SYSTEM 920*i*

PFT for PRI ISDN

System 920i ISDN PRI Reference Document

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GORDON KAPES | INC.

The System 920i Main Menu

This document describes the System 920i menu system for version 1.14, dated 14-June-2000.

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Version Highlights and Changes

Version 1.14 highlights: Internal: Eliminated bus error when changing switch emulation.
Screen 18: Increased ISDN protocol analyzer to 10 pages.
Screen 20: Improved save/restore system configuration to detect multiple profiles during download.

Version 1.13 highlights: Internal: Flash the front panel LEDs on and off if the configuration database is automatically set to its factory default condition due to a corrupted database.
Screen 14: Added reset error to show cause of unexpected system reset.
Screen 20: Added save/restore system configuration (new screen).

Version 1.12 highlights: Internal: Removed code that resets the T1 interface when a yellow alarm is received.

Version 1.11 highlights: Internal: Return service acknowledge with channel out of service for interfaces beyond the system capability. Added checksum to contact alarms and security password. If checksum is not valid, flash LEDs for contact 1, contact 2, and contact 3 and do not go into transfer mode.

Version 1.10 highlights: Screen 7: Fixed ACD call pickup digit prevent none from sending reorder to all OPS ports.
Screen 8: Changed factory default for 11 digit OPS outbound type of number from national to subscriber.
Screen 11: Added configurable CPE DS1 carrier loss delay time.

Version 1.09 highlights: Internal: Fixed recorder/announcer and call pickup to work with 938 analog card.
Screen 10: Fixed ACD overflows routed to redirect. This is a status display and does not affect phone call operation.

Version 1.08 highlights: Internal: Added service acknowledge to service messages containing D-channel status. Used by networks supporting D-channel backup.
Screen 7: Added ring fault action. Screen 9: Added redirect to ACD overflow action.

Version 1.07 highlights: Screen 2: Fixed channel disabled to place channel out of service upon layer 2 startup. Added channel status to show whether channels are in or out of service.
Screen 17: Changed factory default for exclusive/preferred channel ID back to preferred channel ID. Preferred channel ID was the factory default prior to version 1.06. This change was made to reduce glare.

Version 1.06 highlights: Screen 17: Added selectable exclusive/preferred channel ID. Factory default is to send exclusive channel IDs for outgoing calls to NI-2, 4ESS, and 5ESS switches. Prior versions sent preferred channel IDs except DMS100 switches which always send exclusive channels.

Version 1.05 highlights: Changed bearer capability information element to send layer 1 (mu-law) information to 4ESS and 5ESS switches. Prior versions sent layer 1 information only to NI-2 and DMS100 switches.

The System 920i Main Menu

Help for the Main Menu

The System 920i, a completely self-contained backup phone system, extends the concept of power-failure transfer (PFT) to ISDN PRI circuits. The System 920i goes to work automatically when normal operation of ISDN-terminated customer-premise equipment is inhibited due to a power failure, software problem, or hardware malfunction.

When such a failure occurs, the System 920i immediately takes control of the PRI circuits. Personnel at the site are then able to receive inbound calls and place outbound calls without interruption.

A single-cabinet, wall-mounted unit, the System 920i 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 24 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 920i 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 920i if either primary or secondary PRI is connected to the CPE. Both primary and secondary PRI must be disconnected from the CPE and the primary PRI connected to the System 920i in order for the System 920i to process calls.

Some screens may differ from the Master Reference Guide. Use on-line help screens to get the most recent details.

Abbreviations and Terminology

ACD: Automatic Call Distributor. Queues incoming calls.

B-Channel: Bearer channel. Usually contains PCM encoded voice.

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

CPE: Customer Premise Equipment. Equipment connected to the network.

CSU: Customer Service Unit. T1 analog interface.

D-Channel: Data channel. Contains ISDN signaling.

ISDN: Integrated Services Digital Network.

PRI: Primary Rate Interface. Contains 23 B and 1 D-channel operating at 1.544 mbit/s.

The System 920i 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.            System 920i                        Main 1

                               MAIN MENU

                 1. DS1 AND PRI CONFIGURATION
                 2. DS1 CHANNEL CONFIGURATION
                 3. NUMBERING PLAN CONFIGURATION
                 4. OPS CARD CONFIGURATION
                 5. RECORDER/ANNOUNCER CONFIGURATION
                 6. INBOUND CALL CONFIGURATION
                 7. OPS DIALING CONFIGURATION
                 8. OPS OUTBOUND CALL CONFIGURATION
                 9. ACD CONFIGURATION
                10. REDIRECT CONFIGURATION
                11. TRANSFER CONFIGURATION
                12. SECURITY CONFIGURATION
                13. 920i CALL STATUS
                14. DS1 STATUS


                   Enter Selection:

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

```
Gordon Kapes, Inc.            System 920i                        Main 2

                               MAIN MENU

                   15. DS1 ST-BUS STATUS
                   16. CONNECT TONE TO DIGITAL BUS
                   17. DS1 AND PRI TEST FUNCTIONS
                   18. ISDN PROTOCOL ANALYZER CONFIGURATION
                   19. QUICK SYSTEM STATUS
                   20. SAVE/RESTORE SYSTEM CONFIGURATION









                   Enter Selection:

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

DS1 and PRI Configuration

This screen configures the methods used for sending information across the digital interface.

```
Gordon Kapes, Inc.              System 920i                        Menu 1

                        DS1 AND PRI CONFIGURATION

DS1 Card Present:  YES
DS1 Synchronized:  NO

Framing:                   ESF (EXTENDED SUPERFRAME)*
Line Coding Method:        B8ZS (BIPOLAR ZERO SUPPRESSION)*
Line Build Out:            0dB*
Synchronization Source:    NETWORK*
Switch Emulation:          NATIONAL ISDN-2*
Location:                  USER SIDE









* Indicates factory default.


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

Help for DS1 and PRI Configuration

DS1 Card Present: Shows YES or NO.

DS1 Synchronized: Shows YES or NO. Indicates whether the DS1 Interface card is synchronized to the incoming D4 or ESF frame.

Framing: Select ESF (EXTENDED SUPERFRAME)* (default), or D4 (SUPERFRAME).

ESF (EXTENDED SUPERFRAME) is the preferred framing format.

Line Coding Method: Select B8ZS* (bipolar 8 zero code suppression), AMI (alternate mark inversion – no code suppression), or ZCS (jammed bit zero code suppression). B8ZS is the preferred method.

Line Build Out: Select 0dB* (default), –7.5dB, or –15dB. Indicates strength of outgoing signal. 0dB provides the strongest signal and should be used for distances over 1 km. –7.5dB provides average power. –15dB should be used for distances of only a few meters where overloading might cause crosstalk.

Synchronization Source: Select NETWORK* (default) or INTERNAL. Indicates whether system timing synchronizes to the incoming INTERFACE 1 or INTERFACE 2 D4 or ESF frame or to an INTERNAL timing source. Affects the outgoing frame. The incoming frame is always self-synchronizing.

Switch Emulation: Select NATIONAL ISDN-2* (default), 4ESS CUSTOM, 5ESS CUSTOM, or DMS100 CUSTOM. As of late 1997, most switches support NATIONAL ISDN-2 making this the appropriate default selection. 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 (inter-office) switches. <ENTER> must be pressed to change this feature. Changing this field causes all calls to be disconnected, system reboot and the screen to be cleared.

Location: Shows USER SIDE. Indicates that the system can only emulate the customer premise PBX side. This information is sent in the Progress Indicator IE and Cause IE of ISDN messages.

