



a division of Canoga Perkins

Expert Call Analyzer Models E2D and E4A

For Version 3.3



NOTICE!

This device contains static sensitive components. It should be handled only with proper ElectroStatic Discharge (ESD) grounding procedures.

NOTICE

Ellipsys Technologies has prepared this users manual for use by customers and Ellipsys Technologies personnel as a guide for the proper installation, operation and/or maintenance of Ellipsys Technologies equipment. The drawings, specifications and information contained in this document are the property of Ellipsys Technologies and any unauthorized use or disclosure of such drawings, specifications and information is prohibited.

Ellipsys Technologies reserves the right to change or update the contents of this manual and to change the specifications of its products at any time without prior notification. Every effort has been made to keep the information in this document current and accurate as of the date of publication or revision. However, no guarantee is given or implied that the document is error free or that is accurate with regard to any specification.

Ellipsys Technologies
A Division of Canoga Perkins, Inc.

20600 Prairie Street
Chatsworth, California 91311-6008
Customer Service: (800) 668-3547
(Monday - Friday 7 a.m. - 5 p.m. Pacific Time)
FAX: (818) 678-1895 (24 hrs.)
Web Site: www.ellipsys.net
Email: support@ellipsys.net

Copyright © 2003 Ellipsys Technologies
All Rights Reserved

Expert Call Analyzer Models E2D and E4A
User Manual

Product Number 08-20163-06

08/2003

MM

Table of Contents

Chapter 1 Overview	1-1
Working With the ECA Hardware	1-1
Working in the ECA Software	1-2
Working in CAS Mode	1-2
Working in ISDN Mode.....	1-4
Working in CAS/ISDN Mode.....	1-4
Working in Enhanced /ISDN Mode.....	1-6
Working in GR303 Mode	1-8
Chapter 2 Install and Set Up the System.....	2-1
Setting Up the PC.....	2-1
Setting Up a Modem in Windows NT.....	2-1
Setting Up a Modem in Windows 95, 98, 98SE, or ME	2-2
Setting Up a Modem in Windows 2000	2-2
Setting Up an E4A Controller	2-2
E4A Front and Side Panels	2-2
Connecting Circuits to the E4A	2-3
Connecting in Monitor Mode.....	2-4
Connecting in Intrusive Mode.....	2-5
Setting Up an E2D Controller	2-6
E2D Front and Side Panels	2-6
Powering on the E2D	2-7
Connecting T1 Lines to the E2D.....	2-7
Connecting Companion Units	2-10
Connecting the PC to the ECA.....	2-10
Setting Up the ECA.....	2-12
Disconnecting From the ECA	2-12
Chapter 3 Use the Software	3-1
Starting a Session	3-1
Managing a Session.....	3-3
Setting Up an Analog Session.....	3-6
Sending Test Tones.....	3-7
Calibrating Analog Circuits	3-7
Resolving Calibration Problems	3-8
Calibrating Manually	3-9
Setting Up a Digital Session	3-10
Chapter 4 Look at a Session.....	4-1
Analog Signaling Windows.....	4-1
Digital Signaling Windows	4-4
Analyzing Calls	4-7
Review Calls	4-7
Call Statistics and Call Lists	4-9

Filter Calls	4-11
Analyzing Events	4-13
Call List Window.....	4-13
Call Detail Window	4-15
Processed Events Browser.....	4-16
Raw Events	4-17
Working in ISDN and GR303 Modes.....	4-18
Windows Unique to ISDN and GR303 Modes.....	4-18
Facility Group Management Window	4-18
T1 System Detail Window	4-22
Working in CAS/ISDN Mode	4-24
Working in Enhanced ISDN Mode.....	4-26
Working in GR303 Mode	4-28
Chapter 5 Reports, File Transfers, and Working Locally.....	5-1
Creating Reports	5-1
Transferring Files.....	5-2
Analyzing Locally.....	5-3
Chapter 6 Simulate Calls	6-1
Connecting T1 Lines in Drop and Insert Mode	6-1
Making Automatic Simulated Calls.....	6-5
Additional Monitor Window	6-5
Wink-Start, Ground-Start, or Loop-Start Toward Network Side	6-5
Ground-Start or Loop-Start Toward Station side	6-6
Making Manual Simulated Calls	6-6
Raw, Wink-Start, Ground-Start, or Loop-Start Toward Network Side	6-6
Ground-Start or Loop-Start Toward Station Side.....	6-7
Chapter 7 Troubleshooting.....	7-1
Appendix A Call Progress Events	A-1
Events for Raw Circuits	A-1
Events for Loop-Start and Ground-Start Circuits	A-2
Events Unique to 911 Wink-Start Circuits	A-4
Events for Wink-Start and Immediate-Start Circuits.....	A-5
Events Unique to Feature Group D Circuits	A-7
Events Unique to Lucent PBX Circuits	A-8
Appendix B Specifications	B-1
Analog Facility Monitor (AFM) Input:.....	B-2
Digital Facility Monitor (DFM) Input	B-3
Appendix C Product Warranty.....	C-1
Field Located E4A Profile Worksheet.....	C-1

List of Figures

Figure 1. Navigation in CAS Mode.....	1-3
Figure 2. Navigation in CAS/ISDN Mode	1-5
Figure 3. Navigation in Enhanced ISDN Mode	1-7
Figure 4. Navigation in GR303 Mode.....	1-9
Figure 5. E4A Front Panel.....	2-3
Figure 6. E4A Side Panel	2-3
Figure 7. E4A in Monitor Mode.....	2-4
Figure 8. E4A in Intrusive Mode.....	2-5
Figure 9. E2D Front Panel.....	2-6
Figure 10. E2D Side Panel	2-6
Figure 11. DSX; E2D Set to Monitor Mode.....	2-7
Figure 12. Digital Cross-Connect System (DCS); E2D Set to Terminate Mode	2-8
Figure 13. D4 Channel Bank; E2D Set to Bridged Mode	2-8
Figure 14. Network Interface Unit (NIU); E2D Set to Bridged Mode.....	2-9
Figure 15. T1 Channel Service Unit (CSU); E2D Set to Monitor Mode	2-9
Figure 16. ECA Main Window	2-11
Figure 17. Detected Facility Monitors Window, CAS Mode; Shows One E2D With One E4AC5...3-1	3-1
Figure 18. Detected Facility Monitors Window, ISDN Mode	3-2
Figure 19. Session Management Window.....	3-4
Figure 20. Start Session Dialog.....	3-5
Figure 21. Analog Setup Window	3-6
Figure 22. Digital Setup Window.....	3-10
Figure 23. Analog Signaling Window.....	4-1
Figure 24. Analog Signaling Detail Window	4-3
Figure 25. Digital Signaling Window	4-4
Figure 26. Digital Signaling Detail Window.....	4-6
Figure 27. Digital Analyze Window	4-8
Figure 28. Call Statistics Window.....	4-10
Figure 29. Call Filtering Dialog	4-11
Figure 30. Call List Window	4-14
Figure 31. Call Detail Window	4-15
Figure 32. Processed Events Browser	4-16
Figure 33. Raw Events Browser.....	4-17
Figure 34. Facility Group Management Window.....	4-19
Figure 35. Facility Group Setup Dialog	4-21
Figure 36. T1 System Detail Window.....	4-22
Figure 37. CAS/ISDN Monitoring a PRI	4-24
Figure 38. E2D Connected to a GR303 System	4-28
Figure 39. Connecting the E2D and a DSX-1 for Drop and Insert	6-2
Figure 40. Connecting the E2D and a DCS for Drop and Insert	6-3
Figure 41. Call Simulation Window.....	6-4

List of Tables

Table 1. ISDN Options	1-4
Table 2. RJ-45 to Modular Data Cable Pinout.....	2-3
Table 3. Base and Companion E2D and E4A Units	2-10
Table 4. CAS Mode or ISDN Mode Detected Facility Monitors Descriptions	3-2
Table 5. Session Management Window Descriptions	3-4
Table 6. Calibration Process Messages.....	3-8
Table 7. Calibration Error Messages.....	3-8
Table 8. Analog Signaling Window Descriptions	4-2
Table 9. Analog Signaling Detail Window Descriptions.....	4-3
Table 10. Digital Signaling Window Descriptions	4-5
Table 11. Digital Signaling Detail Window Descriptions	4-6
Table 12. Digital Analyze Window Descriptions	4-8
Table 13. Call Summary Categories	4-10
Table 14. Call Statistics Window Options	4-11
Table 15. Call Event Window Fields and Controls	4-13
Table 16. Call List Window Fields and Controls.....	4-14
Table 17. Call Detail Window Controls.....	4-15
Table 18. Processed Events Browser Fields and Controls.....	4-16
Table 19. Raw Events Browser Fields and Controls	4-18
Table 20. Facility Group Management Fields and Controls.....	4-19
Table 21. Facility Group Setup Fields and Controls.....	4-21
Table 22. T1 System Detail Fields and Controls	4-23
Table 23. T1 Connection Setting in CAS/ISDN Mode.....	4-25

Chapter 1

Overview

The Ellipsys Expert Call Analyzer (ECA) monitors, captures, and analyzes call progress events on digital or analog phone lines and trunks. Use the ECA to quickly identify hard-to-spot, intermittent problems and track these problems to their source by isolating the fault within a network element. When the repair is complete, use the ECA to verify that the problem is resolved.

Working With the ECA Hardware

The ECA system software runs on two controllers:

- The E4A, for analog lines, monitors, displays, and analyzes up to four circuits through direct access. Each circuit connects to one of the four Analog Facility Monitors (AFMs) in the unit.
- The E2D, for digital lines, monitors, displays, and analyzes ABCD signaling bits, call progress tones, standard T1 alarms, digits, and parameters such as frame bit errors, frame loss, excessive zeros, and timing slips, on up to 96 channels (4 T1 lines). Each unit includes one or two Digital Facility Monitors (DFMs).

