSK caller ID.

938 Analog Card Description
Contains eight FXO loop start or ground start circuits.

939 Analog Card Description
Emulates eight FXS (subscriber) loop start circuits.

Analog Port Configuration—Detailed

This screen configures individual analog ports for extension number, ACD group assignment, and outbound access. It also displays the port's current state. There are four detailed screens, one for every eight analog ports.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 4-2

                 ANALOG PORT CONFIGURATION - DETAILED

Card 1 Present:   YES - 936 CARD

Port  Ext     ACD     Outbound  Sig   Connect  Hold   State
 1    1001    ACD 1*  ENABLED*  LS*   --       --     01-ON HOOK
 2    1002    ACD 1*  ENABLED*  LS*   --       --     01-ON HOOK
 3    1003    ACD 1*  ENABLED*  LS*   --       --     01-ON HOOK
 4    1004    ACD 1*  ENABLED*  LS*   --       --     01-ON HOOK
 5    1005    ACD 1*  ENABLED*  LS*   --       --     01-ON HOOK
 6    1006    ACD 1*  ENABLED*  LS*   --       --     01-ON HOOK
 7    1007    ACD 1*  ENABLED*  LS*   --       --     01-ON HOOK
 8    1008    ACD 1*  ENABLED*  LS*   --       --     01-ON HOOK




* Indicates factory default.

     Enter extension (1000-7999) then <ENTER>. Backspace to edit.
Press Tab, Arrow Keys, <F1> help, <F2> exit, <F3> previous, <F4> next
```

Help for Analog Port Configuration—Detailed

Card Present: Shows YES – 936 CARD, YES – 938 CARD, YES – 939 CARD, YES – 914 CARD, or NO. The 936 and 938 card drive eight analog loop/ground start FXO circuits. The 936 card also sends analog calling party information. The 939 card emulates eight analog loop start FXS stations. The 914 card has been discontinued and is not supported by this system.

Port: Shows 1 through 32. Identifies the internal hardware number of each analog port.

Ext: Shows the extension number associated with the analog port. If a different extension number is desired, enter it here and then press <ENTER>. Numbers that are not unique, or are outside the permissible range, are automatically disallowed. Outbound access digits, ACD call pickup digit and analog port extensions must not conflict with each other.

ACD: Select ACD 1* (default) through ACD 32, or NONE. Assigns the analog port to an ACD group. NONE restricts the analog port from being part of an ACD group.

Outbound: Select ENABLED* (default) or DISABLED. Enables or disables analog port access to digital interface channels for making outbound calls.

Sig: Select LS* (default) or GS. This assigns the signaling method used by the analog port. Supported by 936 and 938 analog card only. Loop start (LS) is used by plain old telephones (POTS). Ground start (GS) is used by trunks.

Connect: Shows ACT, DCN, GEN, MSG, or PORT. Shows resource connected to analog port. DCN stands for digital channel number. GEN stands for call generator. MSG stands for recorder/announcer message number. PORT stands for analog port number. Hyphens (--) indicate no connection.

Recorder/Announcer

This screen allows the recorded messages to be erased. It also shows the real-time status of the voice messages.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer            Screen 5

                          RECORDER/ANNOUNCER

Recorder/Announcer Analog Access Port:  ALL*
Recorder/Announcer Numeric Password:    1234567
Erase voice messages:  NO*

Message 1 Status:  FF - IDLE
Message 2 Status:  FF - IDLE

Use the analog access port to play or record voice messages.
Go off hook and DTMF dial *99. DTMF dial the numeric password.
Dial 1 to play message 1.
Dial 2 to play message 2.
Dial 3 to record message 1.
Dial 4 to record message 2.



* Indicates factory default.

               Press Space Bar or Backspace then <ENTER>
                 Press Arrow Keys, <F1> help, <F2> exit
```

Help for Recorder/Announcer

Recorder/Announcer Analog Access Port: Select PORT 1-48 or ALL* (default). Assigns the analog port that is used to access the recorder/announcer for maintenance.

Recorder/Announcer Numeric Password: Enter a 7-digit number. Assigns the password to be dialed to access the recorder/announcer for maintenance. The factory default is 1234567.

Erase voice messages: Select NO* (default) or YES. Select Y, then press <ENTER> to erase all voice messages.

Message Status: Shows hexadecimal representation of digitally encoded voice followed by the current state: PLAY, RECORD, PAUSE, or IDLE. Hexadecimal 7F or FF is the normal state when a voice signal is not present.

Use the analog port assigned as the recorder/announcer analog access port to play or record voice messages. Go off hook and DTMF dial *99. Wait for the second dial tone. Dial the 7-digit numeric password. If the correct password has been entered, a periodic beep, once every second, indicates connection to the recorder/announcer. Four commands are available:
Dial 1 to play message 1.
Dial 2 to play message 2.
Dial 3 to record message 1.
Dial 4 to record message 2.

Hang up to stop recording.

Recorded messages can be as long as 20 seconds. Hang up to disconnect from the recorder/announcer. Messages cannot be recorded while the recorder/announcer is playing a message.

Inbound Match Configuration

This screen configures inbound routing for calls received on the digital interface. There are a total of four screens, one for every 12 match numbers.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 6-1

        INBOUND MATCH CONFIGURATION - SHARED BY BOTH INTERFACES

No.  Match Number                          Route if Match
 1.  --                                    ACD 1*
 2.  --                                    ACD 1*
 3.  --                                    ACD 1*
 4.  --                                    ACD 1*
 5.  --                                    ACD 1*
 6.  --                                    ACD 1*
 7.  --                                    ACD 1*
 8.  --                                    ACD 1*
 9.  --                                    ACD 1*
10.  [2-9]NNNNNN                           ACD 1*
11.  [0-1][2-9]NNNNNNNNN                   ACD 1*
12.  --                                    ACD 1*

Preset:  SHARED BY BOTH INTERFACES*

* Indicates factory default.

  Enter match number (0-31 digits) or match range. Backspace to edit.
        Press Tab, Arrow Keys, <F1> help, <F2> exit, <F4> next
```

Help for Inbound Match Configuration

When the digital interface is configured for RBS, the system uses this screen only when routing is set to inbound match on the Channel Configuration screen. The system routes calls by comparing the called number with the list of match numbers.

When the digital interface is configured for ISDN, the system routes incoming ISDN calls by comparing the called number with the list of match numbers. The list is scanned starting from match number 1 until a successful match is found. If the system does not find a match, it connects the call to reorder tone for 30 seconds, followed by a forced disconnect.

When the digital interface is configured for RBS network side the system uses one of eight DTMF receivers for receiving DNIS-DTMF digits. These receivers are shared by the digital interface channels on a first available basis. If a DTMF receiver is available, the caller is sent dial tone. Only E&M wink, ground start FXO, ground start SAO signaling and GR-303 provide handshaking to indicate that a DTMF receiver is available.

Match Number: Enter up to 31 digits and special characters. Digits 0123456789*# are allowed. Indicates the called number to be matched. Digits NXZ[-] are special characters. N matches any number from 0 through 9. Example: 9NN matches any number from 900 through 999. X matches any digit from 0 through #. Example: *XX matches any 2 digits after *. Z creates a match for calls containing no called number. No called number is permitted by switch emulations such as Euro ISDN, DMS100, T1 Robbed Bit Signaling, and GR-303. Otherwise incoming calls containing no called number will be rejected. Match ranges are created using [min-max]. A left bracket, hyphen (-), and a right bracket are required. Example: [234-789] matches any number from 234 through 789. Minimum and maximum values are limited only by the line length but must contain the same number of digits. Minimum and maximum values may not contain * or #. Brackets may be repeated, but not nested. Two hyphens (--) indicate that no match number is specified.

Inbound Match Configuration

Help for Inbound Match Configuration (continued)

Route if Match: Select ACD 1 through ACD 32, PORT 1 through PORT 48, REDIRECT 1 through REDIRECT 4, MESSAGE 1 PLAY TWICE, MESSAGE 2 PLAY TWICE, MESSAGE 1 PLAY CONTINUOUS, MESSAGE 2 PLAY CONTINUOUS, BUSY, or REORDER. ACD routes the call to the specified ACD group. Redirect routes the call to the specified redirect group. Port routes the call to the specified analog port. Message 1 play twice and message 2 play twice routes the call to the specified voice message, plays the message twice, and followed by a forced disconnect. Message 1 play continuous and message 2 play continuous routes the call to the specified voice message and plays it until the caller disconnects. Busy routes the call to busy progress tone for 30 seconds, followed by a forced disconnect. Reorder routes the call to reorder (fast busy) tone for 30 seconds, followed by a forced disconnect.

Preset: Select SHARED BY BOTH INTERFACES* (default), SEPARATE FOR EACH INTERFACE, NORTH AMERICAN NUMBERING PLAN, CONSECUTIVE EXTENSION ACD, CONSECUTIVE EXTENSION PORTS, MATCH FOR NO NUMBER, 3 DIGIT DIALING PLAN through 11 DIGIT DIALING PLAN, ANY DIGIT MATCH, or COPY TO OTHER INTERFACE. Use preset to determine whether there is a common or separate inbound match configuration for each digital interface. It is also a means to quickly configure several useful inbound match configurations. Shared by both interfaces indicates that a single configuration is used by both digital interfaces. Separate for each interface indicates that there is a separate configuration for each digital interface. North American Numbering Plan routes seven digit numbers starting with 2 through 9, and eleven digit numbers whose first digit is 0 or 1 and second digit is 2 through 9 to ACD 1. Consecutive extension ACD route analog port extension numbers to consecutive ACD groups. Match for no number routes a call lacking a called number to ACD 1. 3 digit dialing plan routes any three digit match to ACD 1. 4 digit dialing plan routes any four digit match to ACD 1, etc. Any digit match creates a list of matches to ACD 1. Copy to other interface copies all inbound match parameters from the current interface to the other interface.

Analog Port Dialing Configuration

This screen configures analog port dialing features.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer            Screen 7

                  ANALOG PORT DIALING CONFIGURATION

Intercom Operation:               TRANSFER MODE ONLY*
Intercom Dial 0:                  NOT AVAILABLE*
ACD Call Pickup Digit:            3*
Dial # Mode:                      END OF NUMBER*
Outbound First Digit Timeout:     10* SECONDS
Outbound Interdigit Timeout:      10* SECONDS
Outbound Access Mode:             DIGIT REQUIRED - ALTERNATE INTERFACES*
Interface A Access Digit 1:       9*
Interface A Access Digit 2:       NONE*
Interface A Insert Digits:        -
Interface B Access Digit 1:       8*
Interface B Access Digit 2:       NONE*
Interface B Insert Digits:        -
Recorder/Announcer Access Digits: *99
ACD Hunt Method:                  ASCENDING SEQUENTIAL*
Ring Fault Action:                CONTINUE RINGING*


               Press Space Bar or Backspace to select
               Press Arrow Keys, <F1> help, <F2> exit
```

Help for Analog Port Dialing Configuration

Intercom Operation: Select ALWAYS* (default) or TRANSFER MODE ONLY. Defines whether analog port extensions may dial other analog port extensions at all times or only after the system has seized the network.

Intercom Dial 0: Select NOT AVAILABLE* (default), ACD 1 through ACD 24, MESSAGE 1 PLAY TWICE, or MESSAGE 2 PLAY TWICE. Action that occurs when 0 has been dialed from an analog port. NOT AVAILABLE indicates this feature is not provided. ACD 1-24 connects the call to an ACD group. Message 1-2 play continuous connects the call to a voice message.

ACD Call Pickup Digit: Select 2 through 7 or NOT AVAILABLE. The factory default is 3. The digit to dial to answer an incoming call alerting (ringing) at another station within the ACD group. NOT AVAILABLE indicates this feature is not provided. Note: Outbound access digits, ACD call pickup digit, and analog port extensions must not conflict with each other.

Dial # Mode: Select END OF NUMBER* (default) or PASS THROUGH. Action taken when DTMF # has been dialed on an outbound call. End of number speeds up outbound call processing by immediately processing the dialed number. The # is stripped. The remaining digits are matched with the prefix number on the analog port outbound call configuration screen. Maximum length is ignored. Pass through enables # to be included in the dialed number but does not speed up outbound call processing.

Outbound First Digit Timeout: Select 1 through 10* (default). The maximum time in seconds that the system waits to detect the first digit in the outbound number, after the outbound access digit has been dialed. When this time expires, the caller is sent reorder progress tone.

Outbound Interdigit Timeout: Select 1 through 10* (default). The maximum time in seconds that the system waits to detect interdigit numbers in the outbound number. When this time expires, the system processes the number as dialed.

Analog Port Dialing Configuration

Help for Analog Port Dialing Configuration (continued)

Outbound Access Mode: Select DIGIT REQUIRED – ALTERNATE INTERFACES* (default), DIGIT REQUIRED – DESIGNATED INTERFACE, IMMEDIATE ACCESS TO INTERFACE A, IMMEDIATE ACCESS TO INTERFACE B, IMMEDIATE ACCESS ALTERNATE INTERFACES, or IMMEDIATE ACCESS TO BOTH INTERFACES. DIGIT REQUIRED – ALTERNATE INTERFACES indicates that an access digit must be dialed by a device connected to the analog port to access a digital interface. The selected interface alternates between interface A and B regardless of the dialed access digit. If an access digit is not dialed, only analog port extension numbers and recorder/announcer can be dialed. DIGIT REQUIRED – DESIGNATED INTERFACE indicates that an access digit must be dialed by a device connected to the analog port to access a digital interface. If an access digit is not dialed, only analog port extension numbers and recorder/announcer can be dialed. IMMEDIATE ACCESS TO INTERFACE indicates that calls are sent to the selected digital interface without dialing an access digit. Analog port extension numbers cannot be dialed, but calls can be routed to ACD groups from Analog Port Outbound Call Configuration screen or Inbound Call Configuration screen. Recorder/Announcer cannot be dialed, but calls can be routed to voice messages from Analog Port Outbound Call Configuration screen or Inbound Call Configuration screen. In all cases, calls sent to a digital interface are routed according to the Analog Port Outbound Call Configuration screen. IMMEDIATE ACCESS ALTERNATE INTERFACES indicates that the interface alternates between interface A and B. IMMEDIATE ACCESS TO BOTH INTERFACES is shown when NFAS signaling is enabled.