DS1 Channel Configuration

This screen allows individual channels to be blocked from making or receiving calls. There are two screens, one for every 12 channels.

```
Gordon Kapes, Inc.            System 920i                        Menu 2-1

               DS1 CHANNEL CONFIGURATION - CHANNELS 1-12

DS1 Card Present:  YES
DS1 Synchronized:  NO

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

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

Help for DS1 Channel Configuration

DS1 Card Present: Shows YES or NO.

DS1 Synchronized: Shows YES or NO. Indicates whether the DS1 Interface card is synchronized to the incoming D4 or ESF frame.

Ch: Channel. Shows PRI bearer channel number.

Operation: Select ENABLED* (default), DISABLED, or MAINTENANCE. 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. ISDN accomplishes this by sending an ISDN service message containing change status and channel ID information elements. The ISDN service message is sent on the fly. Each ISDN service message must be acknowledged by the near end or it will be sent again.

Status: Shows IN SERVICE, OUT OF SERVICE, or MAINTENANCE. In service indicates channel is available for inbound and outbound calls. Out of service indicates channel is disabled. Maintenance indicates channel is available for test calls.

Numbering Plan Configuration

This screen allows configuration of all analog ports. Use OPS card configuration to configure individual ports. This screen also configures type of number and numbering plans used by ISDN.

```
Gordon Kapes, Inc.              System 920i                        Menu 3

                      NUMBERING PLAN CONFIGURATION

OPS Extension Digit Length:  4*
OPS Base Extension Number:   1001
Caller Number:               --
Caller Number Sent:          NOT SENT*
Caller Presentation:         ALLOWED*
Caller Type of Number:       NATIONAL NUMBER*
Caller Number Plan:          ISDN NUMBERING PLAN*
Called Number Plan:          ISDN NUMBERING PLAN*









* Indicates factory default.


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

Help for Numbering Plan Configuration

OPS Extension Digit Length: Select 3, 4* (default) or 5. Number of digits that must be dialed to reach an OPS extension from another OPS extension. <ENTER> must be pressed to change this feature. Changing the number of digits causes all OPS extensions to be renumbered sequentially starting from the OPS base extension number.

OPS Base Extension Number: Select 100 to 99999. Starting number used to sequentially number all OPS extensions. The number of digits must agree with the OPS Extension Digit Length. Pressing <ENTER> causes all OPS extensions to be renumbered. If you have an assigned block of caller numbers, we recommend that you set the OPS Base Extension Number to match the last few digits of your caller number. For example, if your assigned block of caller numbers is 312-555-6600 to 312-555-6699, and the OPS Extension Digit Length is 4, set the OPS Base Extension Number to 6600 and the Caller Number to 3125556600. OPS Base Extension Number is adjusted automatically so as to not conflict with Outbound Access Digits and ACD Call Pickup Digit.

Caller Number: Select number, up to 14 digits. Hyphens (--) indicate no number (default). In North America we recommend that you use a 10 digit national number.

Caller Number Sent: Select NOT SENT* (default), SEND CALLER NUMBER, or SEND CALLER NUMBER WITH OPS EXTENSION OVERLAY. Indicates who provides caller number when originating calls. NOT SENT causes the system to not send the caller number, in which case the network may provide the caller number. SEND CALLER NUMBER causes the system to send the caller number. SEND CALLER NUMBER WITH OPS EXTENSION OVERLAY causes the system to send the caller number, replacing the last 3 to 5 digits with the OPS extension number. Caller number is sent in the calling party number information element (IE) of the ISDN setup message.

Numbering Plan Configuration

Help for Numbering Plan Configuration (continued)

Caller Presentation: Select ALLOWED* (default) or BLOCKED. ALLOWED indicates that the called party is allowed to see the caller number. BLOCKED indicates that the caller number is sent, but that only the police may see it. Everyone else sees a word such as BLOCKED. The caller may not want their number displayed for privacy purposes. Caller presentation is sent in the calling party number information element (IE) of the ISDN setup message.

Caller Type of Number: Select NATIONAL NUMBER* (default), INTERNATIONAL NUMBER, SUBSCRIBER NUMBER, ABBREVIATED NUMBER, or UNKNOWN NUMBER. Caller type of number is sent in the calling party number information element of the ISDN setup message. A national number includes a national area code. Example: 312-555-1212. Hyphens are shown for clarity only. An international number includes a country code. Example: 1-312-555-1212. A subscriber number includes a local exchange number. Example: 555-1212. An abbreviated number is 3 to 5 digits long. Example: 1212 or 911. An unknown number is either not identified or contains digits that are not part of the caller number. Example: *70 to disable call waiting.

Caller Number Plan: Select ISDN NUMBERING PLAN* (default), TELEPHONY NUMBERING PLAN, PRIVATE NUMBERING PLAN, or UNKNOWN NUMBERING PLAN. Indicates number plan used to identify the caller. If the system is connected to the public network, set the Caller Number Plan to ISDN NUMBERING PLAN. Caller number plan is sent in the calling party number information element (IE) of the ISDN setup message.

Called Number Plan: Select ISDN NUMBERING PLAN* (default), TELEPHONY NUMBERING PLAN, PRIVATE NUMBERING PLAN, or UNKNOWN NUMBERING PLAN. Indicates number plan used to dial the called party. If the system is connected to the public network, set the Called Number Plan to ISDN NUMBERING PLAN. Called number plan is sent in the calling party number information element (IE) of the ISDN setup message.

OPS Card Configuration

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 three detailed screens, one for every eight analog ports.

```
Gordon Kapes, Inc.              System 920i                        Menu 4-1

                        OPS CARD 1 CONFIGURATION

Card 1 Present:          YES
OPS Software Version:    1.02

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



* Indicates factory default.


      Enter extension (1000-9999) then <ENTER>. Backspace to edit.
           Press Arrow Keys, <F1> help, <F2> exit, <F4> next
```

Help for OPS Card Configuration

Card Present: Shows YES or NO.

OPS Software Version: Shows the OPS Card software version number. Hyphens (--) indicate card is
missing.

Port: Shows 1-24. Identifies the physical OPS connection.

Ext: Select the internal dialing extension associated with the OPS port. If the number is not unique or is outside the range of permissible numbers, it will not be allowed. <ENTER> must be pressed to update the extension. The OPS extension digit length is configured on the NUMBERING PLAN CONFIGURATION screen. The OPS extension number is included in the caller number when Caller Number Sent is set to SEND CALLER NUMBER WITH OPS EXTENSION OVERLAY. See Caller Number Sent on the NUMBERING PLAN CONFIGURATION screen. Note: Outbound Access Digits, ACD Call Pickup Digit and OPS Extensions must not conflict with each other.

ACD: Select ACD 1* (default) to ACD 24, or NONE. Assigns ACD group to OPS extension. NONE disables inbound access from an outside line.

Outbound: Select ENABLED* (default) or DISABLED. Enables outbound access to an outside line.

Connect: Shows OPS-number, CHAN-number, or MSG-number (Recorder / Announcer Message). Shows resource connected to OPS extension. Hyphens (--) indicates no connection or card is missing. CHAN-number is referenced on the 920i CALL STATUS menu.

Hold: Shows OPS-number or CHAN-number. Shows resource placed on hold by OPS extension. Hyphens (--) indicates no connection or card is missing.