The ECA can operate in two modes:

- In Channel Associated Signaling (CAS) mode, the ECA monitors and records call progress events, then uses the Call Processor expert-system software module to interpret these events as higher-level information and list signaling protocol violations, call duration, features used, or which party disconnected.
- In ISDN mode, the Primary Rate ISDN (PRI) Monitor feature provides D channel data for an entire ISDN installation. The PRI Monitor can also capture in-band (B channel) signaling on up to two T1 systems connected to a single DFM so you can correlate common D channel messages with the CAS required for secondary call setup, such as for calling cards or integrated voice response.

The E4A supports only CAS mode. The E2D supports ISDN mode, CAS mode for D4 plug-ins, or both modes.

The ECA also supports the Simulated Calls optional feature for CAS mode that simulates and monitors a call that originates on any one of 24 channels of a T1 facility. Use Simulated Calls to test a PBX or other switch channel by channel, or to isolate a fault on a circuit.

Companion units for the E2D and E4A connect to a master E2D or E4A unit so that you can use a single base unit to view and analyze a large collection of circuits.

The ECA can store up to weeks of events and call analysis that you can view in three ways:

- Connect directly to the ECA with an on-site PC
- Dial up to the ECA from an off-site PC
- Transfer the information to your PC to view it locally, off-line, then create reports about faults

Working in the ECA Software

The ECA software presents a guided environment with standard Windows navigation. In particular, use these tips to navigate through the windows:

- The buttons at the lower edge show which windows are available from the current window.
- The Back button or <Esc> returns to the previous window.

Working in CAS Mode

Figure 1 shows the general window navigation in CAS mode with these definitions:

- **Detected Facility Monitors** shows which DFMs and AFMs the software detected and current status for the T1 signal, synchronization, errors, and alarms; for T1 circuits, you can set the E2D input to Monitor, Terminate (Term), or Bridged
- **Session Management** lets you to start or end a live session or review an archived session; a session is a record of call events on a selected circuit.
- **Digital/Analog Setup** lets you select the operating mode and assign a call processor. It includes the T1 Faults display and offers the **T1 System Detail** window that shows historic and real-time indicators for various error and alarm conditions on the system.
- **Digital/Analog Signaling** shows real-time information about a live session, such as the most recent call progress event, dialed digits, and status of the ABCD bits (E2D) or the tip and ring voltages (E4A).
- **Supervision** displays current ABCD bit information for T1 systems.
- **Review** lets you select specific circuits for analysis; all circuits must be the same type.
- **Simulated Calls** (option) allows you to make simulated calls on an E2D.
- **Call Statistics** shows general analysis results for the selected circuit(s); check or uncheck the various categories to filter the analysis.
- **Call List** shows all calls that meet the selected Call Statistics categories; shows raw or processed events for each call.
- **Call Detail** shows all details for a selected call.
- **Processed Events Browser** shows details for all the events on one circuit
- **Raw Events Browser** shows all the events on a circuit in the lowest level of information available; the data is not interpreted.
- **Reports** lets you save and create reports about the information from a specific window.

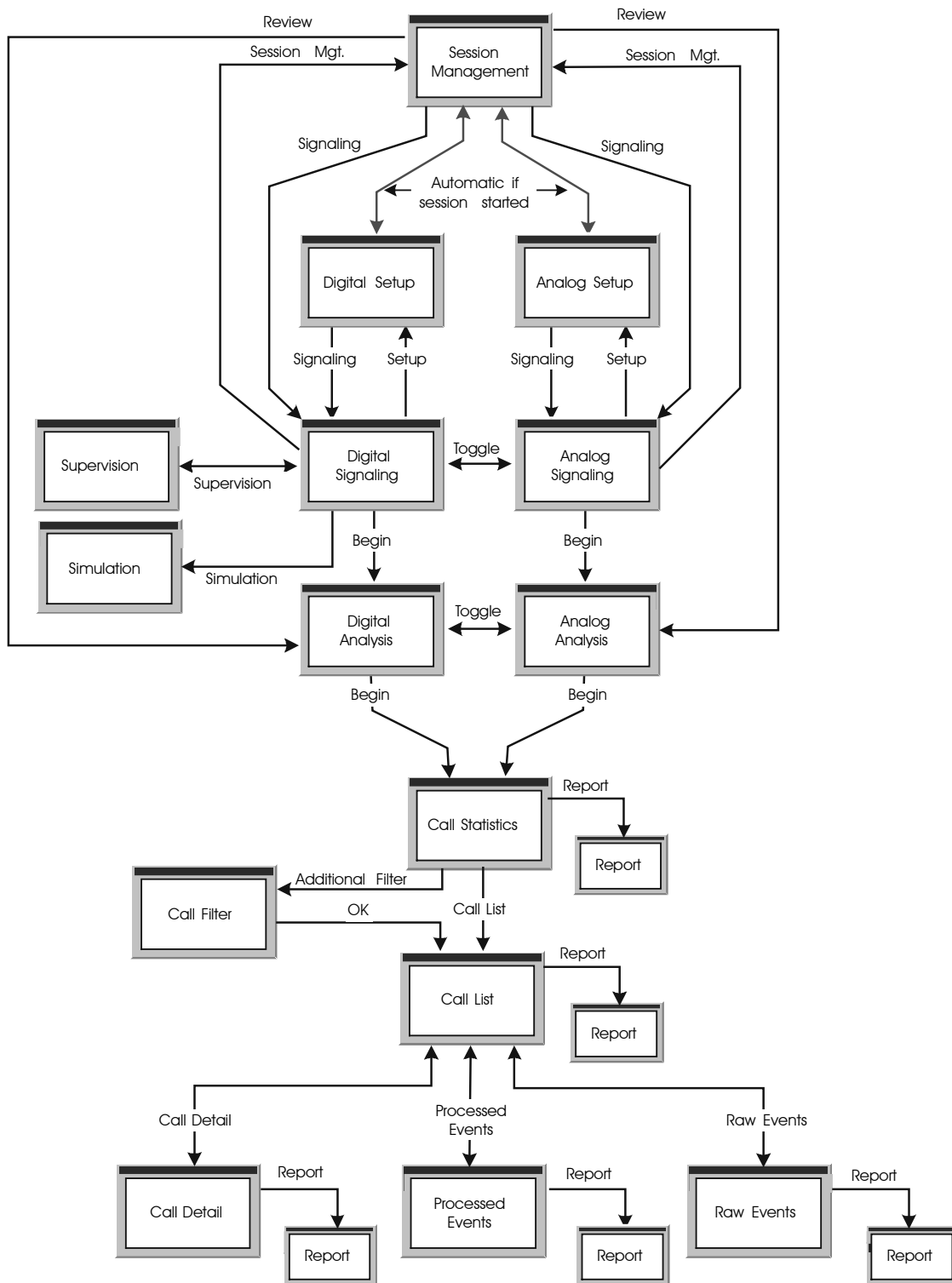


Figure 1. Navigation in CAS Mode

Working in ISDN Mode

The E2D supports two ISDN options; Table 1 compares the options.

- CAS/ISDN captures ISDN messages and in-band digits and tones.
- Enhanced ISDN captures and decodes ISDN messages with detailed call analysis.

Table 1. ISDN Options

Capability	CAS/ISDN	Enhanced ISDN	Notes
Capture ISDN Messages	Yes	Yes	
Capture In-Band Digits and In-Band Tones	Yes	No	Only on monitored facilities
Decode ISDN Messages	No	Yes	
Support National (Bellcore/ITU), Nortel, and AT&T	N/A	Yes	
Auto-Detect Non-Monitored Facilities	Manual	Yes	
Produce Call Records	Yes	Yes	
Provide Call Analysis	Basic	Detailed	
Support FAS ISDN	Yes	Yes	Facility Associated Signaling
Support NFAS ISDN	Yes	Yes	Non-FAS
Generate and Play Back Export Files	No	Yes	
Export to WS_FTP_Pro	Yes	Yes	

Working in CAS/ISDN Mode

In ISDN mode, the E2D provides D channel information for an entire ISDN installation. Use CAS/ISDN to evaluate and characterize ISDN services for a PBX, call center, or Internet Service Provider. In addition, you can capture and analyze B channel events on up to two T1 systems controlled by a D channel connected to the same DFM.

Figure 2 shows general navigation in ISDN mode with these definitions:

- **Detected Facility Monitors** shows which DFMs the software detected and current status for the T1 signal.
- **Facility Group Management** lets you define and apply groups to monitor ISDN data.
- **ISDN Raw Events Browser** lists all the ISDN events for a group; the data is not interpreted.
- **Call List** shows all calls in the selected group.
- **Call Filter** lets you select the various categories and ranges to filter the captured calls.
- **Processed Events Browser** shows ISDN messages and CAS events for a call.
- **Raw Events** shows D and B channel events for a specific call.