Interface A Access Digit 1: Select 0 through 9 or NOT AVAILABLE. Factory default is DTMF 9. Digit dialed on an analog port to access digital interface A. Functional only when access digit is required. NOT AVAILABLE indicates this feature is not provided. The system will match the remaining digits dialed with the Analog Port Outbound Call Configuration screen to determine when the dialed number is complete. Shows DISABLED BY IMMEDIATE ACCESS when outbound access mode is immediate access.

Interface A Access Digit 2: Select NONE* (default) or 0 through 9. NONE indicates a second digit is not required. 0 through 9 indicates a second digit is required to access digital interface A.

Interface A Insert Digits: Enter the number, up to 17 digits. Digits 023456789 are allowed. Hyphens (--) indicate no number (default). The system inserts this number in front of the dialed number when SEND WITH INSERT has been selected as the route-if-match on the Analog Port Outbound Call Configuration – Digital Interface A screen.

Interface B Access Digit 1: Select 0 through 9 or NOT AVAILABLE. Factory default is DTMF 8. Digit dialed on an analog port to access digital interface B. Functional only when access digit is required. NOT AVAILABLE indicates this feature is not provided. The system will match the remaining digits dialed with the Analog Port Outbound Call Configuration screen to determine when the dialed number is complete. Shows DISABLED BY IMMEDIATE ACCESS when outbound access mode is immediate access. Shows DISABLED BY NFAS SIGNALING when NFAS signaling is enabled.

Interface B Access Digit 2: Select NONE* (default) or 0 through 9. NONE indicates a second digit is not required. 0 through 9 indicates a second digit is required to access digital interface B.

Interface B Insert Digits: Enter the number, up to 17 digits. Digits 0123456789 are allowed. Hyphens (--) indicate no number (default). The system inserts this number in front of the dialed number when SEND WITH INSERT has been selected as the route-if-match on the Analog Port Outbound Call Configuration – Digital Interface B screen.

Recorder/Announcer Access Digits: Factory preset to *99. Digits dialed on an analog port to record or playback voice messages. Functional only when access digit is required. Shows DISABLED BY IMMEDIATE ACCESS when outbound access mode is immediate access.

ACD Hunt Method: Select ASCENDING SEQUENTIAL* (default), or CLOCKWISE CIRCULAR. Determines the method used for routing inbound calls to OPS ports assigned to ACD groups. Ascending sequential uses the lowest available port number. Clockwise circular assigns port numbers in a clockwise circular pattern.

Analog Port Dialing Configuration

Help for Analog Port Dialing Configuration (continued)

Ring Fault Action: Select CONTINUE RINGING* (default), SEND REORDER, or REMOVE FROM ACD. Action to be taken when analog port fails to sense ring current during alerting. This condition occurs when no device is connected to the analog port. Continue ringing indicates that an analog port should continue ringing when ring current is not detected. Send reorder indicates that the caller is sent reorder progress tone when ring current is not detected. Remove from ACD indicates that an analog port is temporarily removed from ACD selection when ring current is not detected. In addition, the caller is sent reorder progress tone. Once an analog port is removed from ACD selection it is automatically reinstated upon power up, reboot, or the analog port goes off-hook.

Analog Port Outbound Call Configuration

This screen configures how the system will interpret outbound number dialing from the analog ports. There are eight configuration screens, Each screen contains 12 match configurations. The screens may differ, depending on whether the interface is configured for ISDN or RBS.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 8-1

     ANALOG PORT OUTBOUND CALL CONFIGURATION - DIGITAL INTERFACE 1

No.  Prefix                          Max  Strip  Type  Route if Match
 1.  --                              --   --      -    --
 2.  --                              --   --      -    --
 3.  311                             3    0       N    SEND OUT*
 4.  911                             3    0       N    SEND OUT*
 5.  [2-9]NNNNNN                     7    0       S    SEND OUT*
 6.  011                             17   3       I    SEND OUT*
 7.  --                              --   --      -    --
 8.  --                              --   --      -    --
 9.  0[2-9]NNNNNN                    11   0       S    SEND OUT*
10.  1[2-9]NNNNNNNNN                 11   0       S    SEND OUT*
11.  *                               31   0       U    SEND OUT*
12.  0                               31   0       U    SEND OUT*

Preset:  --

* Indicates factory default.

           Enter number (0-31 digits). Backspace to edit.
       Press Tab, Arrow Keys, <F1> help, <F2> exit, <F4> next
```

Help for Analog Port Outbound Call Configuration

This screen is used when the dialed number is sent en-bloc. This screen is not used when the interface uses overlap dialing. This screen is not used by the call generator. This screen is used to determine when the caller has finished dialing, after which the call is sent to the indicated route. After an outbound access digit has been dialed, the system collects the dialed digits until a combination that matches prefix, max length, and strip length is found. The list is scanned starting from line one until a successful match is found. If a match is not found, the call is not sent out and caller is sent vacant tone.

Prefix: Enter up to 31 digits and special characters. Digits 0123456789*# are allowed. These are the digits to be compared with the leading digits of the dialed number to determine a match. Digits NXZ[-] are special characters. N matches any number from 0 through 9. Example: 9NN matches any number from 900 through 999. X matches any number from 0 through #. Example: *XX matches any 2 digits after *. Z creates a match for calls containing no called number. No called number is permitted by switch emulations such as DMS100 and T1 Robbed Bit Signaling. Otherwise outbound calls containing no called number will be sent out but rejected on the inbound side. Prefix ranges are also be created using [min-max]. Min and max represent the minimum and maximum values of the prefix range. A left bracket, hyphen (-), and a right bracket are required. Example: [234-789] matches any number from 234 through 789. Minimum and maximum values are limited only by the line length but must contain the same number of digits. Minimum and maximum values may not contain * or #. Brackets may be repeated, but not nested. Hyphens (--) indicate no number has been specified.

Analog Port Outbound Call Configuration

Help for Analog Port Outbound Call Configuration

Max: Select 1 through 31. The maximum number of digits (after the outbound access digit) that the caller must dial before a match is automatically sent to the indicated route. The system ignores this number when an interdigit timeout occurs or when the caller dials #, and # is configured as a immediate outdial on the Analog Port Dialing Configuration screen. Hyphens (--) indicate no prefix entry has been made.

Strip: Select 0 through 31. The number of digits that the system removes from the beginning of the dialed number, after the access digit, to isolate and send out the desired called number. Hyphens (--) indicate no strip entry has been made.

Type: Select N (default), I, S, A, or U. Indicates the called number type used to dial the called party.
N indicates national: a number that includes a national area code. Example: 3125551212.
I indicates international: a number that includes a country code. Example: 443125551212.
S indicates subscriber: a number that includes a local exchange number. Example: 5551212.
A indicates abbreviated: a number that is 3 to 5 digits long. Example: 1212 or 51212.
U indicates unknown: a number that is either not identified or contains prefix digits that are not part of the called number. Example: *70 to disable call waiting. This information is sent in the called party number information element of the ISDN setup message. Shown for ISDN digital interfaces only.

Route if Match: Select REORDER, SEND OUT or SEND OUT WITH INSERT. The action the system takes if a number match is made. Reorder is provided as a means of blocking specific called numbers. If a match is made, the caller is sent reorder progress tone and the outbound call is not processed. Send out sends the dialed number as the called number. Send out with insert sends the outbound access insert digits followed by the dialed number as the called number. Hyphens (--) indicate no prefix entry has been made.

Preset: Select NORTH AMERICAN NUMBERING PLAN* (default), PROGRESSIVE DIGITS, or COPY TO OTHER INTERFACE. Use preset to set up examples of outbound match configurations to filter outgoing digits. Hyphens (--) do nothing. North American Numbering Plan allow the following to be sent: 311, 911, seven digit numbers starting with 2 through 9, eleven digit numbers starting with 1, 17 digit numbers starting with 011, and 31 digit numbers starting with 0 or *. Progressive digits allow numbers whose first digit indicates the number of digits to be sent. Copy to other interface copies all outbound match parameters from the current interface to the other interface.

ACD Configuration—Master

This screen allows configuration of ACD parameters for all 32 ACD groups. Press <ENTER> then Y to update the ACD parameter for all ACD groups. Use detailed screens to configure individual ACD groups.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 9-1

                      ACD CONFIGURATION - MASTER

Queue Depth:       0*                          ALL DETAILED SCREENS MATCH
Queue Action:      AUDIBLE RING*               ALL DETAILED SCREENS MATCH
Overflow Action:   BUSY TONE*                  ALL DETAILED SCREENS MATCH
Hunt Method:       ASCENDING SEQUENTIAL*









* Indicates factory default.

          Press Space Bar or Backspace to select then <ENTER>
    Press Arrow Keys, <F1> help, <F2> exit, <F3> previous, <F4> next
```

Help for ACD Configuration—Master

Incoming calls are routed through ACD groups to analog ports. If an analog port is not available, the incoming call can be placed in queue. Queued calls are connected to the next available analog port assigned to the ACD group. While a call is in queue, queue action provides either audible ring, continuous message playback, or play message twice. If the queue becomes full, queue overflow action causes additional calls to hear busy progress tone, or connect to a voice message. If no analog ports are assigned to a specific ACD group, calls routed to that ACD group are connected to reorder progress tone.

Queue Depth: Select 0* (default) through 32. Indicates the maximum number of calls that can be queued. 0 indicates that no calls can be queued.

Queue Action: Select AUDIBLE RING* (default), MESSAGE 1 CONTINUOUS, MESSAGE 2 CONTINUOUS, MESSAGE 1 PLAY TWICE, or MESSAGE 2 PLAY TWICE. Message 1 continuous and message 2 continuous routes the call to the selected voice message until an analog port becomes available. Message 1 play twice and message 2 play twice routes the call to silence after the voice message has played twice.

Overflow Action: Select BUSY TONE* (default), MESSAGE 1 PLAY TWICE, or MESSAGE 2 PLAY TWICE, or REDIRECT 1-4. Message 1 play twice and message 2 play twice does a forced disconnect after the selected message has played twice. Redirect routes calls to the associated redirect group.

Hunt Method: Select ASCENDING SEQUENTIAL* (default), or CLOCKWISE CIRCULAR. Determines the method used for routing inbound calls to analog ports assigned to ACD groups. Ascending sequential uses the lowest available port number. Clockwise circular assigns port numbers in a clockwise circular pattern. This feature is not selectable from detailed screens.

After most selections the screen displays ALL DETAILED SCREENS MATCH, SOME DETAILED SCREENS MATCH, or NO DETAILED SCREENS MATCH. This indicates whether the selection matches the same field on the detailed screens.

ACD Configuration—Detailed

This screen configures individual ACD groups. There are 32 detailed screens, one for each ACD group.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 9-2

                    ACD 1 CONFIGURATION - DETAILED

Queue Depth:       0*
Queue Action:      AUDIBLE RING*
Overflow Action:   BUSY TONE*

Channels Assigned by Interface A:  23
Channels Assigned by Interface B:  23
Analog Ports Assigned:             PORT-1,2,3,4,5,6,7,8,9,10,11,12,13,14
                                   PORT-15,16,17,18,19,20,21,22,23,24,25
                                   PORT-26,27,28,29,30,31,32,33,34,35,36
                                   PORT-37,38,39,40,41,42,43,44,45,46,47
Number of Queued Calls:   0
Number of Overflow Calls: 0




* Indicates factory default.