OPS Card Configuration

Help for OPS Card Configuration (continued)

State: Shows internal state number followed by AUDIBLE RING, BUSY TONE, CONNECT, DIALING, DIAL TONE, RING FAULT, ON HOLD, HOWLER TONE, ON HOOK, MSG DIAL TONE, MSG DIALING, MSG PROGRAM, MSG PLAYBACK, MSG RECORD, PROGRESS TONE, REORDER TONE, RINGING, SILENCE, STUTTER TONE, VACANT TONE, or WAIT ACCESS (wait for access to an outside line). Indicates current active condition. Hyphens (--) indicate card is missing.

Recorder/Announcer Configuration

This screen configures which OPS ports can record a voice message, and the recorder/announcer access password. It allows recorded messages to be erased. Voice message status is shown in real-time. The optional 916 card must be installed to record and play-back voice messages. The optional 915 card also serves this purpose, although it contains DTMF decoders not used by the system.

```
Gordon Kapes, Inc.              System 920i                          Menu 5

                    RECORDER/ANNOUNCER CONFIGURATION

Recorder/Announcer OPS Access Port:       ALL*
Recorder/Announcer Numeric Password:      1234567
Do you wish to erase all voice messages:  NO*

Resource Available:      YES (916 CARD PRESENT)
Message 1 Status:        IDLE
Message 2 Status:        IDLE

Use the OPS 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.
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 to select
                 Press Arrow Keys, <F1> help, <F2> exit
```

Help for Recorder/Announcer Configuration

Recorder/Announcer OPS Access Port: Select 1-24 or ALL* (default) for all OPS ports that can record new voice messages.

Recorder/Announcer Numeric Password: Select a 7-digit number. The factory default is 1234567.

Do you wish to erase all voice messages: Select YES or NO* (default). YES erases the voice messages. NO does nothing. <ENTER> must be pressed to change this feature.

Resource Available: Shows YES (915 CARD PRESENT), YES (916 CARD PRESENT), or NO.

Message Status: Shows PLAY, RECORD, PAUSE, or IDLE. Hyphens (--) show resource not present.

To access the Recorder/Announcer resource, lift the receiver on the OPS phone designated as the Recorder/Announcer Access Port. Dial *99. Wait for the second dial tone. Dial the 7-digit numeric password. If the correct password has been entered, a periodic beep every second indicates connection to the Recorder/Announcer resource.

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.

Messages can be up to 20 seconds long. To disconnect from the Recorder/Announcer resource, just hang up.

Inbound Call 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.            System 920i                        Menu 6-1

                INBOUND CALL CONFIGURATION - MATCH 1-12

No.   Match Number                          Route if Match
 1.   311                                   ACD 1*
 2.   411                                   ACD 1*
 3.   911                                   ACD 1*
 4.   [2-9]NNNNNN                           ACD 1*
 5.   0[2-9]NNNNNNNNN                       ACD 1*
 6.   1[2-9]NNNNNNNNN                       ACD 1*
 7.   --                                    ACD 1*
 8.   --                                    ACD 1*
 9.   --                                    ACD 1*
10.   --                                    ACD 1*
11.   --                                    ACD 1*
12.   --                                    ACD 1*


* Indicates factory default.


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

Help for Inbound Call Configuration

Incoming called numbers are routed by their match numbers. In case of multiple matches, the list is scanned from top to bottom and acts on the first successful match. If a match is not found, the caller hears a reorder tone for 30 seconds and then the call is disconnected.

Match Number: Enter up to 31 digits. Digits #*0123456789 are allowed. Indicates the called number to be matched. Match ranges may be created using N, X, and [min-max]. N matches any number from 0 through 9. Example: 9NN matches any number from 900 through 999. X matches any number from # through 9. Example: *XX matches any 2 digits after *. Match ranges may be created using [min-max]. Min and max represent the minimum and maximum values of the match range. A left bracket, hyphen (-), and a right bracket are required. Example: [2-9]NN matches any number from 200 through 999. Minimum and maximum values may range from 0 through 9. Minimum and maximum values may not contain #*. Brackets may be repeated, but not nested. Two hyphens (--) indicate that no match number is specified. The factory default shows how to match NANP (North American Numbering Plan) numbers. This routes 311, 411, 911, seven digit and eleven digit numbers to ACD 1. All other numbers are sent reorder.

Route if Match: Select ACD 1* (default) to ACD 24, MESSAGE 1-2 PLAY TWICE, REDIRECT 1-24, or REORDER. ACD routes the call to the specified ACD group. REDIRECT routes the call to the specified redirect group. MESSAGE PLAY TWICE causes the caller to hear a specified voice message played twice, then a forced disconnect. REORDER causes the caller to hear a reorder tone for 30 seconds then a forced disconnect.

OPS Dialing Configuration

This screen configures analog port dialing features.

```
Gordon Kapes, Inc.              System 920i                        Menu 7

                        OPS DIALING CONFIGURATION

Intercom Operation:                  TRANSFER MODE ONLY*
Intercom Dial 0:                     VACANT*
ACD Call Pickup Digit:               3*
Outbound Dial #:                     SPECIAL*
Outbound 1st Digit Timeout:          10* SECONDS
Outbound Interdigit Timeout:         10* SECONDS
Outbound Access 1st Digit Group 1:   9*
Outbound Access 2nd Digit Group 1:   NONE*
Outbound Access Insert Group 1:      --
Outbound Access 1st Digit Group 2:   NONE*
Outbound Access 2nd Digit Group 2:   --
Outbound Access Insert Group 2:      --
ACD Hunt Method:                     ASCENDING SEQUENTIAL*
Ring Fault Action:                   CONTINUE RINGING*

* Indicates factory default.


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

Help for OPS Dialing Configuration

Intercom Operation: Select TRANSFER MODE ONLY* (default) or ALWAYS. Defines whether OPS extensions may dial other OPS extensions at all times, or only when the system is in transfer mode.

Intercom Dial 0: Select ACD 1-24, MESSAGE 1-2, or VACANT* (default). Action that occurs when intercom 0 is dialed. ACD 1-24 causes caller to connect to ACD group. MESSAGE 1-2 causes caller to hear voice message. VACANT causes caller to hear vacant tone.

ACD Call Pickup Digit: Select 2-7 or NONE. 3* indicates factory default. Digit dialed that picks up a station that is ringing within the ACD group. NONE disables call pickup. Note: Outbound Access Digits, ACD Call Pickup Digit, and OPS Extensions must not conflict with each other.

Outbound Dial #: Select SPECIAL* (default) or PASS THROUGH. Action taken when # is dialed on an outbound call. SPECIAL speeds up outbound call processing by ignoring the max length needed to match the dialed number. The # is stripped from the dialed number. PASS THROUGH allows # to be included in the dialed number, but does not speed up outbound call processing.

Outbound 1st Digit Timeout: Select 1-10 SECONDS. 10* indicates factory default is 10 seconds. After dialing the outbound access digit, if the first digit of the outbound number is not dialed within configured time, the call is routed to reorder tone.

Outbound Interdigit Timeout: Select 1-10 SECONDS. 10* indicates factory default is 10 seconds. Determines maximum time allowed between dialing digits and how long the system will wait before the dialing sequence is considered to be complete.

Outbound Access 1st Digit Group 1: Select 3-9. 9* indicates factory default. First digit dialed to access an outside line. Call processing will then match the remaining digits with the OPS Outbound Call Configuration Group 1 screen to determined when the dialed number is complete. Note: Outbound Access Digits, ACD Call Pickup Digit, and OPS Extensions must not conflict with each other.

OPS Dialing Configuration

Help for OPS Dialing Configuration (continued)

Outbound Access 2nd Digit Group 1: Select 0-9 or NONE* (default). None indicates a second digit is not needed to access an outside line. 0-9 indicates the second digit needed to access an outside line.

Outbound Access Insert Group 1: Select number, up to 17 digits, or hyphens (--) (default) to indicate no number. This number is inserted before the dialed number if SEND WITH INSERT has been selected as the Route If Match on the OPS Outbound Call Configuration Group 1 screen.

Outbound Access 1st Digit Group 2: Select NONE* (default), or 3-9. First digit dialed to access an outside line. Call processing will then match the remaining digits on the OPS Outbound Call Configuration Group 2 screen to determined when the dialed number is complete. Note: Outbound Access Digits, ACD Call Pickup Digit, and OPS Extensions must not conflict with each other.

Outbound Access 2nd Digit Group 2: Select NONE* (default), 0-9, or hyphens (--). None indicates a second digit is not needed to access an outside line. 0-9 indicates the second digit needed to access an outside line. Hyphens (--) indicate Outbound Access 1st Digit Group 2 is set to NONE.

Outbound Access Insert Group 2: Select number, up to 17 digits, or hyphens (--) (default) to indicate no number. This number is inserted before the dialed number if SEND WITH INSERT has been selected as the Route If Match on the OPS Outbound Call Configuration Group 2 screen.

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.

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 938 analog card only. The 914 OPS card does not sense ring current. 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.

OPS Outbound Call Configuration

This screen configures how the system will interpret outbound number dialing from the OPS ports. There are four configuration screens, one for every 12 match configurations.