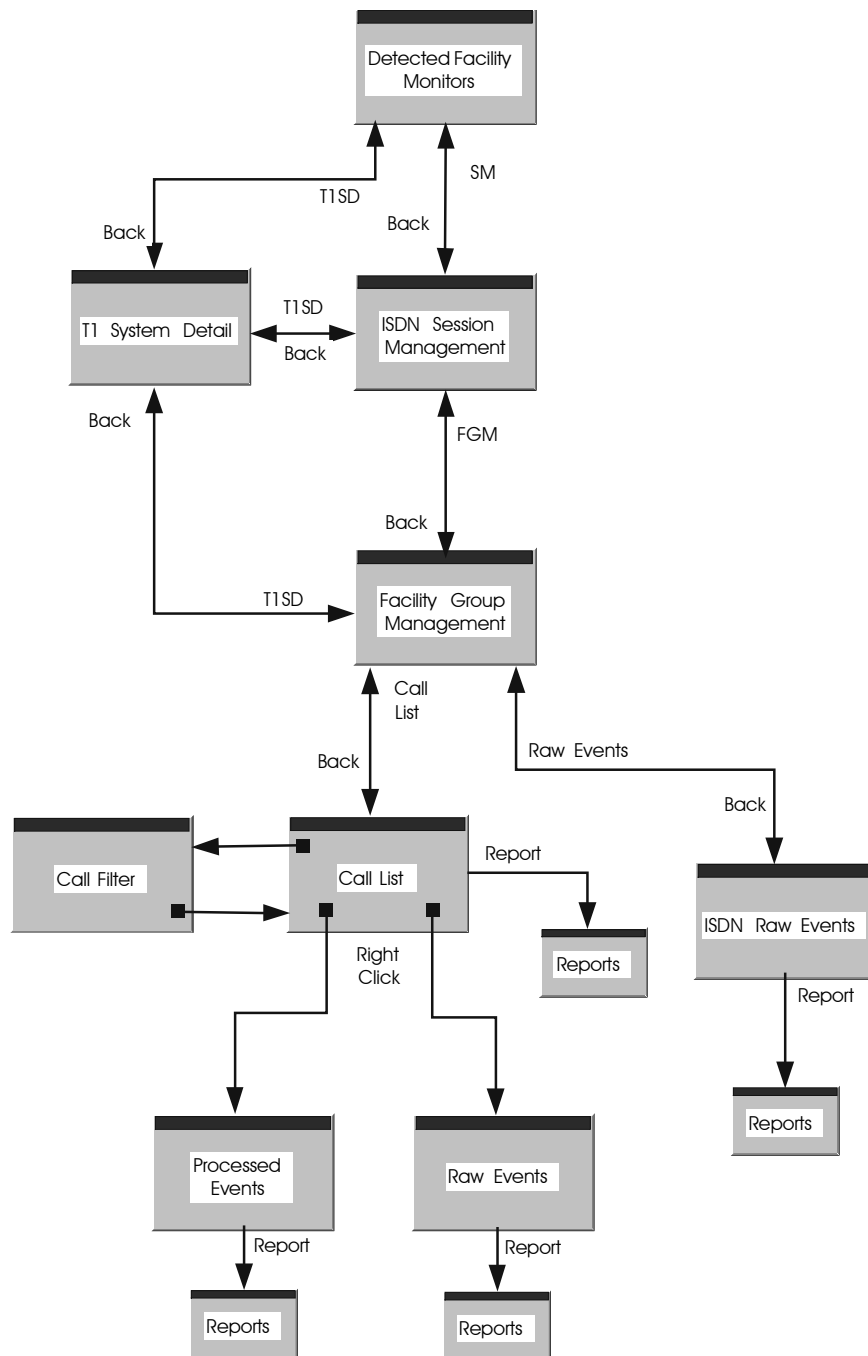


Figure 2. Navigation in CAS/ISDN Mode

Working in Enhanced /ISDN Mode

In Enhanced ISDN mode, the E2D provides Primary and Backup D channel information for up to 25 NFAS PRIs and adds these features to the standard ISDN features:

- Automatically detects non-monitored PRIs
- Identifies more than 100 call performance and fault conditions with Advanced ISDN Call Processor.
- Tracks the ISDN Network and User Timer.
- Decodes National, AT&T, and Nortel messages.
- Exports data in a smaller size with Session Export.
- Imports and reprocesses compressed data with Session Import.
- Provides call and facility data that is compatible with MS Word and Excel
- Adds advanced call filtering.
- Supports External Analysis Tools; for details, contact Ellipsys

Figure 3 shows general navigation in Enhanced ISDN mode with these definitions:

- **Detected Facility Monitors** shows which DFMs the software detected and current status for the T1 signal.
- **Facility Group Management** lets you define and apply primary and backup groups to monitor.
- **ISDN Raw Events Browser** lists all the ISDN events for a group; the data is not interpreted.
- **Call Selection** lets you set the various categories and criteria to filter calls
- **Call List** shows all calls in the defined filter group.
- **Processed Events Browser** shows ISDN messages with status and statistics for a call.
- **Raw Events** shows events for a call, decoding messages to hex level.

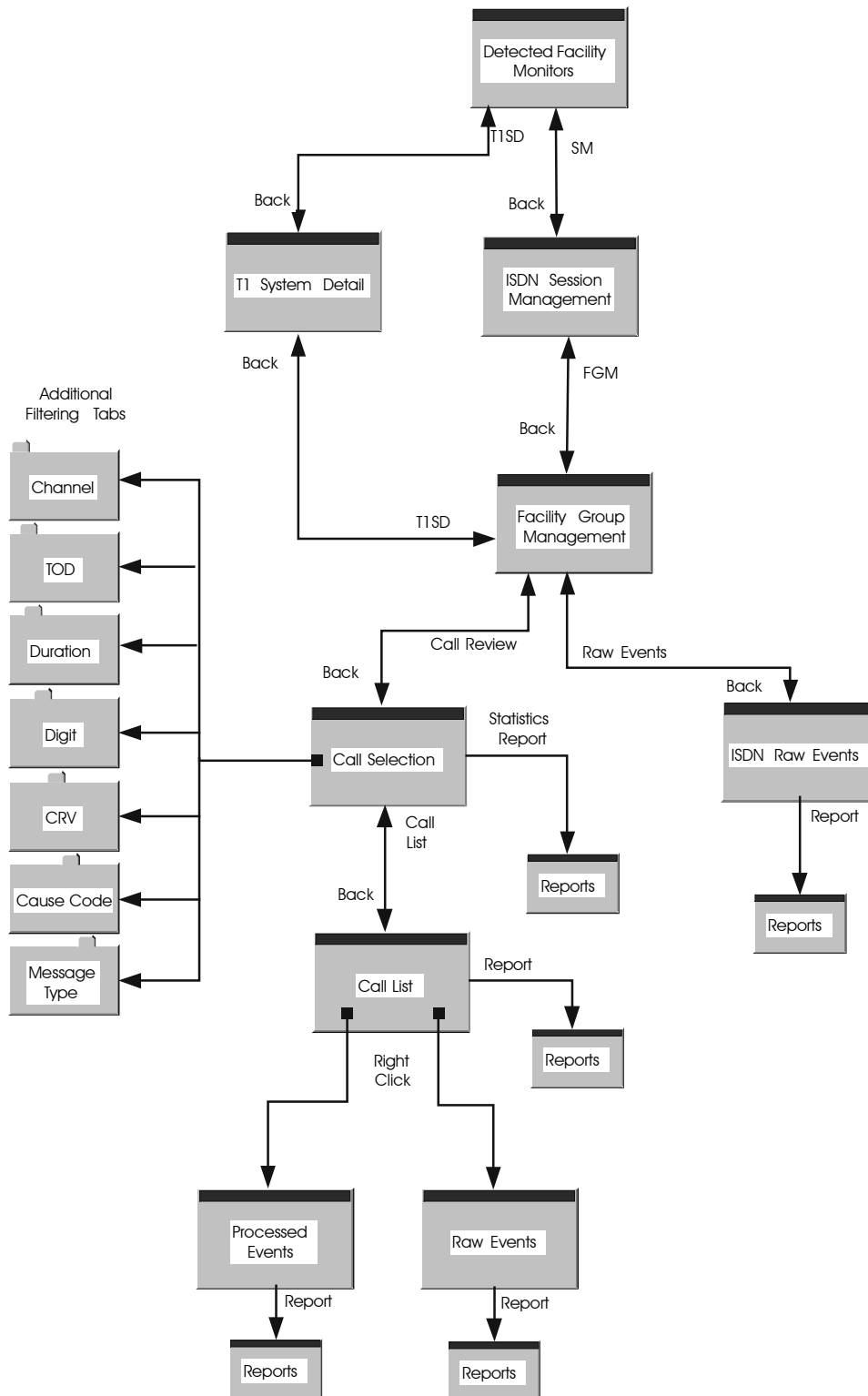


Figure 3. Navigation in Enhanced ISDN Mode

Working in GR303 Mode

The GR303 option monitors Timeslot Management Channel (TMC) or Common Signaling Channel (CSC) GR303 systems and provides these features:

- Automatically detects non-monitored T1s
- Identifies more than 100 call performance and fault conditions with Advanced TMC/CSC Call Processor.
- Tracks the GR303 Network and User Timer.
- Decodes and analyzes Lucent MSDT™, Nortel Access Node™, Fibex M5™, and CAC messages.
- Exports data in a smaller size with Session Export.
- Imports and reprocesses compressed data with Session Import.
- Provides call and facility data that is compatible with MS Word and Excel.
- Adds advanced call filtering.
- Supports External Analysis Tools; for details, contact Ellipsys

Figure 4 shows general navigation in GR303 mode with these definitions:

- **Facility Group Management** lets you define GR303 groups to monitor.
- **ISDN Raw Events Browser** lists all the GR303 events for a group; the data is not interpreted.
- **Call Selection** lets you set the various categories and criteria to filter calls
- **Call List** shows all calls in the defined group.
- **Processed Events** shows events with status and descriptions for a call.
- **Raw Events** shows events for a call, decoding messages to hex level.