                Press Space Bar or Backspace to select
   Press Arrow Keys, <F1> help, <F2> exit, <F3> previous, <F4> next
```

Help for ACD Configuration—Detailed

Incoming calls are routed through ACD groups to analog ports. If an analog port is not available, the incoming call can be placed in queue. Queued calls are connected to the next available analog port assigned to the ACD group. While a call is in queue, queue action provides either audible ring, continuous message playback, or play message twice. If the queue becomes full, queue overflow action causes additional calls to hear busy progress tone, or connect to a voice message.

Queue Depth: Select 0* (default) through 32. Indicates the maximum number of calls that can be queued. 0 indicates that no calls can be queued.

Queue Action: Select AUDIBLE RING* (default), MESSAGE 1 CONTINUOUS, MESSAGE 2 CONTINUOUS, MESSAGE 1 PLAY TWICE, or MESSAGE 2 PLAY TWICE. Message 1 continuous and message 2 continuous routes the call to the selected voice message until an analog port becomes available. Message 1 play twice and message 2 play twice routes the call to silence after the voice message has played twice.

Overflow Action: Select BUSY TONE* (default), MESSAGE 1 PLAY TWICE, MESSAGE 2 PLAY TWICE, or REDIRECT 1-4. Message 1 play twice and message 2 play twice does a forced disconnect after the selected message has played twice. Redirect routes the call to the specified redirect group.

Channels Assigned by Interface: Shows the total number of channels assigned to this ACD group by each digital interface. When the digital interface is configured for ISDN, inbound matches are assigned on the Inbound Match Configuration screen. When the digital interface is configured for RBS, inbound matches are assigned on the Channel Configuration screen. When the digital interface is configured for RBS, and DNIS routing is assigned to a channel, inbound matches must also be assigned on the Inbound Match Configuration screen.

ACD Configuration—Detailed

Help for ACD Configuration—Detailed (continued)

Analog Ports Assigned: This is a static display that shows PORT followed by the port number of all ports assigned to this ACD group. Hyphens (---) indicate no ports are assigned. Analog ports are assigned on the Analog Port Configuration screen.

Number of Queued Calls: This is a real-time display that shows the number of inbound calls currently waiting in the ACD queue.

Number of Overflow Calls: This is a real-time display that shows the number of inbound calls currently routed to overflow action.

Redirect Configuration—Master

This screen allows configuration of redirect parameters for all four redirect groups. Press <ENTER> then Y to update the redirect parameter for all redirect groups. Use detailed screens to configure individual redirect groups.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 10-1

                    REDIRECT CONFIGURATION - MASTER

Prefix Number:    --                              ALL DETAILED SCREENS MATCH
Inbound Number:   INSERT ENTIRE NUMBER*           ALL DETAILED SCREENS MATCH
Type of Number:   UNKNOWN NUMBER*                 ALL DETAILED SCREENS MATCH
Action:           IMMEDIATE*                      ALL DETAILED SCREENS MATCH
Destination:      OPPOSITE DIGITAL INTERFACE*     ALL DETAILED SCREENS MATCH









* Indicates factory default.

 Enter fixed, sequential, or random number (0-31 digits) then <ENTER>.
           Press Arrow Keys, <F1> help, <F2> exit, <F4> next
```

Help for Redirect Configuration—Master

Redirect causes an incoming call to initiate an outbound call on a digital interface, dial a specified number, and then connect both calls together. If desired, the incoming call can be connected to a voice message first, after which the outbound call is initiated.

Sidenote: ISDN calls redirected by the system's redirect facility copy the following information elements from incoming to outgoing call: bearer capability, display, calling party (caller), high layer compatibility, low layer compatibility, progress indicator, transit network selection, and user-user. The channel ID is not copied, but must be recalculated. The number of outgoing channels is determined from the bearer capability information transfer rate. The called number may be copied or replaced as configured by prefix number, inbound number, and type of number. The redirecting number information element is sent using the system's calling number. This is to assist law enforcement in identifying calls redirected through a third party.

Prefix Number: Enter up to 31 digits and special characters. Digits 0123456789*# are allowed. Factory default shows hyphens (--) to indicate that a number has not been entered. This number is inserted in front of the inbound number to form the called number. The called number should not contain an access digit (8 or 9) and is not processed by the Analog Port Outbound Call Configuration screen. The called number is sent in the called party number information element of the ISDN setup message. The system can send and receive up to 31 digits. A prefix number is required on the detailed screens. If the prefix number is blank, the system will send reorder.

Digits [+-] are special characters. Sequential numbers may be created using [min+max]. Random numbers may be created using [min-max]. Min and max represent the minimum and maximum values of the number. A left bracket, plus or minus, and right bracket are required. For example: 55512[00-99]

Help for Redirect Configuration—Master (continued)

indicates to send a random number between 5551200 and 5551299. The minimum and maximum values may range from 0 through 9999 and do not require the same number of digits. The minimum and maximum values may not contain * or #. Brackets may be repeated, but may not be nested.

Inbound Number: Select EXCLUDE ENTIRE NUMBER* (default), INSERT ENTIRE NUMBER, STRIP FIRST DIGIT, or STRIP FIRST 2 DIGITS through STRIP FIRST 30 DIGITS. Selects the number of inbound digits to insert after the prefix number when dialing the redirect called number. Numbers are stripped starting from left to right. Example: *1*5551212, strip first 3 digits becomes 5551212.

Type of Number: Select UNKNOWN NUMBER* (default), INTERNATIONAL NUMBER, NATIONAL NUMBER, SUBSCRIBER NUMBER, or ABBREVIATED NUMBER. Used by ISDN signaling only. Type of number is sent in the called party number information element of the ISDN setup message. Unknown number is either not identified or contains prefix digits that are not part of the called number.

Example: *70 to disable call waiting. International number includes a country code. Example: 443125551212. National number includes a national area code. Example: 3125551212. Subscriber number includes a local exchange number. Example: 5551212. Abbreviated number is 3 to 5 digits long. Example: 1212 or 51212.

Action: Select IMMEDIATE* (default), MESSAGE 1 PLAY ONCE, or MESSAGE 2 PLAY ONCE. If message is selected, the message is played once before the call is redirected.

Destination: Select OPPOSITE DIGITAL INTERFACE* (default), SAME CHANNEL OPPOSITE INT, SAME DIGITAL INTERFACE, or LAST 3 INBOUND DIGITS. Opposite digital interface indicates that the redirected call will use the digital interface not used by the inbound call. For example, if a call comes in on digital interface 1, the redirected call will go out on digital interface 2. The channel number is determined by the channel search configuration.

Same channel opposite interface indicates that the redirected call will use the same channel on the opposite digital interface.

Same digital interface indicates that the redirected call will use the same digital interface that is used by the inbound call. For example, if a call comes in on digital interface 1, the redirected call will go out on digital interface 1.

Last 3 inbound digits indicates that the last three digits of the inbound number determines the destination digital interface and channel number. The digital interface is indicated by the third to last digit. The channel number is indicated by the last two digits. For example, if the last three digits are 102, the redirected call goes out on digital interface 1 channel 2.

After each selection the screen displays ALL DETAILED SCREENS MATCH, SOME DETAILED SCREENS MATCH, or NO DETAILED SCREENS MATCH. This indicates whether the selection matches the same field on the detailed screens.

Redirect Configuration—Detailed

This screen configures individual redirect groups. There are four detailed screens, one for each redirect group.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 10-2

                  REDIRECT 1 CONFIGURATION - DETAILED

Prefix Number:     --
Inbound Number:    INSERT ENTIRE NUMBER*
Type of Number:    UNKNOWN NUMBER*
Action:            IMMEDIATE*
Destination:       OPPOSITE DIGITAL INTERFACE*

Channels Assigned by Interface A:  0
Channels Assigned by Interface B:  0
Inbound Matches Assigned:          --


ACD Overflows Assigned:            --

Number of Redirected Calls:        0


* Indicates factory default.

  Enter fixed, sequential, or random number (0-31 digits). Backspace to edit.
   Press Arrow Keys, <F1> help, <F2> exit, <F3> previous, <F4> next
```

Help for Redirect Configuration—Detailed

Redirect causes an incoming call to initiate an outbound call on a digital interface, dial a specified number, and then connect both calls together. If desired, the incoming call can be connected to a voice message first, after which the outbound call is initiated.

Sidenote: ISDN calls redirected by the system's redirect facility copy the following information elements from incoming to outgoing call: bearer capability, display, calling party (caller), high layer compatibility, low layer compatibility, progress indicator, transit network selection, and user-user. The channel ID is not copied, but must be recalculated. The number of outgoing channels is determined from the bearer capability information transfer rate. The called number may be copied or replaced as configured by prefix number, inbound number, and type of number. The redirecting number information element is sent using the system's calling number. This is to assist law enforcement in identifying calls redirected through a third party.

Prefix Number: Enter up to 31 digits and special characters. Digits 0123456789*# are allowed. Factory default shows hyphens (--) to indicate that a number has not been entered. This number is inserted in front of the inbound number to form the called number. The called number should not contain an access digit
(8 or 9) and is not processed by the Analog Port Outbound Call Configuration screen. The called number is sent in the called party number information element of the ISDN setup message. The system can send and receive up to 31 digits. A prefix number is required. If the prefix number is blank, the system will send reorder.

Digits [+-] are special characters. Sequential numbers may be created using [min+max]. Random numbers may be created using [min-max]. Min and max represent the minimum and maximum values of the number. A left bracket, plus or minus, and right bracket are required. For example: 55512[00-99]

Redirect Configuration—Detailed

Help for Redirect Configuration—Detailed (continued)

indicates to send a random number between 5551200 and 5551299. The minimum and maximum values may range from
0 through 9999 and do not require the same number of digits. The minimum and maximum values may not contain * or #. Brackets may be repeated, but may not be nested.

Inbound Number: Select EXCLUDE ENTIRE NUMBER* (default), INSERT ENTIRE NUMBER, STRIP FIRST DIGIT, or STRIP FIRST 2 DIGITS through STRIP FIRST 30 DIGITS. Selects the number of inbound digits to insert after the prefix number when dialing the redirect called number. Numbers are stripped starting from left to right. Example: *1*5551212, strip first 3 digits becomes 5551212.

Type of Number: Select UNKNOWN NUMBER* (default), INTERNATIONAL NUMBER, NATIONAL NUMBER, SUBSCRIBER NUMBER, or ABBREVIATED NUMBER. Used by ISDN signaling only. Type of number is sent in the called party number information element of the ISDN setup message. An unknown number is either not identified or contains prefix digits that are not part of the called number. Example: *70 to disable call waiting. An international number includes a country code. Example: 443125551212. A national number includes a national area code. Example: 3125551212. A subscriber number includes a local exchange number. Example: 5551212. An abbreviated number is 3 to 5 digits long. Example: 1212 or 51212.

Action: Select IMMEDIATE* (default), MESSAGE 1 PLAY ONCE, or MESSAGE 2 PLAY ONCE. If message is selected, the message is played once before the call is redirected.

Destination: Select OPPOSITE DIGITAL INTERFACE* (default), SAME CHANNEL OPPOSITE INT, SAME DIGITAL INTERFACE, or LAST 3 INBOUND DIGITS. Opposite digital interface indicates that the redirected call will use the digital interface not used by the inbound call. For example, if a call comes in on digital interface 1, the redirected call will go out on digital interface 2. The channel number is determined by the channel search configuration.

Same channel opposite interface indicates that the redirected call will use the same channel on the opposite digital interface.

Same digital interface indicates that the redirected call will use the same digital interface that is used by the inbound call. For example, if a call comes in on digital interface 1, the redirected call will go out on digital interface 1. The channel number is determined by the channel search configuration.

Last 3 inbound digits indicates that the last three digits of the inbound number determines the destination digital interface and channel number. The digital interface is indicated by the third to last digit. The channel number is indicated by the last two digits. For example, if the last three digits are 102, the redirected call goes out on digital interface 1 channel 2.

Channels Assigned by Interface: This is a static display that shows the total number of channels assigned to this redirect group by each digital interface. When the digital interface is configured for ISDN, inbound matches are assigned on the Inbound Match Configuration screen. When the digital interface is configured for RBS, inbound matches are assigned on the Channel Configuration screen. When the digital interface is configured for RBS and inbound match routing is assigned to a channel, inbound matches must also be assigned on the Inbound Match Configuration screen.

Inbound Matches Assigned: This is a static display that shows MATCH followed by the reference number of all matches assigned to this redirect group. Hyphens (--) indicate no matches are assigned. Inbound matches are assigned on the Inbound Match Configuration screen.

ACD Overflows Assigned: This is a static display that shows ACD followed by the ACD number containing the overflow action assigned to this redirect group. Hyphens (--) indicate no ACD overflows are assigned. ACD overflows are assigned on the ACD Configuration screen.

Number of Redirected Calls: This is a real-time display that shows the total number of inbound calls currently being redirected.

CPE DS1 Monitor Configuration—Master

This screen configures conditions under which the system will transfer both digital interfaces to internal or external operation. Press <ENTER> then Y to update a selection. Use detailed screens to configure individual interfaces.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 11-1

                  CPE DS1 MONITOR CONFIGURATION - MASTER

Interface A Status:  PASS-THROUGH
Interface B Status:  PASS-THROUGH

CPE DS1 Monitor Frame Loss: DISABLED*          ALL DETAILED SCREENS MATCH
Include Yellow Alarm:       DISABLED*          ALL DETAILED SCREENS MATCH
CPE DS1 Monitoring Time:    10 SECONDS*        ALL DETAILED SCREENS MATCH
CPE DS1 Keep Alive:         SEND FRAMED ONES*  ALL DETAILED SCREENS MATCH
CPE DS1 Monitor Action:     TRANSFER EACH INTERFACE SEPARATELY*
Send Blue Alarm Time:       10 SECONDS*

Contact 1 Status:  DISABLED
Contact 2 Status:  DISABLED
CPE DS1 A Reconnect Status:  NOT IN TRANSFER MODE
CPE DS1 B Reconnect Status:  NOT IN TRANSFER MODE

* Indicates factory default.


              Press Space Bar or Backspace then <ENTER>
           Press Arrow Keys, <F1> help, <F2> exit, <F4> next
```

Help for CPE DS1 Monitor Configuration—Master

Interface Status: Shows CARD NOT PRESENT, PASS-THROUGH, RECEIVING BLUE ALARM, RECEIVING YELLOW ALARM, SYNCHRONIZED, NOT SYNCHRONIZED, or LAYER 2 DOWN. Indicates framing status of digital interface. Layer 2 down is applicable to ISDN digital interfaces only.

CPE DS1 Monitor Frame Loss: Select DISABLED* (default) or ENABLED. Disables or enables monitoring of frame loss from the CPE DS1.