```
Gordon Kapes, Inc.            System 920i                        Menu 8-1

         OPS OUTBOUND CALL CONFIGURATION GROUP 1 - PREFIX 1-12

No.  Prefix                          Max  Strip  Type   Route if Match
 1.  --                              --   --     -      --
 2.  --                              --   --     -      --
 3.  --                              --   --     -      --
 4.  --                              --   --     -      --
 5.  --                              --   --     -      --
 6.  --                              --   --     -      --
 7.  --                              --   --     -      --
 8.  411                              3    0     S      SEND OUT
 9.  611                              3    0     S      SEND OUT
10.  911                              3    0     S      SEND OUT
11.  [2-9]NNNNNN                      7    0     S      SEND OUT
12.  011                             17    3     I      SEND OUT




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

Help for OPS Outbound Call Configuration

This screen is needed because dialed numbers are sent as a complete block (en-bloc). Analog port outbound call configuration is used to determine when the caller has finished dialing, after which the called number can be sent out. 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, excluding 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. Prefix ranges may be created using N and X. 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 *. 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: [2-9]NN matches any number from 200 through 999. Minimum and maximum values may range from 0 through 9. Minimum and maximum values may not contain * or #. Brackets may be repeated, but not nested. Hyphens (--) indicate no entry has been made.

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.

OPS Outbound Call Configuration

Help for OPS Outbound Call Configuration (continued)

Type: Select N (default), I, S, A, or U. Indicates the called number type used to dial the called party. Shown for ISDN digital interfaces only. N indicates national: a number that starts with a national area code. Example: 3125551212. I indicates international: a number that starts with a country code. Example: 443125551212. S indicates subscriber: a number that starts with a local exchange number. Example: 5551212. A indicates abbreviated: a number that is 3 to 5 digits long. Example: 911, 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. A hyphen (-) indicates no prefix entry has been made.

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.

To change the outbound call configuration values back to their factory default values, type the word DEFAULT from this screen. The factory default allows the following to be sent: 411, 611, 911, 17 digit numbers starting with 011, seven digit numbers starting with 2 through 9, eleven digit numbers starting with 0 or 1 followed by 2 through 9, and 31 digit numbers starting with * or 0.

ACD Configuration

This screen configures individual ACD groups. There are 24 detailed screens, one for each ACD group.

```
Gordon Kapes, Inc.            System 920i                        Menu 9-1

                          ACD 1 CONFIGURATION

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

Inbound Matches Routed to ACD 1:    MATCH-1,2,3,4,5,6



OPS Ports Assigned to ACD 1:        OPS-1,2,3,4,5,6,7,8



Number of Queued Inbound 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

Incoming DS1 calls are routed through ACD functions to OPS ports. If no OPS ports are available, call is placed in queue. Queued calls are connected to the next available OPS port assigned to the ACD function. While a call is in queue, Queue Action provides either audible ring, continuous message playback, or play the message twice then provide a hold tone every 5 seconds. The hold tone indicates to the caller that a connection is still active. If the queue becomes full, Queue Overflow Action connects the caller to busy tone, a voice message, or redirects the call to another number.

Queue Depth: Select 0* (default) to 24. 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 PLAY TWICE plays the message twice and then connects the caller to a hold tone. The hold tone indicates that the connection is still active.

Overflow Action: Select BUSY TONE* (default), MESSAGE 1 PLAY TWICE, MESSAGE 2 PLAY TWICE, or REDIRECT 1-24. MESSAGE PLAY TWICE plays the message twice and then disconnects the call. REDIRECT routes the call to the specified redirect group.

Inbound Matches Routed to ACD: Shows MATCH-numbers. Hyphens (---) indicate inbound matches are missing. Inbound matches are assigned on the Inbound Call Configuration screen.

OPS Port Assigned to ACD: Shows OPS-numbers. Hyphens (---) indicate OPS ports are missing. OPS ports are assigned on the OPS Card Configuration screen.

Number of Queued Inbound Calls: Shows the number of inbound calls currently waiting in the ACD queue.

Number of Overflow Calls: Shows the number of inbound calls directed to the overflow action when the ACD queue is full or queue depth is set to 0.

Redirect Configuration

This screen configures individual redirect groups. There are 24 detailed screens, one for each redirect group.

```
Gordon Kapes, Inc.            System 920i                    Menu 10-1

                        REDIRECT 1 CONFIGURATION


Redirect Number:    --
Type of Number:     NATIONAL NUMBER*
Action:             IMMEDIATE*


Inbound Matches Routed to Redirect 1:  ---


ACD Overflows Routed to Redirect 1:    ---


Number of Redirected Inbound Calls:    NONE


* Indicates factory default.


         Enter redirect number (0-17 digits). Backspace to edit.
    Press Arrow Keys, <F1> help, <F2> exit, <F3> previous, <F4> next
```

Help for Redirect Configuration

Redirect causes an incoming calls to initiate an outbound call, dial the redirect number and connect both calls together. If voice messaging is available, the incoming call can be connected to a voice message first, and then initiate an outbound call.

Redirect Number: Select 1234567890ABCD*#, up to 17 digits. No number shows hyphens (--) (default) to indicate the redirect number is missing. If the redirect number is missing, the caller will hear a reorder tone. The redirect number is the outbound number dialed by the redirect group. No other digits are appended to this number, nor are any stripped. This information is sent in the called party number information element (IE) of the ISDN setup message. The inbound called number is sent in the redirecting number IE.

Type of Number: Select NATIONAL NUMBER* (default), INTERNATIONAL NUMBER, SUBSCRIBER NUMBER, ABBREVIATED NUMBER or UNKNOWN NUMBER. Type of number is sent in the called party number information element of the ISDN setup message. A national number includes a national area code. Example: 312-555-1212. Hyphens are shown for clarity only. An international number includes a country code. Example: 1-312-555-1212. A subscriber number includes a local exchange number. Example: 555-1212. An abbreviated number is 3 to 5 digits long. Example: 1212 or 911. An unknown number is either not identified or contains digits that are not part of the called number. Example: *70 to disable call waiting.

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.

Inbound Matches Routed to Redirect: Shows MATCH numbers. Hyphens (--) indicates no inbound matches. Inbound matches are assigned on the Inbound Call Configuration screen.

ACD Overflows Routed to Redirect: Shows ACD numbers. Hyphens (--) indicates no ACD overflows. ACD overflows are assigned on the ACD Configuration screen.

Number of Redirected Inbound Calls: Shows NONE or number of inbound calls currently being redirected.

Transfer Configuration

This screen configures conditions under which the system will transfer the ISDN-PRI line to internal operation or external operation.