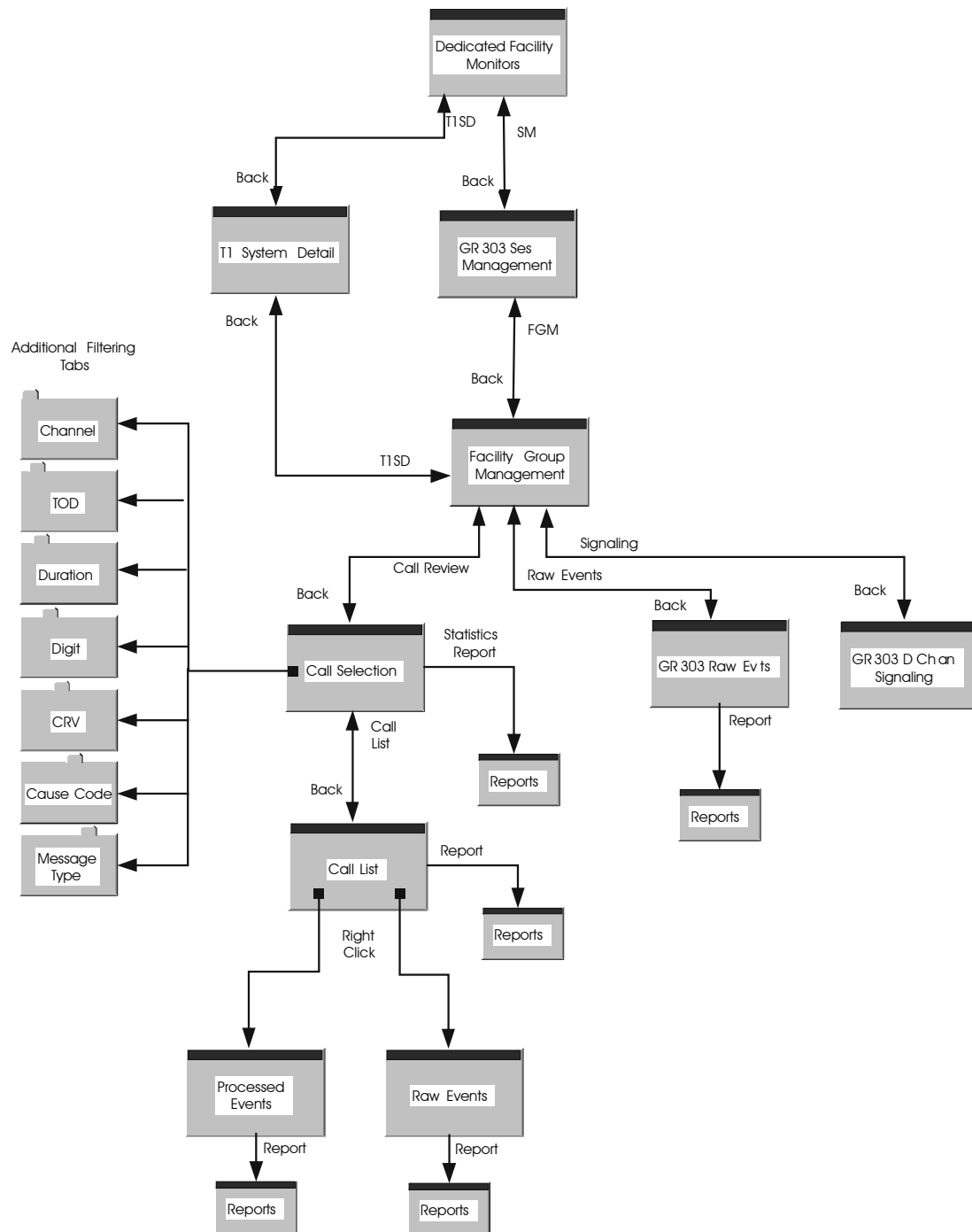


Figure 4. Navigation in GR303 Mode

Chapter 2

Install and Set Up the System

Follow the steps in this chapter to install and set up the software and hardware for an ECA system with E2D or E4A controller.

Setting Up the PC

Terminal Server Client allows you to run view the ECA software on your PC, through either a direct or a remote connection. To install and run Terminal Server Client, follow these step:

1. Launch the CD and run TSClient.exe.
2. Follow the on-screen installation steps, accepting all defaults. It automatically places Terminal Server Client in the Windows Program Group.

Note: To ensure a reliable connection, set the modem baud rate to 19200.

If you will connect remotely to the E2D or E4A, install and set up a modem according to the manufacturer's procedure, then obtain the phone number for the remote modem.

Setting Up a Modem in Windows NT

1. Launch the Dial-Up Networking application; the Networking dialog appears.
2. Click New; the Phonebook dialog appears.
3. In the Name the new phonebook entry, type the name, then click Next; the Server dialog appears.
4. For basic access, click Next, then click Finish. For other options, contact your system administrator.
5. To set up the modem, select the Phonebook entry that you just created, then click More and select Modem Configuration, Edit entry.
6. On the Basic tab, verify the Entry name, Phone number, and that Dial using shows your modem, then check Use another port if busy.
7. To check the speed and hardware features, click Configure, then on the Modem Configuration dialog, set the Initial Speed to 19200 and check Enable flow control, Enable modem error control, and Enable modem compression, then click OK.

Your Windows NT PC is ready to dial up to the Ellipsys equipment.

Setting Up a Modem in Windows 95, 98, 98SE, or ME

1. Launch the Dial-Up Networking application; the Networking dialog appears.
2. Click Make New Connection; the Make New Connection dialog appears.
3. Type your Name for the Ellipsys device, pull down the Select a device list, and choose your modem, then click Next and click Finish.

Your Windows 95, 98, 98SE, or ME PC is ready to dial up to the Ellipsys equipment.

Setting Up a Modem in Windows 2000

1. Launch the Dial-Up Networking application; the Network and Dialup dialog appears.
2. Double-click Make New Connection, then click Next.
3. In the Network Connection Type dialog, click Dial up to a private network, then click Next.
4. In the Phone Number to Dial dialog, type the phone number for the remote modem and click Next.
5. In the Connection Availability dialog, check For All Users, then click Next.
6. In the Completing the Network Connection dialog, optionally check Add a shortcut to my desktop, then click Finish.
7. In the Network and Dialup dialog, double-click the your new Dialup Connection entry and verify that the User name and Phone number are correct.
8. Click Properties, select the Networking tab, and check File and Printer Sharing for Microsoft Networks.
9. Select the General tab and click Configure; set the Speed to 19200 and check Enable flow control, Enable modem error control, and Enable modem compression, then click OK.

Your Windows 2000 PC is ready to dial up to the Ellipsys equipment.

Setting Up an E4A Controller

This section describes the switches, connectors, and LEDs for the E4A, how to connect into a phone circuit, and how to start the unit.

E4A Front and Side Panels

The front panel provides a Mark Event pushbutton, LEDs that show the system and alarm status, and jacks for monitoring the analog lines; you can use either the 310 In and Out jacks for each individual AFM or the RJ-45 In and Out jacks for all four AFMs. The side panel provides various connectors for E-LAN, Ethernet, modem, and serial communications, as well as the AC power and ground connections and switch. Figures 5 and 6 show the front and side panels of the E4A.



Figure 5. E4A Front Panel



Figure 6. E4A Side Panel

Connecting Circuits to the E4A

You can use either of two methods to connect the E4A to circuits, depending on the location or type of call problem.

- Monitor mode bridges the line in a parallel connection; the circuit remains in service at all times.
- Intrusive mode monitors the line in a series connection; you briefly put the circuit out of service when you connect or disconnect the E4A.

You can use either the 310 jacks or the RJ-45 jack. On a banana jack-to-310 adapter, the red terminal is Tip and the black terminal is Ring. Table 2 shows the RJ-45 pinout.

Table 2. RJ-45 to Modular Data Cable Pinout

AFM Number	Pair Number	Tip Pin and Color Code	Ring Pin and Color Code
1, 5, or 9	1	5 (white/blue)	4 (blue/white)
2, 6, or 10	2	1 (white/orange)	2 (orange/white)
3, 7, or 11	3	3 (white/green)	6 (green/white)
4, 8, or 12	4	7 (white/brown)	8 (brown/white)

Connecting in Monitor Mode

Although monitor mode does not interrupt service on the line, the E4A cannot collect information about DC current changes on the line. This may make it difficult to analyze obscure call problems.

Note: If you are connecting an E4A close to a 5ESS central office, you may want to connect in intrusive mode rather than monitor mode, due to characteristics of the 5ESS float voltages.

Follow these steps and see Figure 7:

1. Power on the E4A.

Danger *Hazardous ringing voltage may be present when you connect to the circuit under test. To avoid electrical shock, make sure that you are not grounded and always connect one lead at a time. These typically are live circuits; avoid shorting the connections.*

2. For the circuit under test, plug the alligator-clip cord into the IN jack on the E4A.
3. Attach the alligator clips to the tip and ring leads of the circuit under test.