Include Yellow Alarm: Select DISABLED* (default) or ENABLED. Determines whether monitoring of yellow alarm from the CPE DS1 should be included in frame loss monitoring. Yellow alarm is sent by the CPE when the CPE is unable to detect DS1 framing. Note that the CPE DS1 monitor ignores yellow alarm when going out of transfer mode. When going out of transfer mode the system sends a blue alarm to the CPE, causing the CPE to send back a yellow alarm.

CPE DS1 Monitoring Time: Select 1 SECOND through 100 SECONDS. Factory default is 10 seconds. Indicates the minimum time required to detect CPE DS1 frame loss or yellow alarm before CPE DS1 monitor action is taken.

CPE DS1 Keep Alive: Select SEND FRAMED ONES* (default), SEND BLUE ALARM, SEND YELLOW ALARM, or SEND LINE LOOPBACK. This function selects the signal to be sent to the CPE DS1 by the system when in transfer mode. Send framed ones sends ones with a framing bit. Send blue alarm sends unframed ones. Note that this may cause the CPE device to send back a yellow alarm and if yellow alarm monitoring is enabled, create a dead lock. Send yellow alarm sends a remote alarm. Send line loopback takes the received data and transmits it back to the source. Received data is retransmitted without change in framing format and any bipolar violations are not removed. Received data is also passed unchanged through to the system as incoming data so that CPE DS1 monitoring may continue.

CPE DS1 Monitor Configuration—Master

Help for CPE DS1 Monitor Configuration—Master (continued)

CPE DS1 Monitor Action: Select TRANSFER EACH INTERFACE SEPARATELY* (default), TRANSFER BOTH INTERFACES, or TRANSFER BOTH INTERFACES INCLUSIVELY. Indicates what to do when the CPE DS1 monitor detects an alarm. Transfer each interface separately indicates that when a CPE DS1 alarm occurs, the associated interface goes into transfer mode. Transfer both interfaces indicates that when a CPE DS1 alarm occurs on either monitor, both interfaces go into transfer mode. Transfer both interfaces inclusively indicates that when a CPE DS1 alarm occurs on both monitors, both interfaces go into transfer mode. Otherwise nothing happens.

Send Blue Alarm Time: Select DO NOT SEND BLUE ALARM, 100 MILLISECONDS through 100 SECONDS. Factory default is 10 SECONDS*. Indicates the time the system will send a blue alarm to the central office and the CPE DS1 to cause calls in progress to disconnect. This is done when going into transfer mode and again when going out of transfer mode.

Contact 1-2 Status: Shows DISABLED, NORMAL or ALARM. Indicates the contact status before any debounce delays.

CPE DS1 A/B Reconnect Status: Shows NOT IN TRANSFER MODE, ALARM PRESENT, MANUAL OPERATION PRESENT, or AWAITING BLUE ALARM TIME.

After most selections the screen displays ALL DETAILED SCREENS MATCH, SOME DETAILED SCREENS MATCH, or NO DETAILED SCREENS MATCH. This indicates whether the selection matches the same field on the detailed screens.

CPE DS1 Monitor Configuration—Detailed

This screen configures conditions under which the system will transfer the digital interface to internal or external operation.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 11-2

     CPE DS1 MONITOR CONFIGURATION - DETAILED - DIGITAL INTERFACE A

Interface Status:  PASS-THROUGH

CPE DS1 Monitor Frame Loss:  DISABLED*
Include Yellow Alarm:        DISABLED*
CPE DS1 Monitoring Time:     10 SECONDS*
CPE DS1 Keep Alive:          SEND FRAMED ONES*

CPE DS1 Monitor Alarm Status:  DISABLED (NO FRAMING DETECTED)
CPE DS1 Reconnect Status:      NOT IN TRANSFER MODE
Network DS1 Status:            NORMAL (PASS-THROUGH TO CPE DS1)
Manual DS1 Switch Status:      NORMAL




* Indicates factory default.

               Press Space Bar or Backspace then <ENTER>
   Press Arrow Keys, <F1> help, <F2> exit, <F3> previous, <F4> next
```

Help for CPE DS1 Monitor Configuration—Detailed

Interface Status: Shows CARD NOT PRESENT, PASS-THROUGH, RECEIVING BLUE ALARM, RECEIVING YELLOW ALARM, SYNCHRONIZED, NOT SYNCHRONIZED, or LAYER 2 DOWN. Indicates framing status of digital interface. Layer 2 down is applicable to ISDN digital interfaces only.

CPE DS1 Monitor Frame Loss: Select DISABLED* (default) or ENABLED. Disables or enables monitoring of frame loss from the CPE DS1.

Include Yellow Alarm: Select DISABLED* (default) or ENABLED. Determines whether monitoring of yellow alarm from the CPE DS1 should be included in frame loss monitoring. Yellow alarm is sent by the CPE when the CPE is unable to detect DS1 framing.

CPE DS1 Monitoring Time: Select 1 SECOND through 100 SECONDS. Factory default is 10 seconds. Indicates the minimum time required to detect CPE DS1 frame loss or yellow alarm before CPE DS1 monitor action is taken.

CPE DS1 Keep Alive: Select SEND FRAMED ONES* (default), SEND BLUE ALARM, SEND YELLOW ALARM, or SEND LINE LOOPBACK. This function selects the signal to be sent to the CPE DS1 by the system when in transfer mode. Send framed ones sends ones with a framing bit. Send blue alarm sends unframed ones. Note that this may cause the CPE device to send back a yellow alarm and if yellow alarm monitoring is enabled, create a dead lock. Send yellow alarm sends a remote alarm. Send line loopback takes the received data and transmits it back to the source. Received data is retransmitted without change in framing format and any bipolar violations are not removed. Received data is also passed unchanged through to the system as incoming data so that CPE DS1 monitoring may continue.

CPE DS1 Monitor Alarm Status: Shows DISABLED, NORMAL, or ALARM followed by (FRAMING DETECTED), (NO FRAMING DETECTED), or (YELLOW ALARM DETECTED). Indicates the alarm status and line status before any time delays. Yellow alarm implies framing detected.

CPE DS1 Monitor Configuration—Detailed

Help for CPE DS1 Monitor Configuration—Detailed (continued)

CPE DS1 Reconnect Status: Shows NOT IN TRANSFER MODE, ALARM PRESENT, MANUAL OPERATION PRESENT, or AWAITING BLUE ALARM TIME.

Network DS1 Status: Shows NORMAL (PASS-THROUGH TO CPE DS1) or TRANSFER (NETWORK DS1 SEIZED). Indicates transfer relay status.

Manual Operation Switch Status: Shows NORMAL, SEIZE NETWORK DS1, or RETURN NETWORK DS1 TO CPE DS1. An alarm or manual switch condition causes the system to disconnect from the CPE DS1 and seize the Network DS1. After all conditions return to normal, the system reconnects Network DS1 to CPE DS1. If you have seized Network DS1 using the Manual Operation switch, you must use the Manual Operation switch to return Network DS1 to CPE DS1.

Contact Input Configuration

This screen configures conditions under which the system will transfer the digital interfaces to internal or external operation. Press <ENTER> then Y to update a selection.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 12-1

                      CONTACT INPUT CONFIGURATION

Interface A Status:           PASS-THROUGH
Interface B Status:           PASS-THROUGH

Contact 1 Input:              DISABLED*
Contact 2 Input:              DISABLED*
Contact 1 Action:             TRANSFER INTERFACE A*
Contact 2 Action:             TRANSFER INTERFACE B*

Contact 1 Status:             DISABLED
Contact 2 Status:             DISABLED
CPE DS1 A Reconnect Status:   NOT IN TRANSFER MODE
CPE DS1 B Reconnect Status:   NOT IN TRANSFER MODE



* Indicates factory default.


                Press Space Bar or Backspace then <ENTER>
                  Press Arrow Keys, <F1> help, <F2> exit
```

Help for Contact Input Configuration

Interface Status: Shows CARD NOT PRESENT, PASS-THROUGH, RECEIVING BLUE ALARM, RECEIVING YELLOW ALARM, SYNCHRONIZED, NOT SYNCHRONIZED, or LAYER 2 DOWN. Indicates framing status of digital interface. Layer 2 down is applicable to ISDN digital interfaces only.

Contact 1-2 Input: Select DISABLED* (default), NORMALLY-OPEN, or NORMALLY-CLOSED. Enables or disables contact input monitoring. NORMALLY-OPEN contacts require a minimum of one second closure to detect an alarm. A minimum of three seconds open is required to return back to the NORMAL state. NORMALLY-CLOSED contacts require a minimum of one second open to detect an alarm. A minimum of three seconds closure is required to return back to the NORMAL state. If alarm is detected, the system seizes the Network DS1.

Contact 1-2 Action: Select TRANSFER INTERFACE A* (default for contact 1), TRANSFER INTERFACE B* (default for contact 2), or TRANSFER BOTH INTERFACES. Selects which transfer relay is closed when a contact input activates.

Contact 1-2 Status: Shows DISABLED, NORMAL or ALARM. Indicates the contact status before any debounce delays.

CPE DS1 A/B Reconnect Status: Shows NOT IN TRANSFER MODE, ALARM PRESENT, MANUAL OPERATION PRESENT, or AWAITING BLUE ALARM TIME.

Digital Interface Call Status

This screen shows each digital interface's call status. There are four status screens, two for each digital interface. Each screen has two modes: display called number or display calling number and name. Press the space bar to toggle between them.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 13-1

          DIGITAL INTERFACE CALL STATUS - DIGITAL INTERFACE A

Interface Status:  PASS-THROUGH

DCN    State           Dir   Connect   Called Number
A/1    00-NOT IN USE   ---   ---       ---
A/2    00-NOT IN USE   ---   ---       ---
A/3    00-NOT IN USE   ---   ---       ---
A/4    00-NOT IN USE   ---   ---       ---
A/5    00-NOT IN USE   ---   ---       ---
A/6    00-NOT IN USE   ---   ---       ---
A/7    00-NOT IN USE   ---   ---       ---
A/8    00-NOT IN USE   ---   ---       ---
A/9    00-NOT IN USE   ---   ---       ---
A/10   00-NOT IN USE   ---   ---       ---
A/11   00-NOT IN USE   ---   ---       ---
A/12   00-NOT IN USE   ---   ---       ---



      Press Space Bar to toggle between called and calling number
                Press <F1> help, <F2> exit, <F4> next
```

Help for Digital Interface Call Status

Interface Status: Shows CARD NOT PRESENT, PASS-THROUGH, RECEIVING BLUE ALARM, RECEIVING YELLOW ALARM, SYNCHRONIZED, NOT SYNCHRONIZED, or LAYER 2 DOWN. Indicates framing status of digital interface.

DCN: Shows digital channel number as interface/number.

State: Shows state number followed by state name: ALERTING, MULTIRATE, CONNECT, DATA CHAN, DISCONNECT, FLASH, NOT IN USE, PROCEEDING, PROGRESS, RESERVED, SETUP, SETUP ACK, TRANSITION, or WINK.

Dir: Shows direction. IN for inbound or OUT for outbound. Hyphens (---) indicate channel not in use.

Connect: Shows ACD, DCN, MSG, or PORT. Shows resource connected to digital channel. ACD stands for automatic call distribution. DCN stands for digital channel number. MSG stands for recorder/announcer message. PORT stands for analog port number. Hyphens (---) indicate no connection.

Called Number: Shows the called number, up to 31 digits. Hyphens (---) indicate that a call is not present.

Calling Number: Shows the calling party number that originated the call, up to 17 digits. Hyphens (---) indicate that a call is not present or number not available. Shows PRIVATE if ISDN presentation is restricted. Press space bar to view this field.

Calling Name: Shows the calling party name that originated the call, if presentation is allowed, up to 17 digits. Hyphens (---) indicate that a call is not present or name not available. Shown for ISDN digital interfaces only.

Transmission Status

This screen displays digital interface transmission information. There are two status screens, one for each digital interface.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 14-1

              TRANSMISSION STATUS - NETWORK INTERFACE A

Interface Status:         PASS-THROUGH
Debounced Synchronized:   NO
Transmit Slips:           00000
Receive Slips:            00000
Bipolar Violations:       00000
ESF CRC Errors:           00000
Synchronization Losses:   00000
Receive Level:            LESS THAN -22dB
Elapsed Sync Time:        00 00:00 00
System Reboots:           00002
Reboot Error:             NONE



Reset Status Counters:    NO*

* Indicates factory default.

               Press Space Bar or Backspace then <ENTER>
                 Press <F1> help, <F2> exit, <F4> next
```

Help for Transmission Status

Interface Status: Shows CARD NOT PRESENT, PASS-THROUGH, RECEIVING BLUE ALARM, RECEIVING YELLOW ALARM, SYNCHRONIZED, NOT SYNCHRONIZED, or LAYER 2 DOWN. Indicates framing status of digital interface. Layer 2 down is applicable to ISDN digital interfaces only.

Debounced Synchronized: Shows YES or NO. Yes indicates digital interface has maintained synchronization for one second or more. No indicates it has lost synchronization for five seconds or more.

Transmit Slips: Increments each time transmit elastic store buffer either repeats or deletes a frame. This number can increment only when debounced synchronized is yes.

Receive Slips: Increments each time receive elastic store buffer either repeats or deletes a frame. This number can increment only when debounced synchronized is yes.

Bipolar Violations: Increments each time the receiver circuitry fails to detect an alternate pulse or excessive zeros. This number can increment only when debounced synchronized is yes.