```
Gordon Kapes, Inc.            System 920i                        Menu 11

                        TRANSFER CONFIGURATION

Contact 1 Operation:              DISABLED*
Contact 2 Operation:              DISABLED*
Contact 3 Operation:              DISABLED*
CPE DS1 Carrier Loss Operation: DISABLED*
CPE DS1 Carrier Loss Delay:       10 SECONDS*
CPE DS1 Reconnect Operation:      RECONNECT IMMEDIATE - NO DELAY*

Contact 1 Status:                 DISABLED
Contact 2 Status:                 DISABLED
Contact 3 Status:                 DISABLED
CPE DS1 Carrier Loss Status:      DISABLED
CPE DS1 Reconnect Status:         ---
Network DS1 Status:               NORMAL (BYPASS TO CPE DS1)
Manual Operation Switch Status: NORMAL

* Indicates factory default.


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

Help for Transfer Configuration

Contact 1-3 Operation: Select NORMALLY-OPEN, NORMALLY-CLOSED or DISABLED* (default). Enables or disables contact input monitoring. NORMALLY-OPEN contacts require a minimum of 1 second closure to detect an alarm. A minimum of 3 seconds open is required to return back to the NORMAL state. NORMALLY-CLOSED contacts require a minimum of 1 second open to detect an alarm. A minimum of 3 seconds closure is required to return back to the NORMAL state. If alarm is detected, the system seizes the Network DS1.

CPE DS1 Carrier Loss Operation: Select ENABLED or DISABLED* (default). Enables or disables CPE DS1 Carrier Loss monitoring. The minimum carrier loss required to detect an alarm is set by CPE DS1 carrier loss delay. A minimum of 1 second carrier present is required to return to the NORMAL state. If alarm is detected, the system seizes the Network DS1.

CPE DS1 Carrier Loss Delay: Select 100 MILLISECONDS through 100 SECONDS. Factory default is 10 seconds. Indicates the minimum carrier loss delay required to detect an alarm.

CPE DS1 Reconnect Operation: Select RECONNECT IMMEDIATE - NO DELAY* (default), RECONNNECT AFTER ALL CALLS COMPLETED, RECONNECT AFTER 5 MINUTE DELAY, RECONNECT AFTER 10 MINUTE DELAY, or RECONNECT AFTER 15 MINUTE DELAY. When all alarms have ceased, determines the time delay before CPE DS1 is reconnected to the Network DS1. A triple alert tone is heard every 30 seconds on all active channels during the time delay.

Contact 1-3 Status: Shows DISABLED, NORMAL or ALARM. Indicates the contact status before any time delays.

CPE DS1 Carrier Loss Status: Shows DISABLED, NORMAL (CARRIER DETECTED), or ALARM (NO CARRIER DETECTED). Indicates the carrier status before any time delays.

Transfer Configuration

Help for Transfer Configuration (continued)

CPE DS1 Reconnect Status: Shows AWAITING CALL COMPLETION, AWAITING 5 MINUTE DELAY, AWAITING 10 MINUTE DELAY, AWAITING 15 MINUTE DELAY, or Hyphens (---). Hyphens (---) indicates the system is not waiting for reconnect.

Network DS1 Status: Shows NORMAL (BYPASS TO CPE DS1), TRANSFER (NETWORK DS1 SEIZED), FORCE OFF (BYPASS TO CPE DS1), or FORCE ON (NETWORK DS1 SEIZED). Indicates transfer relay status. FORCE ON and FORCE OFF are caused by network DS1 override on the DS1 AND PRI TEST FUNCTIONS screen.

Manual Operation Switch Status: Shows TRANSFER (AWAITING MANUAL RETURN), NORMAL, or MANUAL RETURN. An alarm condition causes the system to disconnect from the CPE DS1 and immediately 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.

Front Panel +8V and –8V LEDs: Indicates whether internal power is active. Both LEDs should be on when the System 920i is on and both LEDs should be off when the System 920i is off.

Front Panel Ring Active LED: Indicates whether the internal ring voltage power is active. To save power, the ring voltage is active only when needed to alert a telephone.

Front Panel Contact 1-3 LEDs: Indicates the contact status before any time delays. Lit if alarm is active and extinguished if alarm is not active. The contact operations contain a checksum and if not valid flash the LEDs on and off and inhibit the network from connecting to the System 920i. This condition is cleared by changing the contact alarm configuration. The 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 LEDs from flashing.

Front Panel CPE DS1 Carrier Loss LED: 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 LED on and off and inhibit the network from connecting to the System 920i. This condition is cleared by changing the contact alarm configuration.

Front Panel Network DS1 Status LED: Indicates transfer relay status. Lit when network is connected to System 920i and extinguished when network is connected to CPE. LED flashes on and off when network is connected to System 920i but DS1 is not synchronized.

Security Configuration

This screen enables the VT100 compatibility test and configures security access to the user screens.

```
Gordon Kapes, Inc.            System 920i                        Menu 12

                         SECURITY CONFIGURATION

Perform VT100 Compatibility Test Upon Login:  YES*
Maintenance Port Inactivity Time:             60  MINUTES
Password:                                     SYS920I









* Indicates factory default.


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

Help for Security Configuration

Perform VT100 Compatibility Test Upon Login: Select YES* (default), or NO. YES asks user to press function keys F1, F2, F3, F4, and backspace after password login. NO skips this feature.

Maintenance Port Inactivity Time: Select number from 1 to 999. Amount of time in minutes that the keyboard will remain inactive before the system automatically logs out. Factory default is 60 minutes.

Password: Select password, up to 10 characters, using alphabetic letters, numbers or punctuation characters. This is the password entered on login screen that allows access to configuration, security and diagnostic screens. Factory default password is SYS920I.

920i Call Status

This screen shows the digital interface call status. There are two status screens, one for every 12 digital interface channels.

```
Gordon Kapes, Inc.            System 920i                    Menu 13-1

                    920i CALL STATUS - CHANNEL 1-12

DS1 Card Present:  YES
DS1 Synchronized:  NO

Chan  CR    State       Dir  Caller Number      Called Number
1     ----  ---         ---  ---                ---
2     ----  ---         ---  ---                ---
3     ----  ---         ---  ---                ---
4     ----  ---         ---  ---                ---
5     ----  ---         ---  ---                ---
6     ----  ---         ---  ---                ---
7     ----  ---         ---  ---                ---
8     ----  ---         ---  ---                ---
9     ----  ---         ---  ---                ---
10    ----  ---         ---  ---                ---
11    ----  ---         ---  ---                ---
12    ----  ---         ---  ---                ---



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

Help for 920i Call Status

DS1 Card Present: Shows YES or NO.

DS1 Synchronized: Shows YES or NO. Indicates whether the digital interface is synchronized to the incoming D4 or ESF frame.

Chan: Shows bearer channel number. This number is referenced on the OPS CARD CONFIGURATION menu as CHAN-number.