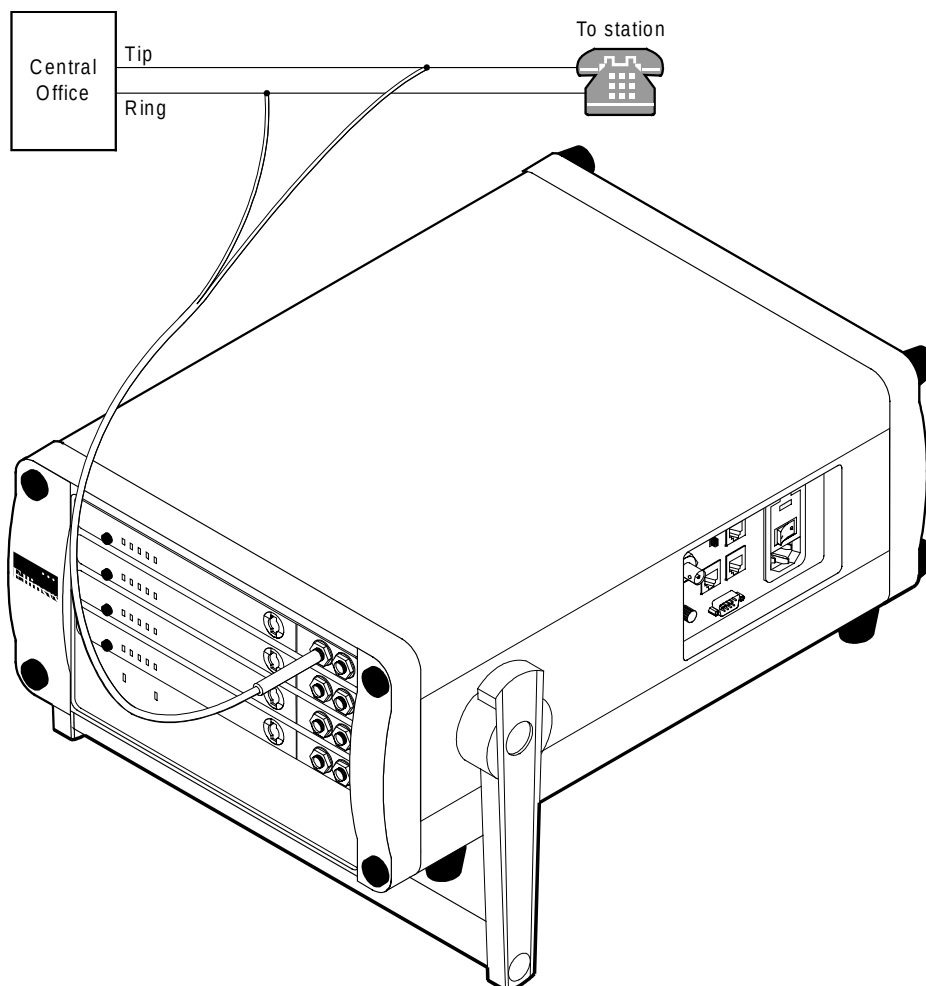


Figure 7. E4A in Monitor Mode

Connecting in Intrusive Mode

Intrusive mode briefly interrupts service while you connect a circuit to the E4A. If this is not possible for the customer, use monitor mode instead. After you make the connection, the E4A does not interfere with customer usage.

Follow these steps and see Figure 8:

1. Power on the E4A.
2. Notify the customer that service will be interrupted briefly.

Danger ***Hazardous ringing voltage may be present when you connect to the circuit under test. To avoid electrical shock, make sure that you are not grounded in any way and always first plug the cord into the E4A, then plug into the circuit under test.***

3. For each circuit under test, plug the 310 cord into the IN jack on the E4A.
4. Plug the second 310 cord into the OUT jack on the E4A.

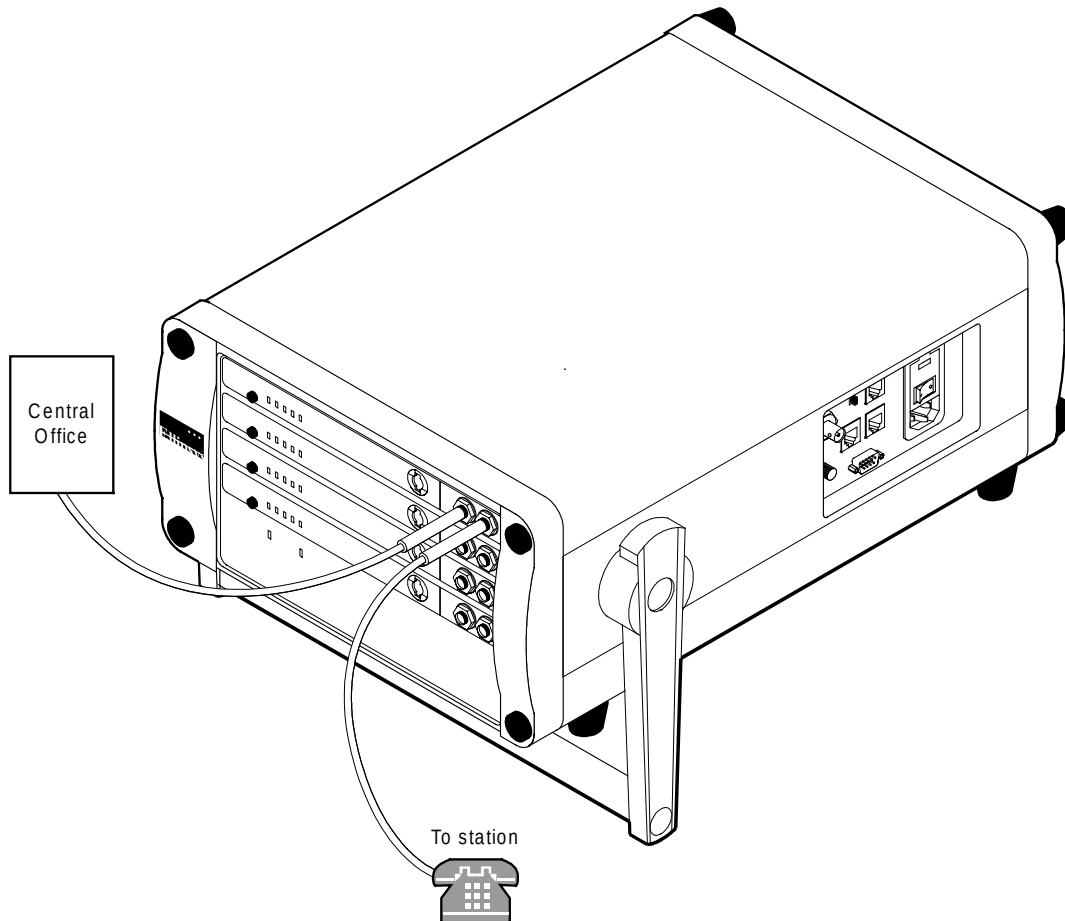


Figure 8. E4A in Intrusive Mode

Setting Up an E2D Controller

This section describes the switches, connectors, and LEDs for the E2D, how to connect into a T1 line, and how to start the unit.

E2D Front and Side Panels

The front panel provides LEDs that show the system and alarm status, as well as jacks for monitoring the T1 lines. The side panel provides various connectors for E-LAN, Ethernet, modem, and serial communications, as well as the AC power and ground connections and switch. Figures 9 and 10 show the front and side panels of the E2D.

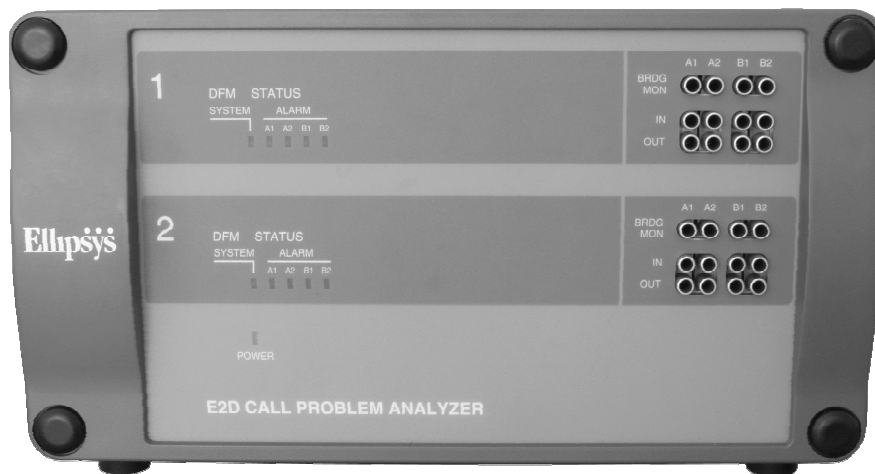


Figure 9. E2D Front Panel



Figure 10. E2D Side Panel

Powering on the E2D

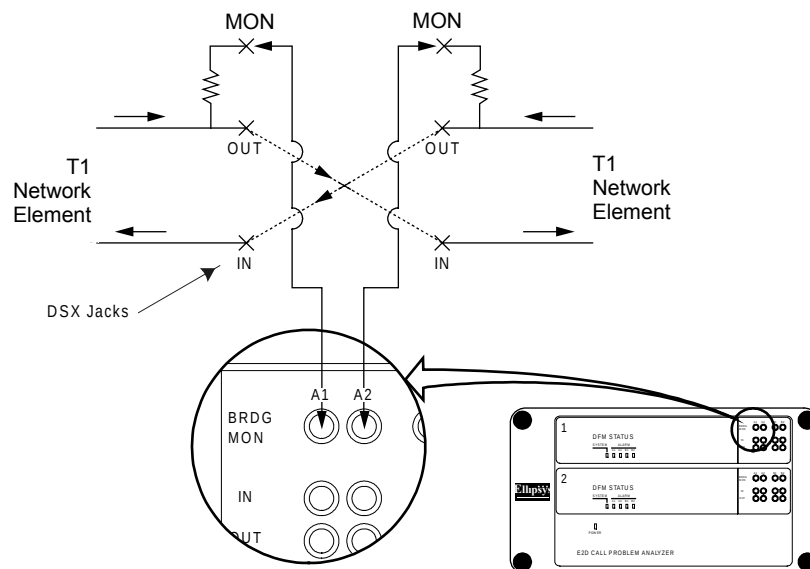
To power on the E2D, follow these steps:

1. Plug the power cord into the side of the E2D and a grounded 115V AC receptacle.
2. Turn on the E2D. During power-on, the green SYSTEM LEDs and the red ALARM LEDs flash, then stay on. Allow 4 minutes for the boot process.
3. After the 4-minute boot process, connect to the E2D from your PC, either directly or by dial-up, and start an application. The green SYSTEM LEDs stay on after you start an application. The red ALARM LEDs stay off when a T1 line is connected, unless the DFM cannot synchronize with a signal, then the ALARM LED stays on. For details on running applications, see Chapter 3.