ESF CRC Errors: Shows number of ESF checksum errors. Hyphens (---) indicate D4 framing. This number is updated only when debounced synchronized is yes.

Synchronization Losses: Shows number of times system has lost synchronization.

Receive Level: Shows +2dB TO –7.5dB, –7.5dB TO –15dB, –15dB TO –22.5dB, or LESS THAN –22.5dB, or hyphens (---). Indicates strength of incoming signal; +2dB to –7.5dB is the strongest, less than –22.5dB is the weakest. Hyphens (---) indicate no card present.

Elapsed Sync Time: Shows time since start of last debounced synchronization. Format is days hours:minutes seconds.

Help for Transmission Status (continued)

System Reboots: Shows number of times system has rebooted due to power failure, manual reset through keystrokes, or software run-time error.

Reboot Error: Shows NONE, BUS ERROR, ADDRESS ERROR, ILLEGAL INSTRUCTION, DIVIDE BY ZERO, PRIVILEGED INSTRUCTION, UNEXPECTED SINGLE STEP, UNEXPECTED TRAP, and GENERAL ERROR. Used by factory to show cause of unexpected system reboot.

Reset Status Counters: Select NO* (default), THIS SCREEN ONLY, ALL TRANSMISSION STATUS SCREENS, or ALL STATUS SCREENS. The selections allow status counters on this screen, all transmission screens, or all status screens to be reset. All status screens include Transmission Status and Data Capture Display screens. <ENTER> must be pressed to reset the status counters. Status counters are saved when power is shut off.

Data Monitor—Digital Interface

This screen connects a test tone to a digital interface channel or analog port. Note that DTMF tones don't have a cadence, but are steady tones.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 15-1

                  DATA MONITOR - DIGITAL INTERFACE A

Interface Status:  PASS-THROUGH

                                1 1 1 1 1 1 1 1 1 1 2 2 2 2 2
Channel:     1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4

Inbound Data (Hex):
Bits 5-8:    0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Bits 1-4:    0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

                Press <F1> help, <F2> exit, <F4> next
```

ISDN Data Monitor–Digital Interface Screen

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 15-1

                  DATA MONITOR - DIGITAL INTERFACE A

Interface Status:  SYNCHRONIZED

                                1 1 1 1 1 1 1 1 1 1 2 2 2 2 2
Channel:     1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4

Inbound Data (Hex):
Bits 5-8:    F F F F F F F F F F F F F F F F F F F F F F F C
Bits 1-4:    F F F F F F F F F F F F F F F F F F F F F F F F
Inbound Signaling Bits (Binary):
Bit A:       1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Bit B:       1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Bit C:       1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Bit D:       1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Outbound Signaling Bits (Binary):
Bit A:       0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Bit B:       0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Bit C:       0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Bit D:       0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

                Press <F1> help, <F2> exit, <F4> next
```

Robbed Bit Data Monitor–Digital Interface Screen

Data Monitor—Digital Interface

Help for Data Monitor—Digital Interface

This screen displays channel data for each digital interface. It also shows the interface status. There are two digital interface status screens, one for each digital interface. The screens may differ, depending on whether the interface is configured for ISDN or RBS.

Interface Status: Shows CARD NOT PRESENT, PASS-THROUGH, RECEIVING BLUE ALARM, RECEIVING YELLOW ALARM, SYNCHRONIZED, NOT SYNCHRONIZED, or LAYER 2 DOWN. Indicates framing status of digital interface.

Channel: Shows channel number for items below.

Inbound Data: Shows data coming into the system. Most of the channels are bearer channels and contain digitally encoded voice or data. 00 indicates that the interface is not synchronized. FF is the idle state. Occasionally FF changes to FE on channels containing robbed bit signaling. Channel 24 of an ISDN digital interface is the data channel and contains HDLC packets. FF indicates HDLC packets are not present. 3F, 7E, 9F, CF, E7, F3, F9, and FC are valid HDLC idle states. The idle state tends to change as new HDLC packets are received.

Inbound Signaling Bits: Shows ABCD signaling in binary coming into the system. SF framing uses only the A and B bits. ESF framing also contains C and D bits. Shown for RBS digital interfaces only.

Outbound Signaling Bits: Shows ABCD signaling bits in binary sent from the system. SF framing uses only the A and B bits. ESF framing also contains C and D bits. Shown for RBS digital interfaces only.

Data Monitor—Analog Ports

This screen displays port data for the analog ports.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 15-3

                      DATA MONITOR - ANALOG PORTS


                                1 1 1 1 1 1 1 1 1 2 2 2 2 2
Port:     1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4

Inbound Data (Hex):
Bits 5-8: F F F 7 F F 7 F F F F F 7 7 F F F F F F F F F F
Bits 1-4: E F F F F E F F F F F F E F F F F F F F F F F F


          2 2 2 2 2 3 3 3 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4
Port:     5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8

Inbound Data (Hex):
Bits 5-8: F F F F F F F F F 7 F F F F F F 7 F 7 F 7 7 F F
Bits 1-4: F F F F F F F F F F F F F F F F F F F F F F F F




               Press <F1> help, <F2> exit, <F3> previous
```

Help for Data Monitor—Analog Ports

Port: Shows port number for items below.

Inbound Data: Shows data coming into the system. Ports 1 through 48 contain digitally encoded voice or data.

Tone Connect Test Functions

This screen connects a test tone to a digital interface channel or analog port. Note that DTMF tones don't have a cadence, but are steady tones.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 16

                     TONE CONNECT TEST FUNCTIONS

Connect Status:  NORMAL OPERATION*
Tone Number:     1 (DTMF 1)*
Destination:     DIGITAL INTERFACE A*
DCN/Port:        DCN 1*









* Indicates factory default.

                Press Space Bar or Backspace to select
                Press Arrow Keys, <F1> help, <F2> exit
```

Help for Tone Connect Test Functions

Connect Status: Select NORMAL OPERATION* (default) or CONNECT TONE. Normal operation indicates the tone is not connected. Connect tone indicates to connect the tone to the destination device. Upon power up or system reboot, connect status is normal operation.

Tone Number: Select 0 through 9 and 14 through 19. See tone list.

Destination: Select DIGITAL INTERFACE A* (default), DIGITAL INTERFACE B, or ANALOG PORTS. This selects the group of ports or channels the tone should be connected to.

DCN/Port: Select the specific DCN or PORT the tone should be connected to. DCN stands for digital channel number. PORT stands for analog port number. The factory default is DCN 1.

Tone List

0 - DTMF 0	4 - DTMF 4	8 - DTMF 8	16 - Dial Tone
1 - DTMF 1	5 - DTMF 5	9 - DTMF 9	17 - Audible Ring
2 - DTMF 2	6 - DTMF 6	14 - DTMF *	18 - Busy/Reorder
3 - DTMF 3	7 - DTMF 7	15 - DTMF #	19 - 440Hz

Digital Interface Test Functions

This screen allows configuration of digital interface test functions. There are four screens, two for each digital interface. The screens may differ, depending on whether the interface is configured for ISDN or RBS. Many of these tests are not related to each other.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 17-1

        DIGITAL INTERFACE TEST FUNCTIONS - DIGITAL INTERFACE A

Loopback:                    NO LOOPBACK*
Send Alarm:                  AUTO ALARM*
Setup Bearer Capability:     SPEECH*
Information Transfer Rate:   64 KBPS*
Channel ID Format:           SEND CHANNEL ID WITHOUT INTERFACE ID*
Channel ID Mode:             SEND CHANNEL ID IN FIRST MESSAGE ONLY*
ISDN Setup Ack Message:      SEND SETUP ACK MSG*
ISDN Proceeding Message:     SEND PROCEEDING MSG*
ISDN Alerting Operation:     SEND ALERTING MSG*
ISDN Progress Description:   IN-BAND PROGRESS AVAILABLE*
In-band Tones:               SUPPLY IN-BAND TONES*

ISDN Alerting Action:  SEND ALERTING MSG WITH PROGRESS IE
ISDN Progress Action:  SEND PROGRESS MSG WITH PROGRESS IE


* Indicates factory default.

              Press Space Bar or Backspace then <ENTER>
          Press Arrow Keys, <F1> help, <F2> exit, <F4> next
```

ISDN Digital Interface Test Functions Screen

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 17-1

        DIGITAL INTERFACE TEST FUNCTIONS - DIGITAL INTERFACE A

Loopback:             NO LOOPBACK*
Send Alarm:           AUTO ALARM*
In-band Tones:        SUPPLY IN-BAND TONES*
Local Ringback Tone:  CUT-THROUGH*









* Indicates factory default.

              Press Space Bar or Backspace then <ENTER>
          Press Arrow Keys, <F1> help, <F2> exit, <F4> next
```

Robbed Bit Digital Interface Test Functions Screen

Digital Interface Test Functions

Help for Digital Interface Test Functions

Loopback: Select NO LOOPBACK* (default), LINE LOOPBACK, PAYLOAD LOOPBACK, or INTERNAL LOOPBACK. This selection affects layer 1. No loopback causes the digital interfaces to operate normally. No loopback is the default condition upon power up or reboot. Line loopback takes the received data and transmits it back to the source. Received data is retransmitted without change in framing format and any bipolar violations are not removed. Received data is also passed unchanged through to the system as incoming data. Payload loopback takes the received data and transmits it back to the source. The framing FDL bits and CRC bits are recalculated before being retransmitted and bipolar violations are removed. Normally this loopback is enabled in ESF framing mode. Received data is also passed unchanged through to the system as incoming data. Internal loopback takes the transmitted data and loops it back internally as the incoming data. Received data from the source is ignored. Transmit data is not sent to the source.

Send Alarm: Select AUTO ALARM* (default), YELLOW ALARM, BLUE ALARM, or NO ALARM. This selection affects layer 1. Auto alarm sends a yellow alarm as part of the transmitted data whenever the received data has been out of sync for more than five seconds. Upon power up or reboot, send alarm is set to auto alarm. When an interface is set to D4 framing, yellow alarm sends zeros in bit position 2 on all 24 digital interface channels. Does not cause loss of synchronization but causes transmitted data to be intentionally corrupted. When an interface is set to ESF framing, yellow alarm sends 8 zeros and 8 ones in the facilities data link time slot of the framing bit. Does not cause loss of synchronization or corruption of transmitted data. Blue alarm sends ones in all bit positions, including the framing bit. Causes loss of synchronization and essentially no transmit data. No alarm prevents transmitting a yellow or blue alarm, even when the incoming data warrants it.

Setup Bearer Capability: Select SPEECH* (default), UNRESTRICTED DIGITAL INFORMATION, RESTRICTED DIGITAL INFORMATION, 3.1KHZ AUDIO (ANALOG MODEM), 7KHZ AUDIO, or VIDEO. This information is sent in the bearer capability information element. This selection is not used by redirected calls. Shown for ISDN digital interfaces only.

Information Transfer Rate: Select 64 KBPS* (default) through 23 x 64 KBPS (MULTIRATE) in 64 KBPS increments. This information is sent in the bearer capability information element and channel ID information element. This selection is not used by redirected calls. 5ESS, DMS100, Euro ISDN, and NI-2 accept all transfer rates. 4ESS accepts 64 KBPS and 6 x 64 KBPS (H0) only. All other 4ESS transfer rates are special cases and are not coded according to CCITT standards. Shown for ISDN digital interfaces only.

Channel ID Format: Select SEND CHANNEL ID WITHOUT INTERFACE ID* (default) or SEND CHANNEL ID WITH INTERFACE ID. Send channel ID without interface ID indicates that the channel ID information element is sent in ISDN messages with interface ID not present. This is the normal case for FAS (Facility Associated Signaling) and indicates that each digital interface contains its own ISDN signaling channel. Send channel ID with interface ID indicates that the channel ID information element is sent in ISDN messages with interface ID present. This is the normal case for NFAS (Non-Facility Associated Signaling) and indicates that only one digital interface contains an ISDN signaling channel. This system must be licensed for NFAS to operate properly on more than one interface. Shown for ISDN digital interfaces only.

Channel ID Mode: Select SEND CHANNEL ID IN FIRST MESSAGE ONLY* (default), SEND CHANNEL ID IN ALLOWABLE MESSAGES, or DO NOT SEND CHANNEL ID. Send channel ID in first message only indicates that the channel ID information element is sent in the first ISDN message of a new call. This is usually the setup, call proceeding, or setup acknowledge message. Send channel ID in allowable messages indicates that the channel ID information element is sent in all allowable ISDN messages. This includes the setup, setup acknowledge, proceeding, progress, and connect messages. Do not send channel ID indicates that the channel ID information element is not sent in ISDN messages. This is allowed for user side Euro ISDN and causes problems for other switch emulations. Shown for ISDN digital interfaces only.

Help for Digital Interface Test Functions (continued)

ISDN Setup Ack Message: Select SEND SETUP ACK MSG* (default), or DO NOT SEND SETUP ACK MSG. Send setup ack msg causes the system to send the ISDN setup acknowledge message in response to receiving an ISDN setup message. Do not send setup ack msg prevents the system from sending the ISDN setup acknowledge message. This message is normally sent to acknowledge a setup message not containing a called number. Shown for ISDN digital interfaces only.

ISDN Proceeding Message: Select SEND PROCEEDING MSG* (default), or DO NOT SEND PROCEEDING MSG. Send proceeding msg causes the system to send the ISDN call proceeding message in response to receiving an ISDN setup message. Do not send proceeding msg prevents the system from sending the ISDN call proceeding message. This message is normally sent to acknowledge a setup message containing a called number. Shown for ISDN digital interfaces only.