CR: Call Reference. Shows call reference in hexadecimal. Numbers range between 0000 - 7FFF. Identifies each call. This number also appears in the PROTOCOL ANALYZER. Used by ISDN layer 3 to identify each call on both sides of the network.

State: Shows internal state number followed by TRANSITION, NOT IN USE, SETUP, INCOMING, PROCEEDING, ALERTING, PROGRESS, CONNECT, or DISCONNECT.

Dir: Direction. Shows IN (inbound) or OUT (outbound). Hyphens (--) indicate call not in use.

Caller Number: Shows the caller phone number that originated the call if presentation is allowed, up to 17 digits. Hyphens (--) indicate call not in use or number not available. Shows BLOCKED if presentation is not allowed.

Called Number: Shows the phone number being called, up to 17 digits. Hyphens (--) indicate call not in use.

DS1 Status

This screen displays digital interface transmission information.

```
Gordon Kapes, Inc.          System 920i                    Menu 14-1

                             DS1 STATUS

DS1 Card Present:           YES
DS1 Synchronized:           NO
Debounced Synchronized:     NO
Phase Word:                 15
Slip Count:                 00000
Bipolar Violations (1/64):  00000
ESF CRC Error Count:        00000
System Resets:              00000
Synchronization Loss Count: 00000
Receive Level Indication:   LESS THAN -22dB
Elapsed Sync Time:          0000 00:00:03
Yellow/Blue Alarm:          NO ALARMS
Reset Error:                NONE

Reset DS1 Statistics:       NO



              Press Y or N to select then <ENTER>
                  Press <F1> help, <F2> exit
```

Help for DS1 Status

DS1 Card Present: Shows YES or NO.

DS1 Synchronized: Shows YES or NO. Indicates whether the digital interface card is synchronized to the incoming D4 or ESF frame.

Debounced Synchronized: Shows YES or NO. Indicates digital interface synchronized after 1 second delay, and loss of sync after a 5 second delay.

Phase Word: Shows phase difference in hexadecimal between incoming frame and internal ST-BUS. A non-changing number indicates perfect synchronization.

Slip Count: Shows number of times incoming frame needed to be repeated or dropped to maintain frame synchronization. The system contains an elastic buffer to adjusts for frequency differences between the internal telecom bus and the received frame. This number is updated when debounced synchronized is YES.

Bipolar Violations (1/64): Shows number of times the incoming bipolar clock failed to detect an alternate pulse. Number is divided by 64. This number is updated when debounced synchronized is YES.

ESF CRC Error Count: Shows number of ESF checksum errors. Hyphens (---) indicate D4 framing. This number is updated when debounced synchronized is YES.

System Resets: Shows number of times system has rebooted.

Synchronization Loss Count: Shows number of times system lost non-debounced synchronization.

Receive Level Indication: Shows +2dB TO –7.5dB (strongest), –7.5dB TO –15dB, –15dB TO –22.5dB, LESS THAN –22.5dB (weakest), or hyphens (--). Hyphens indicate information not available. Indicates strength of incoming signal.

DS1 Status

Help for DS1 Status (continued)

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

Yellow/Blue Alarm: Shows NO ALARMS, BLUE ALARM, ESF YELLOW ALARM, or D4 YELLOW ALARM. NO ALARMS indicates incoming frame does not contain a blue or yellow alarm. BLUE ALARM indicates incoming frame contains ones in all bit positions including the framing bit. Causes loss of synchronization and loss of channel data. ESF YELLOW ALARM indicates incoming ESF frame contains 8 zeros and 8 ones in the facilities data link portion of the framing bit. Does not cause loss of synchronization or loss of channel data. D4 YELLOW ALARM indicates incoming D4 frame contain zeros in bit position 2 on all channels. Does not cause loss of synchronization, but causes loss of channel data.

Reset 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 reset.

Reset DS1 Statistics: Select YES or NO. Select YES to clear status counters. Status counters are saved when power is shut off. Clearing status counters resets all counters to zero. This may be useful when diagnosing a problem over long periods of time.

DS1 ST-Bus Status

This screen displays channel data for the digital interface. It also shows the interface status.

```
Gordon Kapes, Inc.            System 920i                    Menu 15-1

                          DS1 ST-BUS STATUS

DS1 Card Present:  YES
DS1 Synchronized:  NO

DS1 Channel Number:
      1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

DS1 Channel Data In:
      00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00









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

Help for DS1 ST-Bus Status

DS1 Card Present: Shows YES or NO.

DS1 Synchronized: Shows YES or NO. Indicates whether the digital interface card is synchronized to the incoming D4 or ESF frame.

DS1 Channel Number: Shows numbers 1-24.

DS1 Channel Data In: Shows hexadecimal data coming into the system.

Channels 1-23 are B-channels containing PCM encoded voice. 00 indicates DS1 is not synchronized. Steady non-00 is the idle state. Channel 24 is the D-channel containing HDLC signaling packets. FF indicates HDLC signaling is missing. 3F, 7E, 9F, CF, E7, F3, F9 and FC are HLDC idle states. Idle state tends to change when receiving HDLC packets. Use the ISDN Protocol Analyzer to view HDLC packets.

Connect Tone to Digital Bus

This screen connects a test tone to a digital interface channel or OPS port.

```
Gordon Kapes, Inc.            System 920i                    Menu 16

                      CONNECT TONE TO DIGITAL BUS

Connect Tone:        NO
Tone Number:         1 (DMTF 1)
Bus Destination:     OPS
Channel Selection:   OPS 1









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

Help for Connect Tone to Digital Bus

Tone	Tone	Tone
0 - Silence	12 - DTMF A	24 - 350Hz
1 - DTMF 1	13 - DTMF B	25 - 480Hz
2 - DTMF 2	14 - DTMF C	26 - 620Hz
3 - DTMF 3	15 - DTMF D	27 - 950Hz
4 - DTMF 4	16 - Dial Tone	28 - 1400Hz
5 - DTMF 5	17 - Audible Ring	29 - 1800Hz
6 - DTMF 6	18 - Busy/Reorder	30 - DTMF 0
7 - DTMF 7	19 - Call Waiting	31 - Silence
8 - DTMF 8	20 - 500Hz	
9 - DTMF 9	21 - 1000Hz	
10 - DTMF #	22 - 2000Hz	
11 - DTMF *	23 - 200mS Pulse	

This feature connects an OPS port or interface channel to a test tone. Prior to being connected to a test tone, the OPS port or interface channel must be connected to another OPS port or interface channel or nothing will happen.

Connect Tone: Select YES or NO. Selects whether tone is connected or not.

Tone Number: Select 0-31. See previous page for list of tones.

Bus Destination: Select OPS, or DS1.

Channel Selection: If Bus Destination is OPS, select OPS 1-24. If Bus Destination is DS1, select CHANNEL 1-23.