Connecting T1 Lines to the E2D

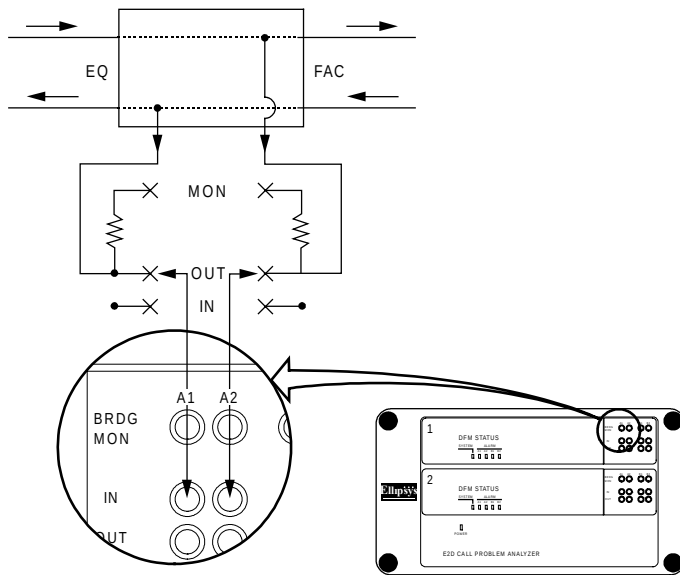
You can use any of several methods to connect the E2D to T1 lines, depending on your access point or type of monitoring. Figures 11 through 15 show typical connections to a single T1. Use the A1 and A2 jacks for the first T1 and use the B1 and B2 jacks for the second T1.

When a T1 line is connected to the E2D and frame synchronization is error-free, the red ALARM LEDs are off. If there is a problem with frame synchronization, the LEDs are on.



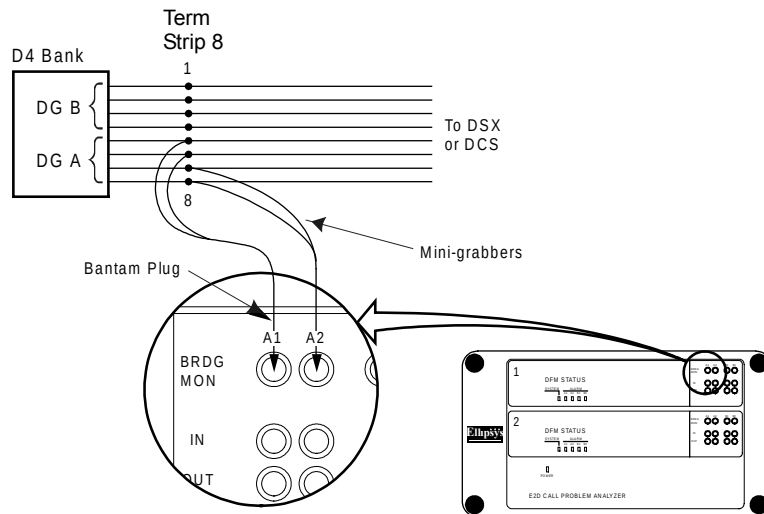
Example: -200 dBdsx monitor access for one T1 circuit. Use A1 Jacks for Timing.

Figure 11. DSX; E2D Set to Monitor Mode



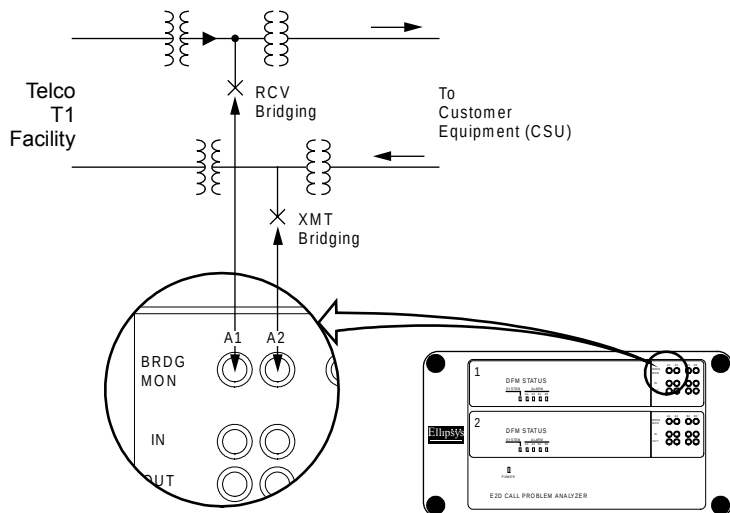
Example: DCS or DACS test access, monitoring the T1 both ways.
 The DCS test port is an isolated, full 0 dBsx level, appearing in a DSX "OUT" jack.
 100 Ohm termination required.
 (TL1 command: CONN-TACC-T1::TESTPORT,FROM,TO::MONEF;)

Figure 12. Digital Cross-Connect System (DCS); E2D Set to Terminate Mode



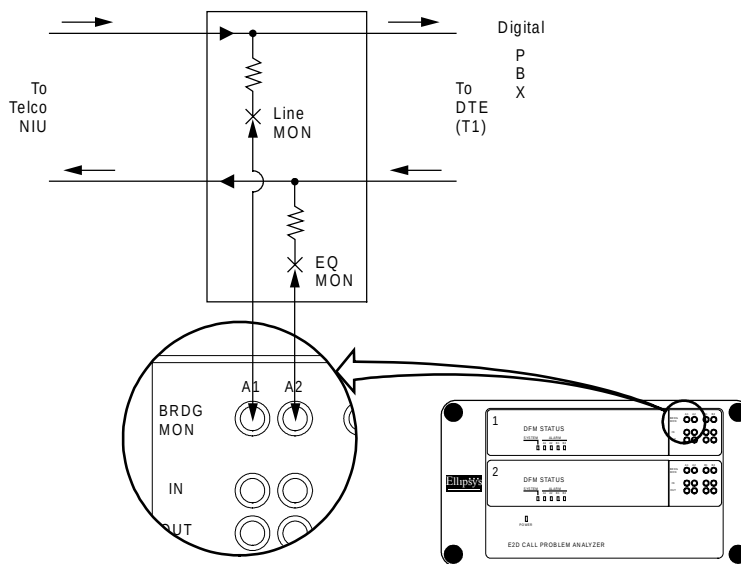
Example: "Bridging" across T1 line on terminal strip
 #8 on a D4 channel bank or other network element.

Figure 13. D4 Channel Bank; E2D Set to Bridged Mode



Example: "Bridging" across a T1 line on a T1 network interface unit.

Figure 14. Network Interface Unit (NIU); E2D Set to Bridged Mode



Example: Monitoring the T1 at a T1 CSU in the monitor jacks (-20 dBdsx).

Note: Read the CSU documentation to make sure you DO NOT interrupt service by going into an intrusive jack, such as "OUT" or "IN."

Figure 15. T1 Channel Service Unit (CSU); E2D Set to Monitor Mode

Connecting Companion Units

You can connect companion E2Ds or E4As to a base E2D to monitor and analyze more T1 systems and analog lines. Table 3 lists the possible configurations.

Table 3. Base and Companion E2D and E4A Units

Base Unit ECA	Companion Unit(s)	Maximum Lines and Systems
E2D (one DFM)	E2DC (one DFM)	Four T1 systems
E2D (two DFMs)	E4AC5 (four AFMs)	Four T1 systems and four analog lines
E2D (two DFMs)	E4AC5 + E4AC9 (eight AFMs)	Four T1 systems and eight analog lines

To connect companion units to a base unit, follow these steps:

1. Make sure all units are powered off.
2. Using the shortest possible four-conductor, RJ11 cable, plug one end of the cable into the E-LAN port on the side of the base unit.
3. Turn on the switch next to the E-LAN port on the base unit.
4. Plug the other end of the RJ11 cable into the E-LAN port on the companion unit.
5. To connect a second companion unit:
 - a. Plug another RJ-11 cable into the E-LAN ports on the first and second companion units.
 - b. Turn on the switch next to the E-LAN port on the first companion unit.
 - c. Turn off the switch next to the E-LAN port on the second companion unit.
6. Turn on the power for the units in any order.

Connecting the PC to the ECA

To run an analysis session, you connect to the E2D or E4A controller hardware, start the Terminal Server Client application, and then start the ECA software, which runs within the Terminal Server Client.

When you connect to the ECA, use one of these user IDs:

- User1 For Single-Session mode or for the first access in Multi-Session mode.
- User2 For the second access in Multi-Session mode; use this to monitor different types of calls on the same system.
- Viewer For reviewing an archived ECA session.

If this is either a dialup or a direct connection, the IP addresses are listed on the E4A and E2D Access Information and Instructions for the unit. If this is a connection through a LAN, contact your system administrator to obtain the server name or IP address.

To run Terminal Server Client, follow these steps:

1. Connect to the ECA either remotely or directly:
 - To connect remotely, launch the Dial-Up Networking application, select the connection entry for the E4A or E2D, enter `user1` as the User name for the first connection, then click Dial or Connect.
 - To connect directly to the ECA, plug the supplied crossover LAN cable into the Ethernet ports on your PC and the E4A or E2D.
2. When connected, launch Terminal Server Client.
3. In the Terminal Server Client window, set the IP address for the E4A or E2D and set the screen resolution to 1024 x 768. If this is a dialup connection, click Low Speed.

Note: The Dialup IP address starts with 192.168 and the Direct LAN IP address starts with 10.0.

4. Click Connect.
5. In the Logon Information dialog, type "User1" as the User name and leave the Password blank. The ECA Main window appears; see Figure 16.