The next four test functions provide a way to test how the receiving side handles progress tones. In-band (circuit switched) progress tones are sent across the digital interface faster than ISDN progress messages (packet switched), but automated equipment might prefer using ISDN progress messages. Network side dial tone (after any access digits) is always supplied locally. User side T1 ISDN uses en-bloc sending, so dial tone (after any access digits) is supplied locally. User side T1 RBS (robbed bit signaling) uses overlap sending, so dial tone (after any access digits) must be supplied by the network side. The ISDN call proceeding message is always sent after the call setup message.

ISDN Alerting Operation: Select SEND ALERTING MSG* (default), SEND PROGRESS MSG, SEND CONNECT MSG, or DO NOT SEND ALERTING MSG. Send alerting msg causes the system to send the ISDN alerting message and supply in-band audible ring progress tones. Send progress msg prevents the ISDN alerting message from being sent. Instead, it sends the ISDN progress message while supplying in-band audible ring progress tones providing ISDN progress description is not do not send progress IE. Send connect msg prevents the ISDN alerting message from being sent. Instead, it sends the ISDN connect message while supplying in-band audible ring progress tones providing ISDN progress description is not do not send progress IE. Do not send alerting msg prevents any ISDN messages from being sent when an alerting message would normally be sent. This creates an abnormal situation. Combined with do not send proceeding msg, the near end should resend the setup message and then release the call. To help understand the full effect from this selection, the message sent is shown at the bottom of this screen. Shown for ISDN digital interfaces only.

ISDN Progress Description: Select IN-BAND PROGRESS AVAILABLE* (default), NOT END-TO-END ISDN, RETURN TO END-TO-END ISDN, or DO NOT SEND PROGRESS IE. This is a code sent in the progress indicator information element of progress messages and alerting messages. It also determines which ISDN messages are sent. To help understand the full effect from this selection, the message sent is shown at the bottom of this screen. Use in-band progress available, not end-to-end ISDN, and return to end-to-end ISDN to indicate there are in-band progress tones. On the receiving side, presence of a progress IE indicates to connect the bearer channel to the audio path. Use do not send progress IE to indicate there are no in-band progress tones. Do not send progress IE implies an end-to-end ISDN connection and there are no in-band progress tones. On the receiving side, lack of a progress IE indicates not to connect the bearer channel to the audio path. Shown for ISDN digital interfaces only.

In-band Tones: Select SUPPLY IN-BAND TONES* (default) or DO NOT SUPPLY IN-BAND TONES. Supply in-band tones permits the system to send tones across the digital interface. This includes dial, busy, reorder, and audible ring progress tones. These tones are normally sent by the system when it is the terminating side to a call. Do not supply in-band tones prevents the system from supplying in-band tones across the digital interface. This is not the normal case for the public network. Use this selection to determine the origin of progress tones. This selection affects the audio path only, it has no effect on ISDN messages sent by the system.

Help for Digital Interface Test Functions (continued)

Local Ringback Tone: Select CUT-THROUGH* (default) or SUPPLY LOCAL RINGBACK. Cut-through connects the audio path so that the caller can hear tones from the connected system. Supply local ringback is intended for use with channel banks that do not supply ringback tone. Local ringback is supplied on the network side (FXO/SAO) of loop start or ground start systems, and both sides for E&M immediate and E&M wink. Shown for RBS digital interfaces only.

The next two fields are static displays to help understand the full effects from ISDN Alerting Operation and ISDN Progress Description.

ISDN Alerting Action: Shows SEND ALERTING MSG, SEND ALERTING MSG WITH PROGRESS IE, NONE, SEND PROGRESS MSG WITH PROGRESS IE, or SEND CONNECT MSG WITH PROGRESS IE. Send alerting message indicates that the ISDN alerting message is sent without the progress indicator information element and the system supplies in-band audible ring progress tones. This indicates that the receiving side should supply local audible ring progress tone even though the remote audible ring progress tone is present. Send alerting message with progress information element indicates that the ISDN alerting message is sent with the progress indicator information element and the system supplies in-band audible ring progress tones. None indicates that no ISDN message is sent and the system supplies in-band audible ring progress tones. Send progress message with progress information element indicates that the ISDN progress message is sent with the progress indicator information element and the system supplies in-band audible ring progress tones. Send connect message with progress information element indicates that the ISDN connect message is sent with the progress indicator information element and the system supplies in-band audible ring progress tones. Shown for ISDN digital interfaces only.

ISDN Progress Action: Shows SEND DISCONNECT MSG, SEND PROGRESS MSG WITH PROGRESS IE or NONE. Send disconnect message indicates that the ISDN disconnect message is sent without supplying an in-band progress tone, indicating that the far end should supply local busy or reorder progress tones based on the cause information element included in the disconnect message. Send progress message with progress information element indicates that the ISDN progress message is sent with the progress indicator information element and the system supplies an in-band busy or reorder progress tone. None indicates that the switch emulation does not send a progress message. Shown for ISDN digital interfaces only.

Digital Interface Test Functions

This screen allows configuration of digital interface test functions. There are four screens, two for each digital interface. The screens may differ, depending on whether the interface is configured for ISDN or RBS. This screen has no configurable parameters for RBS. Most of these tests are not related to each other.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 17-2

        DIGITAL INTERFACE TEST FUNCTIONS - DIGITAL INTERFACE A

ISDN Layer 2 Startup:          START IMMEDIATELY*
Setup Exclusive Channel ID:    PREFERRED*
Non-Setup Channel ID Format:   NUMBER/SLOT MAP*
Multirate Slot Assignment:     FIXED SLOTS*
Redirect Elements:             COPY END TO END ELEMENTS*
Network Specific Service:      DO NOT SEND NETWORK SPECIFIC SERVICE*









* Indicates factory default.

               Press Space Bar or Backspace then <ENTER>
   Press Arrow Keys, <F1> help, <F2> exit, <F3> previous, <F4> next
```

Help for Digital Interface Test Functions

ISDN Layer 2 Startup: Select START IMMEDIATELY* (default), or WAIT UNTIL FIRST OUTGOING CALL. This selection selects when the interface should initiate layer 2 handshaking. Start immediately indicates to initiate handshaking upon detection of frame synchronization. Wait until first outgoing call indicates to initiate handshaking upon making the first outgoing call. Shown for ISDN digital interfaces only.

Setup Exclusive Channel ID: Select PREFERRED* (default) or EXCLUSIVE. This information is sent by the ISDN channel ID information element as part of setup messages. Preferred indicates that the channel is being requested and may be changed by the near end if the channel is already in use. Exclusive indicates that the channel is not negotiable and the call should be rejected by the near end if the channel is already in use. This feature was added to test for rejection of preferred channel IDs and to allow testing for glare. Applies only to channel IDs sent as part of setup messages. Non-setup messages always send exclusive channel IDs. DMS100 always sends exclusive channel IDs regardless of this setting. Shown for ISDN digital interfaces only.

Non-Setup Channel ID Format: Select NUMBER/SLOT MAP* (default) or SLOT MAP ONLY. This is the format sent by the ISDN channel ID information element in non-setup messages. Number/slot map indicates that number format is used for 64 KBPS calls and slot map format is used for 128 KBPS or higher calls. Slot map only indicates that slot map format is used for all calls. Use number/slot map on older Lucent (AT&T) switches that do not support slot map format for 64 KBPS calls. Slot map only will cause older Lucent (AT&T) switches to return cause code 82, channel does not exist, when sent slot map format in call proceeding messages. Shown for ISDN digital interfaces only.

Help for Digital Interface Test Functions (continued)

Multirate Slot Assignment: Select FIXED SLOTS* (default) or FLEXIBLE SLOTS.

This selection applies to H0, H11, and multirate channels. Fixed slots indicate that slot assignment must be contiguous and end on a slot evenly divisible by the rate multiplier. Example: 6 x 64 KBPS transfer rates must end on slot 6, 12, 18, 24, or 30. Flexible slots indicate that slot assignment may be contiguous or noncontiguous. Shown for ISDN digital interfaces only.

Redirect Elements: Select COPY END TO END ELEMENTS* (default) or DO NOT COPY END TO END ELEMENTS. This selection indicates when the system's redirect facility will copy the display, high layer compatibility, low layer compatibility, progress indicator, transit network, and user-user information elements from the incoming setup message to outgoing setup message. Copy end to end elements: allows these elements to be copied. Do not copy end to end elements: inhibits these elements from being copied. Shown for ISDN digital interfaces only.

Network Specific Service: Select DO NOT SEND NETWORK SPECIFIC SERVICE* (default), or SEND CODE 0 through SEND CODE 31. Network specific service identifies a specific long distance service. It is sent in the network specific facility information element of ISDN setup messages. Do not send network specific service does not send the network specific facility information element when originating a call and does not check for it when receiving a call. Send code 0 through send code 31 sends the network specific facility information element when originating a call and checks for it when receiving a call. If missing, the call is rejected with cause 96; mandatory information element is missing. Shown for ISDN digital interfaces only.

Data Capture Configuration

This screen configures the way signaling messages and call detail records are captured and displayed. It also starts or stops the call generator. To display captured data, press <ENTER> from this screen.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 18

                      DATA CAPTURE CONFIGURATION

Status:                 NOT RUNNING*
Screen Mode:            VT100 EMULATION*
Capture Type:           LAYER 3 WITH INFORMATION ELEMENTS*
Calls to Capture:       ALL*
Source:                 INTERFACE A AND INTERFACE B*
Message Type 1:         ALL MESSAGE TYPES*
Message Type 2:         NONE*
Message Type 3:         NONE*
Message Type 4:         NONE*









* Indicates factory default.

     Press Space Bar or Backspace. Press <ENTER> to view results.
                     Press <F1> help, <F2> exit
```

Help for Data Capture Configuration

Status: Select NOT RUNNING or RUNNING. Not running stops data capture and holds the information shown in VT100 emulation mode. Running allows new information to be captured. In VT100 emulation mode, press <ENTER> to display the last page of captured information. In raw ASCII output screen mode, press <ENTER> to display the special raw ASCII output screen.

Screen Mode: Select VT100 EMULATION* (default) or RAW ASCII OUTPUT. VT100 emulation displays captured information using normal screen output. Raw ASCII output sends newly arrived information to the display device with VT100 emulation disabled. This feature is useful for capturing screen output to a file.

Capture Type: Select LAYER 3 WITH INFORMATION ELEMENTS* (default), LAYER 3 - NO INFORMATION ELEMENTS, LAYER 2 & LAYER 3 WITH INFORMATION ELEMENTS, LAYER 2 & LAYER 3 - NO INFORMATION ELEMENTS, LAYER 2 ONLY, or CALL DETAIL RECORDS. Layer 3 with information elements shows ISDN layer 3 messages with information elements on separate lines. Layer 3 - no information elements: shows ISDN layer 3 messages without information elements. Layer 2 only: shows ISDN layer 2 frames. Use layer 2 to check layer 2 handshaking with the near end. Layer 2 and layer 3 shows identical information for T1 RBS. Call detail records show basic information such as channel used and called number. They are displayed after a call is disconnected. See help in the Data Capture Display Screen section for more details.

Calls to Capture: Select ALL* (default), NEXT INCOMING, NEXT OUTGOING, or UNTIL INTERNAL ERROR. Indicates whether to capture all calls or only the next incoming or outgoing call. ALL captures all calls. It is undesirable to run data capture with all calls for long periods of time because it may interfere with normal system operation. This selection is preset to ALL when Capture Type is CALL DETAIL RECORDS. NEXT INCOMING captures the next incoming call. Data capture may be retriggered by changing data capture status from running to not running and then running again. NEXT OUTGOING captures the next outgoing

Help for Data Capture Configuration (continued)

call. Data capture may be retriggered by changing data capture status from running to not running and then running again. UNTIL INTERNAL ERROR captures all calls until an internal ISDN error is reported. Upon detecting an internal ISDN error, data capture status is changed to not running so that data capture is preserved for later analysis.

Source: Select INTERFACE A AND INTERFACE B* (default), INTERFACE A, INTERFACE B, or ANALOG PORTS. Indicates the source from which the data will be captured. Analog ports work only with call detail records.

Message Type 1: Select ALL MESSAGE TYPES* (default), SETUP, SETUP_ACK, CALL_PROC, ALERTING, PROGRESS, CONNECT, CONNECT_ACK, DISCONNECT, RELEASE, RELEASE_COMP, INFO, NOTIFY, RESTART, RESTART_ACK, STATUS, STATUS_ENQ, or USER_INFO. Indicates whether to capture all message types or only the selected message type.

Message Type 2: Select NONE* (default), SETUP, SETUP_ACK, CALL_PROC, ALERTING, PROGRESS, CONNECT, CONNECT_ACK, DISCONNECT, RELEASE, RELEASE_COMP, INFO, NOTIFY, RESTART, RESTART_ACK, STATUS, STATUS_ENQ, or USER_INFO. Allows a second message type to be captured.

Message Type 3: Similar to message type 2. Allows a third message type to be captured.

Message Type 4: Similar to message type 2. Allows a fourth message type to be captured.