DS1 and PRI Test Functions

This screen allows configuration of digital interface test functions.

```
Gordon Kapes, Inc.            System 920i                        Menu 17

                      DS1 AND PRI TEST FUNCTIONS

Network DS1 Override:                OFF*
Network DS1 Loopback:                OFF*
Send Yellow or Blue Alarm:           AUTO*
Network Specific Service:            NO SPECIFIC SERVICE*
ISDN Alerting Operation:             ENABLED*
ISDN Progress Description:           INBAND PROGRESS AVAILABLE*
Inband Progress Tones:               ENABLED*
Local Progress Tones:                ENABLED*
Outbound Channel Search:             DESCENDING SEQUENTIAL*
Exclusive Channel ID:                PREFERRED*

ISDN Alerting Message to be sent:    ALERTING WITH INBAND PROGRESS
ISDN Progress Message to be sent:    PROGRESS WITH INBAND PROGRESS


* Indicates factory default.


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

Help for DS1 and PRI Test Functions

Network DS1 Override: Select FORCE ON (NETWORK DS1 SEIZED), FORCE OFF (BYPASS TO CPE DS1), or OFF* (default). This function allows the keyboard to override the manual operation switch, contact inputs and carrier loss monitoring.

Network DS1 Loopback: Select REMOTE LOOPBACK (TEST ONLY), FRAMER LOOPBACK (TEST ONLY), PAYLOAD LOOPBACK (TEST ONLY), or OFF* (default). REMOTE LOOPBACK sends the line received data as the transmitted data. FRAMER LOOPBACK ignores the line received data. The transmitted data is not sent but is looped back internally as received data. PAYLOAD LOOPBACK is similar to REMOTE LOOPBACK except the framing, FDL and CRC bits are recalculated instead of looped back. OFF* causes the line received data to be processed normally.

Send Yellow or Blue Alarm: Select ESF YELLOW ALARM (TEST ONLY), D4 YELLOW ALARM (TEST ONLY), BLUE ALARM (TEST ONLY), NO ALARM (TEST ONLY), or AUTO* (default).

D4 YELLOW ALARM sends zeros in bit position 2 on all line channels when using D4 framing. Does not cause loss of synchronization, but causes loss of line channel data.

ESF YELLOW ALARM sends 8 zeros and 8 ones in the facilities data link time slot of the framing bit when using ESF framing. Does not cause loss of synchronization or loss of line channel data.

BLUE ALARM sends ones in all bit positions including the framing bit. Causes loss of synchronization and loss of line channel data.

NO ALARM does not send a yellow or blue alarm on the outgoing line data stream.

AUTO sends a yellow alarm on the outgoing line data stream when the incoming line data stream has been out of sync for more than 5 seconds.

Help for DS1 and PRI Test Functions (continued)

Network Specific Service: Select NO SPECIFIC SERVICE* (default), or CODE 0-31. If the network switch is not required to use a specific long distance service, then set this field to NO SPECIFIC SERVICE. If the network switch is rejecting ISDN Setup messages with cause 96 (60 or E0 hex), mandatory information element is missing, you might need to include the network specific facility information element (IE) in the ISDN Setup message. This is done by setting this field to CODE 0-31. The code identifies a specific long distance service to be used by the network. This feature was developed before there was competition for long distance services. Its future use is questionable. Here are some known service codes:
CODE 1 (SDN) (including GSDN),
CODE 2 (MEGACOM 800) (inbound only),
CODE 3 (MEGACOM) (outbound only),
CODE 4 (INWATS) (inbound voice only),
CODE 5 (OUTWATS) (outbound voice only),
CODE 6 (ACCUNET) (data only),
CODE 7 (AT&T LDS) (Long Distance Service),
CODE 8 (I800) (International 800 inbound only),
CODE 16 (MULTIQUEST 900) (inbound only),
MEGACOM, ACCUNET and MULTIQUEST are registered trademarks.

The next 4 fields (ISDN Alerting Operation, ISDN Progress Description, Inband Progress Tones, and Local Progress Tones) are used to test whether the receiving side can derive the correct progress tones. In general, dial tone is always generated locally. The ISDN call proceeding message is always sent after receiving the ISDN setup message. Progress tones are provided inband, even when the peer side should generate local progress tones (such as audible ringing).

ISDN Alerting Operation: Select ENABLED* (default), or DISABLED (TEST ONLY). ENABLED sends the ISDN alerting message during audible ringing. DISABLED prevents the ISDN alerting message from being sent and attempts to send the ISDN progress message during audible ringing.

ISDN Progress Description: Select INBAND PROGRESS AVAILABLE* (default), NOT END TO END ISDN (TEST ONLY), or END TO END ISDN (TEST ONLY). Use INBAND PROGRESS AVAILABLE or NOT END TO END ISDN (TEST ONLY) to test inband progress tones. This information is sent in the progress indicator information element (IE) of progress and alerting messages. Use END TO END ISDN (TEST ONLY) to test local progress tones.

Inband Progress Tones: Select ENABLED* (default) or DISABLED (TEST ONLY). ENABLED permits the system to generate all inband progress tones. DISABLED (TEST ONLY) prevents the system from generating inband busy, reorder, or audible ringing tones.

Local Progress Tones: Select ENABLED* (default) or DISABLED (TEST ONLY). ENABLED permits the system to activate all local progress tones. DISABLED (TEST ONLY) prevents the system from generating local busy, reorder, and audible ringing tones.

Outbound Channel Search: Select DESCENDING SEQUENTIAL* (default), ASCENDING SEQUENTIAL, CLOCKWISE CIRCULAR, or COUNTER CLOCKWISE CIRCULAR. Used for finding the next idle channel. ASCENDING SEQUENTIAL starts searching from channel 1. DESCENDING SEQUENTIAL starts searching from channel 23. CLOCKWISE CIRCULAR starts one channel higher than the previous channel and wraps around between channel 23 and 1. COUNTER CLOCKWISE CIRCULAR starts one channel lower than the previous channel and wraps around between channel 1 and 23. On the user side, use DESCENDING SEQUENTIAL to reduce glare. On the network side, use ASCENDING SEQUENTIAL to reduce glare.

Help for DS1 and PRI Test Functions (continued)

Exclusive Channel ID: Select PREFERRED* (default) or EXCLUSIVE. This information is sent in the ISDN channel ID information element. Preferred indicates that the channel is being requested and may be changed by the central office if the channel is already in use. Exclusive indicates that the channel is not negotiable and the call should be rejected by the central office if the channel is already in use. This feature was added to test if some central offices reject preferred channel IDs and to allow testing for glare. DMS100 always sends exclusive channel IDs regardless of this setting.

ISDN Alerting Message to be sent: Shows ALERTING WITH INBAND PROGRESS, ALERTING, PROGRESS WITH PROGRESS IE, or NONE. ALERTING WITH INBAND PROGRESS shows that the ISDN alerting message is sent with the progress indicator information element (IE) during audible ringing. ALERTING shows that the ISDN alerting message is sent during audible ringing. The receiving side should generate local audible ringing. PROGRESS WITH INBAND PROGRESS shows that the ISDN progress message is sent during audible ringing. NONE shows that no ISDN message is sent during audible ringing.

ISDN Progress Message to be sent: Shows PROGRESS WITH PROGRESS IE, or DISCONNECT. PROGRESS WITH PROGRESS IE shows that the ISDN progress message is sent with the progress indicator information element (IE) during busy or reorder progress tones. DISCONNECT shows that the ISDN disconnect message is sent without inband progress tones. The receiving side should generate local busy or reorder progress tones based on the cause IE included in the disconnect message.

ISDN Protocol Analyzer Configuration

This screen configures the way ISDN messages are captured.

```
Gordon Kapes, Inc.            System 920i                        Menu 18

                  ISDN PROTOCOL ANALYZER CONFIGURATION

Raw ASCII Mode:     DISABLED*
Calls to Watch:     ALL CALLS*
Capture Type:       LAYER 3 WITH INFORMATION ELEMENTS*









* Indicates factory default.


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

Help for ISDN Protocol Analyzer Configuration

Raw ASCII Mode: Select DISABLED* (default) or ENABLED. <ENTER> must be pressed to enable this feature. When enabled, the screen is cleared and a special help menu gives further instructions on how to use this feature. This feature is handy for capturing data to a file.