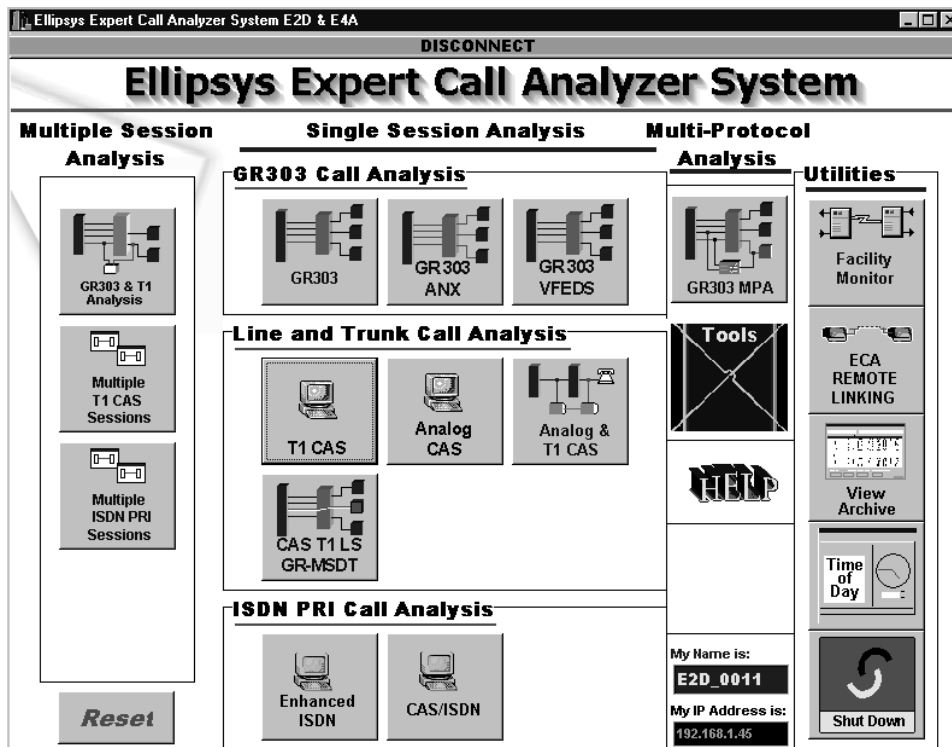


Figure 16. ECA Main Window

Setting Up the ECA

The first time you run the ECA software, set the values for the general parameters.

1. At the Main ECA window, click Time of Day.
2. In the Date/Time Properties dialog, pull down the Time zone menu and select your time zone.
3. Click the Date and time tab, then set your date and time.
4. Click OK, then click Back. The ECA Main window appears.
5. Run your application. For details, see Chapter 3.

Disconnecting From the ECA

To disconnect from or end a session, use one of these alternatives:

- To keep the ECA session running after you disconnect, in the Terminal Server window, click Start, then click Disconnect.
- To end the ECA session, in the Session Management window, click End, then Back to access the Detected Facility Monitors window, and click Quit Application (for details on these windows, see Chapter 3), then in the Terminal Server Client window, click Start, then Logoff.

If you are connected remotely, access your Dial-Up Networking application and click Hang up or Disconnect.

Note: If the Terminal Server session ends improperly, such as from a loss of power, select Logoff.

Chapter 3

Use the Software

The ECA software monitors call progress events on selected circuits and lists the data about those events in various formats. This chapter provides details on how to start a session and set up monitoring on either a digital or analog circuit.

Starting a Session

To start a live session, connect the circuits that you want to monitor to the E2D or E4A, then launch and set up the ECA software; for details, see Chapter 2. In the ECA software:

Step 1. Launch the ECA software to view events through the E2D or E4A, the ECA Main window appears; see Figure.

Step 2. At the ECA Main window, click an application such as T1CAS, Analog CAS, or Enhanced ISDN. At the license dialog, click I Agree; the Detected Facility Monitors window for the application appears. See Figures 17 and 18 and Table 4.



Figure 17. Detected Facility Monitors Window, CAS Mode; Shows One E2D With One E4AC5



Figure 18. Detected Facility Monitors Window, ISDN Mode

Table 4. CAS Mode or ISDN Mode Detected Facility Monitors Descriptions

Item	Description
DFMs (Digital window)	Shows all active Digital Facilities Monitors, up to four DFMs.
Sig	Signal condition: Green shows received signal; Red shows loss of signal.
Sync	D4 or ESF frame synchronization: Green shows in sync; Red shows loss of sync.
RAI	Remote Alarm Indication: Yellow shows a remote alarm.
AIS	Alarm Indication Signal: Blue shows Unframed All 1s detected.
Slips	Frame slip in relation to timing reference on A1; Red shows a frame slip.
FRM/CRC	Frame or CRC6: Red shows Frame or CRC6 errors.
B8ZS	B8ZS line coding: Yellow shows when the DFM detects enough B8ZS code words to lock on.
BPV	BiPolar Violations: Red shows violations occurring.

Item	Description
Excess zeros	Contiguous zeros: Red shows more than seven zeros detected on B8ZS or more than 15 zeros on AMI.
Level	T1 signal level: Green shows signal OK; Yellow shows low signal
Connection	Shows type of connection into the line, Monitor, Terminate, or Bridged; to change the input mode, click an indicator.
AFMs (Analog window)	Shows all active Analog Facilities Monitors, up to 12 AFMs.
Facility Name (Digital window)	Shows the Facilities Identifiers for the DFMs.
Session Mgmt button	Opens the Session Management window
Training/Training Mode Off button	Starts training mode or turns training mode off
About	Shows version information for ECA software and firmware
T1 System Detail button	Opens the T1 System detail window
Quit Application button	Leaves the current ECA application and transfers the ended ECA session to the archive.
Caution: <i>Before you quit the current application, go to the Session Management window and verify that you ended the live session.</i>	

Managing a Session

A session is a named sequence of selected call progress events on the circuits that the ECA monitors.

- A live session captures and updates events continuously. You can run only one live session at a time on the ECA.
- An archived session shows events captured in a previous live session.

Use the Session Management window to start and end live sessions, review a session, or remove an archived session.

1. At the Detected Facility Monitors window, verify that the correct circuits appear, then click Session Mgmt. See Figure 19 and Table 5.

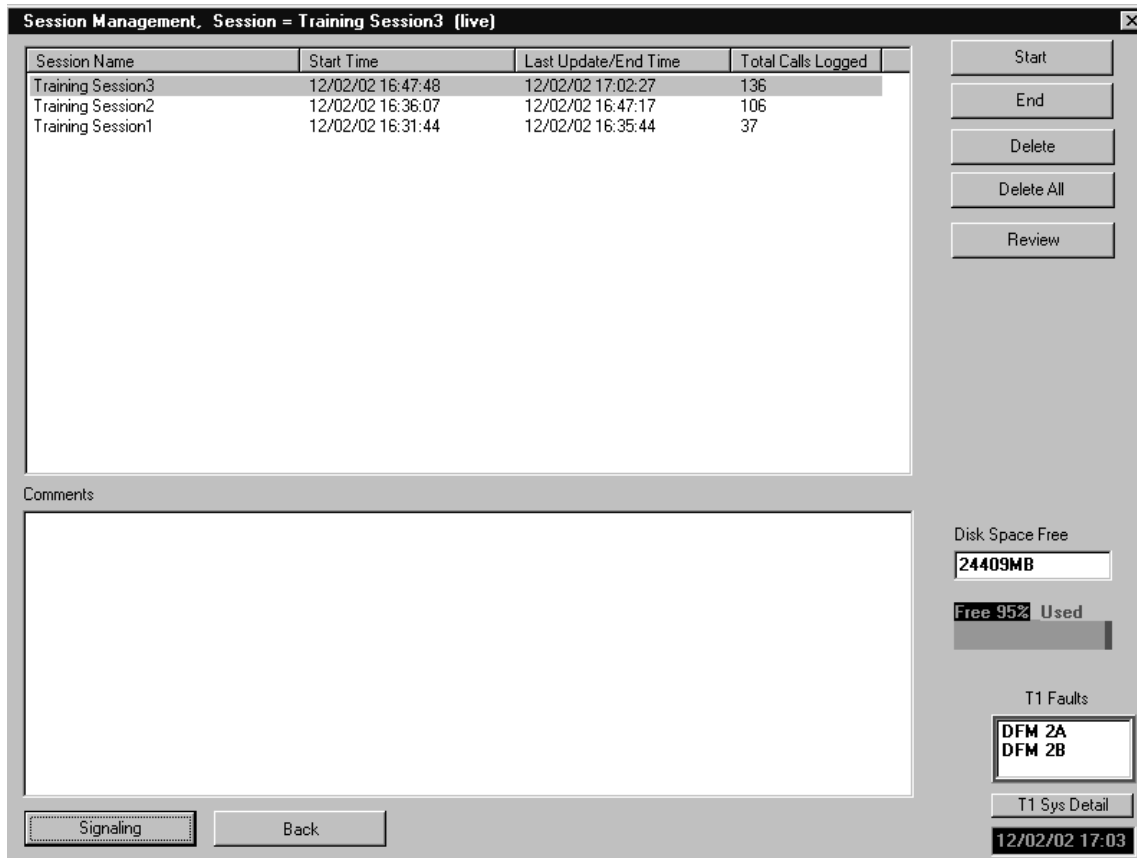


Figure 19. Session Management Window

Table 5. Session Management Window Descriptions

Item	Description
Title Bar	Includes the Name of the live session or "None" if no session is running.
Session Name	Lists the names of available live and archived sessions.
Start Time	Shows the date and time that session started.
Last Update/End Time	Shows the date and time that a live session was last updated or an archived session was ended.
Total Calls Logged	Number of calls in the session; updated if the session is live.
Comments	Includes notes about the session; enter these at the Start Session pane.
Start	Begins a live session.
End	Stops a live session.
Delete	Removes a session from the ECA.
Delete All	Removes all sessions from the ECA.
Review or Group Review	Opens the Analyze window to show calls for the selected session; can show a live or archived session; shows Facility Groups in CAS/ISDN mode and offers review by calls or raw events.