Data Capture Display

The display screen shows layer 2, layer 3, and call detail records. It is accessed from the configuration screen by pressing <ENTER>.

```
Gordon Kapes, Inc.        922 Power-Fail Transfer            Screen 18-10

                      DATA CAPTURE DISPLAY PAGE 10


 Version 5.00
 Version 5.00
 RECEIVE DSL=A TIME=00:29 37.000 CRV=00001 CRF=0 SETUP
               BEARER_CAPABILITY 04 03 80 90 A2   SPEECH
               CHANNEL_ID        18 03 A1 83 81   CHANNEL 1
               PROGRESS_IND      1E 02 80 83      ORIGIN ADDRESS NON-ISDN
               CALLED_NUMBER     70 08 C1         "5551234"
 SEND    DSL=A TIME=00:29 37.000 CRV=00001 CRF=1  CALL_PROC
               CHANNEL_ID        18 03 A9 83 81   CHANNEL 1
 SEND    DSL=A TIME=00:29 37.050 CRV=00001 CRF=1  ALERTING
               PROGRESS_IND      1E 02 80 88      IN-BAND PROGRESS
 RECEIVE DSL=A TIME=00:29 50.800 CRV=00001 CRF=0  DISCONNECT
               CAUSE             08 02 82 90  #16:NORMAL CLEARING
 SEND    DSL=A TIME=00:29 50.800 CRV=00001 CRF=1  RELEASE
 RECEIVE DSL=A TIME=00:29 50.850 CRV=00001 CRF=0  RELEASE_COMP


       RUNNING - Press Space Bar to stop. Press C to clear screen.
                 Press <F1> help, <F2> exit, <F3> previous
```

ISDN Data Capture Display Screen

```
Gordon Kapes, Inc.        922 Power-Fail Transfer            Screen 18-10

                      DATA CAPTURE DISPLAY PAGE 10









 I/O,CID..,DCN.,CONN,STATE NAME,OUT.,IN..,TIME......,CALLED, (RBS Format)
 IN ,00001,D101,    ,SETUP     ,0000,1111,00:03 10.700,,
 IN ,00001,D101,    ,WINK      ,1111,1111,00:03 10.850,,
 IN ,00001,D101,    ,SETUP ACK ,0000,1111,00:03 11.050,,
 IN ,00001,D101,P002,CONNECT   ,1111,1111,00:03 41.650,5551234,
 IN ,00001,D101,P002,DISCONNECT,0000,1111,00:03 46.050,5551234,
 IN ,00001,D101,P002,NOT IN USE,0000,0000,00:03 46.600,5551234,


    NOT RUNNING - Press Space Bar to start. Press C to clear screen.
                  Press <F1> help, <F2> exit, <F3> previous
```

Robbed Bit Data Capture Display Screen

Data Capture Display

Help for Data Capture Display

In VT100 emulation mode, information is scrolled upward, starting from the bottom of the last page. It is best to start viewing from the last page as it contains the most recent information. In raw ASCII output mode, each line is sent as 8 bit ASCII text followed by carriage return (CR) and line feed (LF).

Select NOT RUNNING and RUNNING by pressing the space bar. Not running stops data capture and holds the information shown. Running allows new information to be captured. If there is a lot of screen activity, the message ***DATA OVERFLOW IN DATA CAPTURE*** will appear in the text. Pressing the space bar also retriggers data capture when configured for next incoming call or next outgoing call.

Press C to clear screen. Pressing C also retriggers data capture when configured for next incoming call or next outgoing call. Pressing C has no effect on data capture status.

The following text applies to ISDN layer 2 and layer 3. Robbed bit signaling and call detail records are explained later.

The first word of each line identifies the information source: RECEIVE, SEND, STATUS, and ERROR. Receive indicates the message was received by the system when ISDN signaling is in effect, or this is the terminating side when RBS signaling is in effect. Send indicates the message was sent by the system when ISDN signaling is in effect, or this is the originating side when RBS signaling is in effect. Status indicates the message is internal to the system and typically indicates digital interface shutdown and startup requests due to loss of synchronization. Error indicates an error has occurred within the system. Error messages are captured even when the status of data capture is not running.

ISDN records are displayed in several different formats: layer 2, layer 3, and layer 3 with information elements.

When capture type is layer 3, the format for the first line of ISDN messages that are sent and received is: SEND or RECEIVE, DSL, TIME, CRV, CRF, and ISDN message name. Information elements then follow on separate lines.

When capture type is layer 2 & layer 3, the first line shows ISDN layer 2 frames. Use layer 2 to check layer 2 handshaking with the near end. The format is: SEND or RECEIVE, DSL, TIME, TEI, SAPI, frame type, NS, NR, and PF. SEND or RECEIVE, CRV, CRF, and ISDN message name appear on next line. Information elements then follow on separate lines.

Format of status messages is: STATUS, DSL, TIME, TEI, SAPI, and primitive type.

Format of error messages is: ERROR followed by text describing the error.

Definitions:

CES: Connection Endpoint Suffix. Layer 3 information. Associated with TEI. Private to each side of the digital interface. CES 0 is broadcast, 1 is PRI endpoint.

CID: Call ID. Internal to the system. Decimal number used to identify each call. Private to each side of the system. Associated with Call Reference, which identifies the call between the user and the connected equipment. CID 0 is non-call related, 0001 through 32767 are incoming calls, 32769 through 65535 are outgoing calls. Robbed Bit Signaling CIDs range from 00001 through 32767.

CRF: Call Reference Flag. Layer 3 information. The most significant bit of the call reference. This bit is 0 for the originating side and 1 for the terminating side.

CRV: Call Reference Value. Layer 3 information. Decimal number used to identify a specific call between the system and the connected equipment. Numbers range from 00001 through 32767. CRV is associated with Call ID, which is private to each side of the connection.

DSL: Digital Subscriber Line. Layer 1 information.

SAPI: Service Access Point Identifier. Layer 2 information. SAPI 0 is signaling, 16 is packetized data, and 63 is network management.

TEI: Terminal Endpoint Identifier. Layer 2 information. Identifies the terminating endpoint to the central office. Associated with CES. TEI 0 is broadcast, 1 is PRI endpoint.

Help for Data Capture Display (continued)

TIME: Time shown as hh:mm ss.mmm representing hour, minute, second, and millisecond. Uses current system time.

Frame Type: Layer 2 information:
DISC: Disconnect.
DM: Disconnect mode.
FRMR: Frame Reject.
I: Information; followed by NS and NR.
REJ: Reject.
RNR: Receive Not Ready.
RR: Receive Ready; followed by NR.
SABME: Set Asynchronous Balanced Mode Extended.
UA: Unnumbered Acknowledge.
UI: Unnumbered Information.
XID: Exchange Identification.

NR: Frame Received Number. Layer 2 information.

NS: Frame Sent Number. Layer 2 information.

PF: Poll/Final Bit. Layer 2 information. PF 0 is poll, 1 is final.

Primitives are ISDN layer to layer messages. Primitives are displayed by status messages and are generally useful only to the factory. Although there are too many to fully describe here, the most common are:
MDL_ERR_IND: Layer 2 error indication.
MDL_STARTUP_REQ: Layer 2 startup request.
MDL_SHUTDOWN_REQ: Layer 2 shutdown request.

Message Name: Layer 3 information. Although there are too many to fully describe here, the most common are:
SETUP: Begin call setup.
CALL_PROC: Proceeding; near end has received setup.
PROGRESS: Far end is sending a progress tone.
ALERTING: Far end is sending an audible ring progress tone.
CONNECT: Far end has answered.
DISCONNECT: Disconnect far end.
RELEASE: Near end has disconnected.

Information elements contain details about each message. Layer 3 information. Information elements are displayed on separate lines after the message name. There are two information element formats: standard Q.931 and non-standard. Both formats display the information element name followed by hex octets representing the information element data. Q.931 octet 1 contains the information elements identifier. Q.931 octet 2 shows the number of octets to follow. Some Q.931 information elements only contain one octet. Non-standard information elements are preceded by a tilde (~) and are for factory use. Non-standard octets 1 and 2 are the information element identifier. Non-standard octet 3 shows the number of octets to follow. IA5 (International Alphabet) characters are decoded and shown as readable characters surrounded by quotes (“).

The most common information elements are:
BEARER_CAPABILITY: Encoding method. Transfer capability shown as text.
CALLING_NUMBER: Originating phone number.
CALLED_NUMBER: Destination phone number.
CAUSE: Cause of problem. Cause shown as text.
CHANGE_STATUS: Channel is in or out of service.
CHANNEL_ID: Bearer channel. Channel number shown as text.
DISPLAY: Send text such as an extension number or name.

Data Capture Display

Help for Data Capture Display (continued)

NETWORK_FACILITY: Type of long distance service.
PROGRESS_IND: Whether or not call is end to end ISDN.
REDIRECTING_NUM: Redirecting phone number.

Call detail records show basic call information such as channel used and called number. Call detail records are displayed after a call is disconnected. The header *I/O,CID,DCN,CONN,START_T,CONNECT_T, DISC_T,CALLED,CALLING,NAME, (CDR Format) is displayed when data capture starts running. Call detail records start with * and commas separate each field.

I/O shows whether the call was inbound or outbound.

CID shows call id (5 decimal digits).

DCN shows the digital channel number (Dnnn) or analog port (Pnnn).

CONN shows the connecting device and is formatted as Dnnn (digital channel number), Gnnn (call generator), Mnnn (message number), or Pnnn (analog port). Blank indicates no device.

Time is shown as ddhhmmss representing day, hour, minute, and second.

START_T shows the time call was started.

CONNECT_T shows the time call was connected.

DISC_T shows the time call was disconnected.

CALLED shows called number.

CALLING shows calling party number. NAME shows calling party name. Adjacent commas (,,) indicate information was not available.

Example: *0,00003,D201,P016,01143915,,,5551212,,, shows that the call was sent by the system, call id is 00003, uses digital interface 2 channel 1, originated from analog port 16, started at day 01 hour 14 minute 39 second 15, no connect or disconnect time, called number is 5551212, and no calling number.

Quick System Status

This screen shows a simple real time overview of each analog port or digital interface channel. It also shows the audio monitor status and call generator status. It starts or stops the call generator.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer            Screen 19

                          QUICK SYSTEM STATUS

                                1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 3 3 3
              1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2

Analog 1-32:  - - - - - - - - - - - - - - - -

Analog 33-48: - - - - - - - - - - - - - - - -

Interface A:  PASS-THROUGH

Interface B:  PASS-THROUGH









                Press Space Bar or Backspace then <ENTER>
```

Help for Quick System Status

This screen shows a simple real time overview of each analog port or digital interface channel. It also shows the audio monitor status and call generator status. It starts or stops the call generator.

Analog 1-32 and Analog 33-48: Shows single character status for each analog port: hyphen (-) for on-hook or break-loop current, A for alerting, C for off-hook, or N for no ring current detected (ring fault). If analog card is not present, nothing is shown for its associated ports.

Interface A and Interface B: Shows single character value for each digital interface channel: hyphen (-) for not in use, A for alerting, C for connected, D for disconnect, F for flash, G for progress, K for setup acknowledge, M for multirate, P for proceeding, R for reserved, S for setup, T for transition, and W for wink.

The line may also show CARD NOT PRESENT, PASS-THROUGH, RECEIVING BLUE ALARM, RECEIVING YELLOW ALARM, NOT SYNCHRONIZED, or LAYER 2 DOWN indicating framing status of digital interface.

Save/Restore System Configuration

This screen loads the system configuration to or from nonvolatile memory. Before installing new program ROM chips to upgrade the system, record the system configuration as all configuration parameters in system memory will be cleared.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 20

                  SAVE/RESTORE SYSTEM CONFIGURATION

Action:           --
Selected Profile: 1

No.  Profile Description
1    FACTORY DEFAULTS
2    FACTORY DEFAULTS
3    FACTORY DEFAULTS
4    FACTORY DEFAULTS

Active Profile:   1 - FACTORY DEFAULTS
Active Status:    MATCHES SYSTEM CONFIGURATION

Activating an action item stops call processing.
It also takes the system out of transfer mode.




             Press Space Bar or Backspace then <ENTER>
                    Press <F1> help, <F2> exit
```

Help for Save/Restore System Configuration

Action: Select hyphens (--), SAVE SYSTEM CONFIGURATION INTO SELECTED PROFILE, RESTORE SELECTED PROFILE INTO SYSTEM CONFIGURATION, RESTORE FACTORY DEFAULTS AND RESTART SYSTEM, SEND SELECTED PROFILE TO OUTPUT DEVICE, RECEIVE INCOMING DATA AND STORE INTO SELECTED PROFILE, or RESTART SYSTEM. <ENTER> must be pressed to initiate selected action. Hyphens (--) indicate no selection. Save system configuration into selected profile writes the current system configuration into the selected profile. Restore selected profile into system configuration loads the selected profile as the current system configuration. If the version numbers match, the system is restarted and the screen is cleared. If the version numbers do not match, NOT RESTORED – WRONG VERSION NUMBER appears on the action line. Restore factory defaults into system configuration loads the factory default values into the system configuration but not the profile database. The system is then restarted, which clears the screen. Restore factory defaults and profile database loads the factory default values into the system configuration and profile database. The system is then restarted, which clears the screen. This also stops the front panel alarm status LEDs from flashing on and off due to a corrupted database. Send selected profile to output device displays a special screen that gives further instructions regarding sending a profile to a remote storage device. Receive incoming data and store into selected profile displays a special screen that gives further instructions regarding receiving a profile from a remote storage device. Restart system restarts the system, which clears the screen.

Selected Profile: Select 1 through 4. Selects the profile to be acted upon by the action or new description function.