Calls to Watch: Select ALL CALLS* (default), NEXT INCOMING CALL or NEXT OUTGOING CALL. <ENTER> must be pressed to view results. Captures all calls or only the next incoming or outgoing call. When configured for next incoming or outgoing call, the protocol analyzer may be retriggered by stopping and running it again. When configured for ALL CALLS, do not run the protocol analyzer for long periods of time because it may interfere with normal system operation.

Capture Type: Select LAYER 3 WITH INFORMATION ELEMENTS* (default), LAYER 3 – HELP FOR ISDN PROTOCOL ANALYZER CONFIGURATION NO INFORMATION ELEMENTS, LAYER 2 & LAYER 3 WITH INFORMATION ELEMENTS, LAYER 2 & LAYER 3 – NO INFORMATION ELEMENTS, or LAYER 2 ONLY. 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.

ISDN Protocol Analyzer Display

The protocol analyzer displays ISDN messages sent by and received from the other side. Information is scrolled upward, starting from the bottom of the last page. The system initially displays the last page because it contains the most recent information.

```
Gordon Kapes, Inc.            System 920i                    Menu 18-10

                    ISDN PROTOCOL ANALYZER DISPLAY 10



SEND     DSL=1  TIME=00:01:22.000  CR=0001 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 "5551212"
RECEIVE  DSL=1  TIME=00:01:22.050  CR=8001 CALL_PROC
                CHANNEL_ID         18 03 A1 83 81    CHANNEL 1
RECEIVE  DSL=1  TIME=00:01:22.050  CR=800 ALERTING
                CHANNEL_ID         18 03 A1 83 81    CHANNEL 1
                PROGRESS_IND       1E 02 80 88  IN-BAND PROGRESS
SEND     DSL=1  TIME=00:01:29.550  CR=0001 DISCONNECT
                CAUSE              08 02 82 90  #16:NORMAL CLEARING
RECEIVE  DSL=1  TIME=02:22 46.750  CR=8003 RELEASE
SEND     DSL=1  TIME=02:22 46.750  CR=0003 RELEASE_COMP


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

Help for ISDN Protocol Analyzer Display

Pressing the space bar allows new information to be captured (RUNNING), or frozen (STOPPED). Select C to clear screen. Pressing the space bar or C also retriggers the analyzer when it is configured for NEXT INCOMING CALL or NEXT OUTGOING CALL (see ISDN PROTOCOL ANALYZER CONFIGURATION). When configured for ALL CALLS, it is undesirable to run the protocol analyzer for long periods of time because it may interfere with normal system operation.

The first word of each message identify the message source. Identities are: RECEIVE, SEND, STATUS, and ERROR. RECEIVE indicates the message was received from the other side. SEND indicates the message is sent to the other side. STATUS indicates the message is internal to the ISDN stack and typically indicates the ISDN stack is being shutdown or startup due to loss of line synchronization. ERROR indicates a internal error has occurred within the system. ERROR messages are captured even when the protocol analyzer is stopped.

Format of SEND and RECEIVE messages: Shows SEND or RECEIVE, DSL, TIME, ST, TEI, SAPI, Frame Type, NS, NR, and PF. CR and Message Type follow on next line. Information elements follow on separate lines.

Format of STATUS messages: Shows STATUS, ST, DSL, TIME, ST, TEI, SAPI, and Primitive Type.

Format of ERROR messages: Shows ERROR and text describing the error.

Definitions:

DSL: Digital Subscriber Line - Layer 1.

TIME: Time shown as hh:mm ss.mmm representing hours, minutes, seconds, and milliseconds since system power up or reboot.

ST: State Number - Layer 2. For factory use.

ISDN Protocol Analyzer Display

Help for ISDN Protocol Analyzer Display (continued)

TEI: Terminal Endpoint Identifier - Layer 2. The same number is used by both sides of the network. Associated with CES. TEI=0 is broadcast. TEI=1 is PRI endpoint.

SAPI: Service Access Point Identifier - Layer 2. SAPI=0 is signaling. SAPI=16 is packetized data. SAPI=63 is network management.

Frame Types - Layer 2:
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 Number Received - Layer 2.

NS: Frame Number Sent - Layer 2.

PF: Poll/Final Bit - Layer 2. Poll=0, Final=1.

Primitives are ISDN layer to layer messages. They are displayed by STATUS messages and are useful only to the factory. There are too many of them to describe here. The two most common primitives are:
MDL_STARTUP_REQ: Startup layer 2.
MDL_SHUTDOWN_REQ: Shutdown layer 2.

CR: Call Reference. Shows hexadecimal number used to identify the call on both sides of the network. Layer 3. The most significant bit is called the call reference flag. This bit is low for requests and high for responses. The call reference is also displayed on the DS1 CALL STATUS menu. Associated with Call ID, which is private to each side of the network.

Message Type: Layer 3. There are too many message types to describe here. The most common message types are:
SETUP: Begin call setup.
CALL_PROC: Other side has received setup.
PROGRESS: Other side is sending a progress tone.
ALERTING: Other side is sending a ringback tone.
CONNECT: Other side has answered.
DISCONNECT: Begin call teardown.
RELEASE: Teardown has been completed.

Information elements (IE's) contain details about each message. Layer 3. IE's are displayed on separate lines after the message type. There are two IE formats: standard (Q.931) and unpacked. Unpacked IE's are preceded by a tilde (~). Following the IE name are hex octets representing the IE data. Octets 1 and 2 are the IE identifier. Octet 3 shows the number of octets following octet 3.

ISDN Protocol Analyzer Display

Help for ISDN Protocol Analyzer Display (continued)

There are too many IE's to describe here. The most common IE's are:
BEARER_CAPABILITY: Encoding method.
CALLER_NUMBER: Originating phone number.
CALLED_NUMBER: Destination phone number.
CAUSE: Reason for disconnect.
CHANGE_STATUS: Channel in or out of service.
CHANNEL_ID: Bearer channel number to be used.
CONGEST_LEVEL: Identifier is only 1 octet.
DISPLAY: Text such as a person's name.
NETWORK_FACILITY: Type of long distance service.
PROGRESS_IND: Progress tone number.
REDIRECTING_NUM: 3rd party phone number.

Quick System Status

This screen shows a simple real time overview of each OPS port and digital interface channel.

```
Gordon Kapes, Inc.            System 920i                        Menu 19

                          QUICK SYSTEM STATUS

                                    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

OPS:           - - - C - - - -

DS1:          - - - - - - - - - - - - - - - - - - - - - - - C




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

Help for Quick System Status

Channel: Shows OPS port number or digital interface bearer channel number.

OPS: Shows single character status for each OPS port. Possible status are: hyphen (-) for on-hook or break-loop current, A for alerting, or C for off-hook, or N for no phone (ring error detected). If the OPS card is missing, nothing is shown for the associated ports.

DS 1: Shows single character value for each interface channel. Possible status are: hyphen (-) for not in use, I for incoming setup, S for outgoing setup, P for proceeding, G for progress, A for alerting C for connected, or D for disconnect. If the interface card is not present, the entire line shows CARD NOT PRESENT. If interface is not debounced synchronized, the entire line shows NOT SYNCHRONIZED. If interface is disabled, the entire line shows DISABLED.

Save/Restore System Configuration

This screen loads the system configuration to or from non-volatile 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.            System 920i                        Menu 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









              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 contact 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.

Note: Profiles saved by version 1.13 and up are compatible with 1.14 . New features may or may not be initialized to their factory default settings. Manually set them to their factory default or strange behavior may result.