Profile Description: Enter text to uniquely describe a profile. Hyphens (--) indicate no text has been entered. Press <ENTER> to write the new name into the selected profile. This field can not be changed until the profile has been saved.

Save/Restore System Configuration

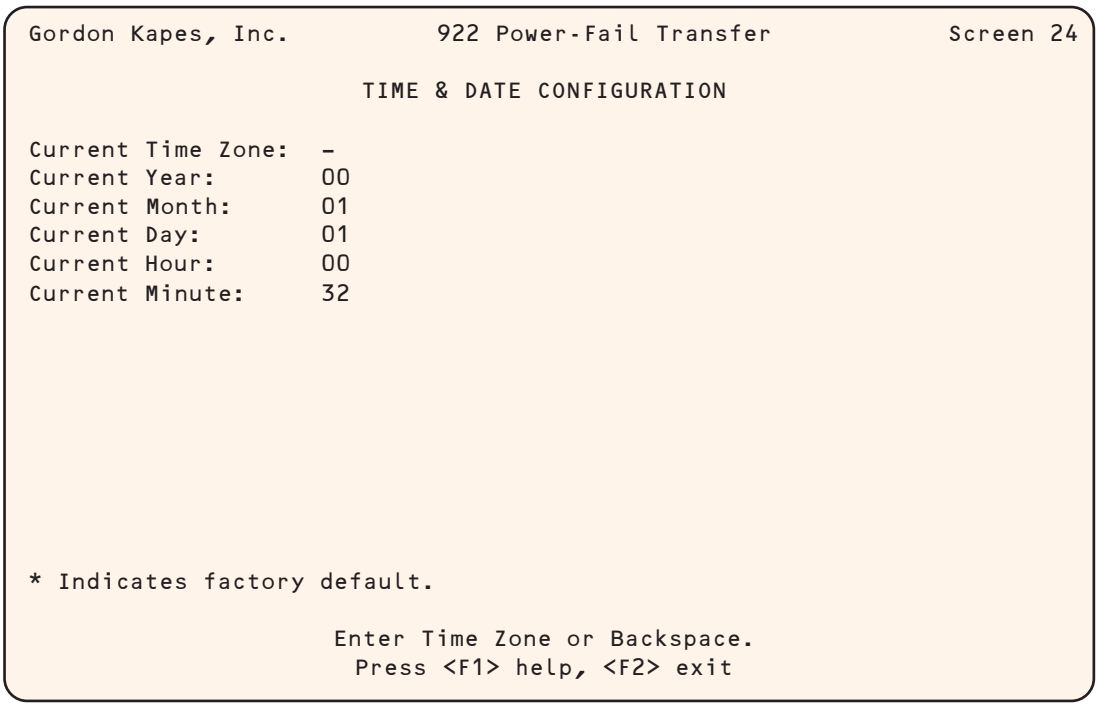
Help for Save/Restore System Configuration (continued)

Active Profile: Shows 1 through 4 and its associated description. Indicates the most recently loaded or saved profile. When not factory default, the associated description is also displayed at the top of each screen.

Active Status: Shows MATCHES SYSTEM CONFIGURATION or DOES NOT MATCH SYSTEM CONFIGURATION. Indicates whether the active profile matches the current system configuration.

Time & Date Configuration

This screen sets the time and date used by data capture display screens and for sending Caller ID.



Help for Time & Date Configuration

Time Zone: Enter time zone abbreviation, up to 5 characters. Shows hyphens (--) if no time zone has been entered. Example: UTC for Universal Time Coordinated. Just a reminder and not used by any screens or resources.

Current Year: Select 00 through 99. Current time appears in data capture records. Revision C processor card does not advance time during power down. Revision F and higher processor board maintains time during power down through use of a battery powered clock. Changing any time field resets seconds to 00.

Current Month: Select 01 through 12.

Current Day: Select 01 through 31. Upper limit depends on year and month.

Current Hour: Select 00 through 23.

Current Minute: Select 00 through 59.

939 Analog Card Configuration

This screen configures parameters for the 939 analog card. The 939 analog card emulates eight FXS (subscriber) loop start circuits.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 25

                    939 ANALOG CARD CONFIGURATION

Inbound Analog Call Configuration:
Number of Rings:       1*
Route Action:          ACD 1*
Called Number:         5550O[01+99]
Called Mode:           SEND CALLED NUMBER*
Type of Number:        UNKNOWN NUMBER*

Outbound Analog Calls Initiated from a Digital Interface:
Analog Dialed Number:  9,5550O[01+99]
Analog Dialed Mode:    SEND ANALOG DIALED NUMBER*

General Parameters:
939 Receive Loss:         OdB*
939 Reference Tone:       OFF*
Forced Disconnect Time:   O    SECONDS

* Indicates factory default.

               Press Space Bar or Backspace then <ENTER>
                 Press Arrow Keys, <F1> help, <F2> exit
```

Help for 939 Analog Card Configuration

The 939 analog card allows the system to answer an incoming analog call. Incoming analog calls are detected by the presence of alerting voltage. The system then initiates an outbound call according to the selected route action. The calls are then connected together. Call teardown is initiated by a break in analog loop current or a disconnect from the outbound side. The Analog Port Dialing Configuration screen and Analog Port Outbound Call Configuration screen are not used.

The 939 analog card also allows the system to initiate an outbound analog call. Calls may be initiated from one of three sources; an incoming call from a digital interface, the call generator, or an outgoing call from another analog port. To initiate an outbound analog call the 939 analog port goes off-hook, DTMF dials the analog dialed number, and connects the calls together. Digital interface calls are routed to the 939 analog card when route if match on the Inbound Match Configuration screen is set to an ACD or PORT containing a 939 analog port. Call generator calls are routed to the 939 analog card when call routing on the Call Generator Configuration - Analog Ports screen is set to an ACD containing a 939 analog port. Analog port calls are routed to the 939 analog card by dialing the extension of a 939 analog port. When going off-hook, if the 939 analog port does not detect loop current within the outbound first digit timeout time as configured on the Analog Port Dialing Configuration screen, the port goes on-hook and the call is terminated.

Number of Rings: Select 1* (default) through 9. Number of incoming alerting cycles before going off-hook and processing the call.

Route Action: Select ACD 1* (default) through ACD 32, DIGITIAL INTERFACE B, DIGITAL INTERFACE B, ALTERNATE INTERFACES REORDER, BUSY, MSG 1 PLAY CONTINUOUS, or MSG 2 PLAY CONTINUOUS. Selects the action taken after the 939 analog port answers a call. ACD routes the call to the specified ACD group. Digital interface and alternate interfaces sends the call to the specified digital interface. Alternate interfaces uses digital interfaces 1 & 2, alternating between them on every other call. Reorder and busy

Help for 939 Analog Card Configuration (continued)

routes the call to the specified progress tone and remains connected until the caller disconnects. Msg 1 play continuous and msg 2 play continuous routes the call to the specified voice message and plays the message until the caller disconnects.

Called Number: Enter up to 31 digits and special characters. Digits 0123456789*# are allowed. The factory default is 55500[01+99]. Hyphens (--) indicate no number entered. Used when an inbound call is routed to a digital interface. Determines part of the called number sent to the digital interface. An access digit (8 or 9) is not required. The system can send and receive up to 31 digits.

Digits [+-] are special characters. Sequential numbers may be created using [min+max]. Random numbers may be created using [min-max]. Min and max represent the minimum and maximum values of the number. A left bracket, plus or minus, and right bracket are required. For example: 55512[00-99] indicates to send a random number between 5551200 and 5551299. The minimum and maximum values may range from 0 through 9999 and do not require the same number of digits. The minimum and maximum values may not contain * or #. Brackets may be repeated, but may not be nested.

Called Mode: Select SEND CALLED NUMBER* (default), SEND CALLED NUMBER WITH 1 DIGIT EXT OVERLAY through SEND CALLED NUMBER WITH 4 DIGIT EXT OVERLAY, SEND CALLED NUMBER WITH EXTENSION OVERLAY, or SEND NO NUMBER. Used when an inbound call is routed to a digital interface. Determines the called number sent to the digital interface. Send called number sends the called number. Send called number with 1 digit ext overlay through Send called number with 4 digit ext overlay sends the called number and overlays the last one to four analog port extension digits at the end of the called number. The digits are overlaid from left to right. Send called number with extension overlay sends the called number and overlays up to five analog port extension digits at the end of the called number. Send no number means that there is no number. Example: If this selection is send called number with 2 digit ext overlay, the called number is 5550000, and the extension is 1234, then the number sent is 5550034.

Type of Number: Select UNKNOWN NUMBER* (default), INTERNATIONAL NUMBER, NATIONAL NUMBER, SUBSCRIBER NUMBER, or ABBREVIATED NUMBER. Used when an inbound call is routed to an ISDN digital interface. The digital interface type of number is sent in the called party number information element of the ISDN setup message. Unknown number is either not identified or contains prefix digits that are not part of the called number. Example: *70 to disable call waiting. International number includes a country code.
Example: 443125551212. National number includes a national area code.
Example: 3125551212. Subscriber number includes a local exchange number.
Example: 5551212. Abbreviated number is 3 to 5 digits long. Example: 1212 or 51212.

Analog Dialed Number: Enter up to 31 digits and special characters. Digits 0123456789*# are allowed. The factory default is 9,55500[01+99]. Hyphens (--) indicate no number entered. This determines part of the number to be DTMF dialed by the 939 analog card when calls are initiated from a digital interface. Digital interface calls are routed to the 939 analog card from the Inbound Match Configuration screen when route if match is set to an ACD or PORT containing a 939 analog port. This selection is not used for calls initiated by the call generator or when dialing a 939 analog port from a non-939 analog port. Each DTMF tone is on for 100 ms, with 100 ms between tones. The system can send up to 31 DTMF digits.

Digits ,[+-] are special characters. Comma (,) causes DTMF dialing to pause for two seconds. Sequential numbers may be created using [min+max]. Random numbers may be created using [min-max]. Min and max represent the minimum and maximum values of the number. A left bracket, plus or minus, and right bracket are required. For example: 55512[00-99] indicates to send a random number between 5551200 and 5551299. The minimum and maximum values may range from 0 through 9999 and do not require the same number of digits. The minimum and maximum values may not contain * or #. Brackets may be repeated, but may not be nested.

939 Analog Card Configuration

Help for 939 Analog Card Configuration (continued)

Analog Dialed Mode: Select SEND ANALOG DIALED NUMBER* (default), SEND ANALOG DIALED NUMBER WITH CALLED NUMBER OVERLAY, SEND ANALOG DIALED NUMBER FOLLOWED BY CALLED NUMBER, or SEND NO NUMBER. This determines the complete number to be DTMF dialed by the 939 analog card when calls are initiated from a digital interface. Digital interface calls are routed to the 939 analog card from the Inbound Match Configuration screen when route if match is set to an ACD or PORT containing a 939 analog port. This selection is not used for calls initiated by the call generator or when dialing a 939 analog port from a non-939 analog port. Send analog dialed number allows the analog dialed number to be DTMF dialed. Send analog dialed number with called number overlay DTMF dials the analog dialed number with the called number overlaid at the end of the analog number. The digits are overlaid from left to right. The called number is the called number received from the digital interface. Send analog dialed number followed by called number DTMF dials the analog dialed number followed by the called number. Send no number does not DTMF dial a number.

939 Receive Loss: Select 0dB* (default) or –6dB. 0dB sends the audio level unattenuated. –6dB reduces the audio level sent to all 939 card analog ports.

939 Reference Tone: Select OFF* (default) or ON. Sends a 1kHz 1 milliwatt (0dB) reference tone to all 939 card analog ports.

Forced Disconnect Time: Enter 0* (default) through 999. Maximum amount of time in seconds that the 939 card will keep a call connected before forcing a disconnect. 0 disables this feature.

Security Configuration

This screen configures access security features. These can be useful when accessing the menu system through a local area network. The security configuration is saved in nonvolatile memory, but not in the profile area and is not affected by the Save/Restore System Configuration screen.

```
Gordon Kapes, Inc.          922 Power-Fail Transfer          Screen 26

                        SECURITY CONFIGURATION

Login Required:             NO*
Password:                   SYS922
Password Reminder:          Default password is SYS922
VT100 Compatibility Test:   NO*
Automatic Logoff:           NO*
Inactivity Time:            120  MINUTES









* Indicates factory default.

                Press Space Bar or Backspace to select
                Press Arrow Keys, <F1> help, <F2> exit
```

Help for Security Configuration

Login Required: Select NO* (default), or YES. No allows the operator to immediately access the main menu. Yes requires the operator to enter the password and, if selected, VT100 compatibility test before accessing the main menu.

Password: Enter password, up to 10 characters, using alphabetic letters, numbers, or punctuation characters. This is the password entered upon login that allows access to the main menu. Factory default password is SYS922.

Password Reminder: Enter password reminder, up to 39 characters. This text is displayed during login. Example: Enter childhood phone number. Factory default is Default password is SYS922.

VT100 Compatibility Test: Select NO* (default), or YES. No skips this feature. Yes asks user to press function keys F1, F2, F3, F4, and backspace after successful password entry. This test ensures that correct keyboard entry can be performed.

Automatic Logoff: Select NO* (default), or YES. No disables automatic logoff, allowing continuous access to the screens. Yes automatically logs the user off when the inactivity time is reached.

Inactivity Time: Enter number from 1 to 999 in minutes. Amount of time that the keyboard must remain inactive before the system automatically logs off. Factory default is 120 minutes.