Disk Space Free	Shows unused disk space in Mbytes.
Free/Used	Shows the relative amounts of space on the hard disk.
Signaling	Opens the Digital or Analog Signaling window.
Back	Returns to the previous window.

- At the Session Management window, click Start, the Start session dialog appears; see Figure 20.

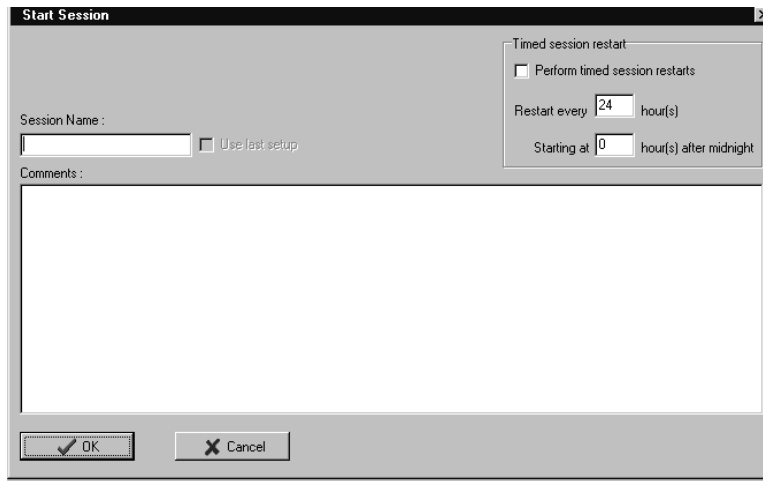


Figure 20. Start Session Dialog

- At the Start Session dialog, enter this information:
 - Session Name, up to 20 alphanumeric characters; invalid characters are "\ / : ; ? * -".
 - Comments, such as the customer contact name and number with details about the problem.
- To use the same setup as the last session for the circuits, check Use last setup.
- To restart a session automatically, check Perform timed session restarts, then enter the Restart interval and Starting time (after midnight). The name of the restarted session appears in the session list with the suffix "-000nS" where *n* is the *n*th restart.
- Click OK to return to the Session Management window (ISDN mode) or to the Analog or Digital Setup window (CAS mode).
- To end a session, click End, then in the message box, click Yes. The ECA archives that session.
- To review a session, highlight the name, then click Review. The Review window appears with the session details; see Chapter 4.
- To delete one or more sessions, highlight the name(s) and click Delete or Delete All, then in the message box, click Yes.

Setting Up an Analog Session

Use the Analog Setup window to define circuits for a session; see Figure 21. The window appears automatically when you start a live session on an E4A. Alternately, to reach this window from the Analog Signaling window, click Setup.

The image shows a software window titled "Analog Setup. Session = Analog Session (live)". It contains a table for configuring 12 channels. Each channel has a "Manual Calibration" button, a "Circuit Type" dropdown menu (all set to "Raw Events"), and a "Circuit Identity" text field. A checkbox "All like Ch 1" is checked under the "Circuit Type" header. To the right of the table are buttons for "OK", "Cancel", and "Test Tones Setup". At the bottom right, there is a "T1 Sys Detail" button and a timestamp "01/10/03 11:01".

Ch	Manual Calibration	Circuit Type	Circuit Identity
1	Manual Calibration	Raw Events	Circuit Id ?
2	Manual Calibration	Raw Events	Circuit Id ?
3	Manual Calibration	Raw Events	Circuit Id ?
4	Manual Calibration	Raw Events	Circuit Id ?
5	Manual Calibration	Raw Events	Circuit Id ?
6	Manual Calibration	Raw Events	Circuit Id ?
7	Manual Calibration	Raw Events	Circuit Id ?
8	Manual Calibration	Raw Events	Circuit Id ?
9	Manual Calibration	Raw Events	Circuit Id ?
10	Manual Calibration	Raw Events	Circuit Id ?
11	Manual Calibration	Raw Events	Circuit Id ?
12	Manual Calibration	Raw Events	Circuit Id ?

Figure 21. Analog Setup Window

To set up an analog session, follow these steps:

1. At the center of the window:
 - a. Select a circuit type for each channel. If all circuits are the same type, set the type for Channel 1, then check All like Ch 1.
 - b. Optionally, enter a Circuit Identity, up to 12 characters, such as the station number.
2. When all parameters are set, click OK. The Analog Signaling window appears, Loop-Start circuits start to calibrate, and all other circuits start processing events.

Sending Test Tones

If you need to identify a circuit location on a connecting block, you can send a test tone toward either the station or the network, or Central Office. Although the ECA does not capture call events on that circuit, it does capture call events on the other connected circuits.

Note: To send test tones, you must use intrusive mode to connect to the circuit. For details, see Chapter 2.

To send test tones, follow these steps:

1. At the Analog Setup window, click Test Tones Setup. The Test Tones Management dialog appears.
2. For each channel, select an option from the pull-down list: Test Tone Off, Test Tone Station, or Test Tone Network.
3. Click Apply to stay in the Test Tones Management dialog or click OK to return to the Analog Setup window. The E4A sends test tones until you select Test Tone Off for that channel.

Calibrating Analog Circuits

The E4A calibrates analog Loop-Start circuits by actual call voltages. It calibrates other types of circuits by preset values, which you can change manually if needed.

Caution: *To prevent calibration problems, the E4A must be properly grounded, through either the AC ground or an external ground connected to the ground post.*

Typically, the E4A automatically calibrates a Loop-Start circuit within the first few successful calls. If possible, make an initial call to ensure that calibration takes place the first time. Perform these steps slowly to give the E4A time to run the calibration:

1. Dial the number of the station that you are calling from.
2. Listen to the busy signal for a few moments.
3. Go back on-hook.
4. Wait 10 seconds, then click Signaling and verify that in the Signaling window, the circuit shows Idle (green); the circuit is calibrated. For details on the Signaling window, see Chapter 4.

Table 6 explains messages that appear during automatic Loop-Start calibration. After calibration, the on-hook and off-hook benchmarks appear in the Analog Signaling window.

Note: After a circuit is calibrated, record the voltages on the forms provided in Appendix D.

Table 6. Calibration Process Messages

Message	Definition
Waiting 2 Sec to Start Calibration	Calibration starts automatically for Loop-Start circuits
Dial Tone Detected - Waiting 2 Sec	For an originating call, the E4A detects a dial tone and waits 2 seconds to ensure that the dial tone is valid
Dial Tone In Progress Waiting 2 Sec For Stable Dial Tone or DTMF Digit	The E4A verifies the dial tone by its continued presence or by detecting a valid dialed digit
Dialing Waiting 15 Sec For Audible Ringing or Busy	The E4A monitors the dialed digits, then waits for either audible ringing or a busy signal.

Resolving Calibration Problems

Call progress events must occur in the correct sequence in order for the E4A to calibrate itself on a Loop-Start circuit. Improperly dialed or incomplete calls cause the E4A to wait until the next call. These problems can interfere with E4A calibration:

- Abandoned calls
- Connecting as a call is in progress
- Rapid dialing sequences
- Random voltage events, such as spikes or other transients
- Faulty facilities
- Faulty terminal equipment
- Operator error
- Positive voltages on PBX or other CPE equipment; however, the E4A will calibrate lines with reversed tip and ring
- Missing or improper ground on AC power

Table 7 explains some calibration error messages. For circuits other than Loop-Start, you will need to calibrate the circuit manually if errors occur.

Table 7. Calibration Error Messages

Message	Symptom	Action
Calibration Restart - Dial Tone Or Machine Ringing Not Detected In Time	Dial tone delay - too much time has expired until a dial tone was detected, or a dial tone was not detected at all.	Verify that the dial tone is on the circuit, or initiate a terminating call.
Calibration Restart - Event Out of Sync	The E4A detected voltage or tone events that are not part of normal call setup.	Try to resolve the problem or call Ellipsys technical support.

Message	Symptom	Action
Calibration Restart - Abandon Call or Event Out of Sync *	Either the caller went on-hook before audible ringing or a busy tone was detected.	Wait for the next call. If the line is pretripping, check the Raw Events Browser to find the trouble.
Supervision Change Detected Waiting for Dial Tone or Machine Ringing	The E4A detected voltage or tone events that are not part of normal call setup.	A line was flashed before a call was set up; make another call or wait for the next call.

Calibrating Manually

If necessary, you can manually calibrate a Loop-Start or Ground-Start circuit connected to the E4A. To reach the Manual Calibration window from the Analog Setup window, click Manual Calibration.

To calibrate a Loop-Start circuit, follow these steps:

1. In the scrolling display area, find the information you want to use for calibration and click Freeze to hold it in the window.
2. Select the correct on-hook (idle) value in the display area.
3. Click Station On Hook or type the nominal on-hook voltages in the Tip and Ring fields; if needed, click Auto Cal On/Off to view the Voltages Magnitudes window.
4. Select the correct off-hook value in the display.
5. Click Station Off Hook or type the nominal off-hook voltages in the Tip and Ring fields.
6. Click Apply to stay in the Manual Calibration window or click OK to return to the Analog Setup window.

The Manual Calibration window includes these additional buttons:

- **Default** Use the preset calibration defaults
- **Read Volts** Read the current tip and ring voltages on the circuit.
- **Auto Cal On/Off** Toggles auto calibration on and off.
- **Advanced On/Off** Shows or hide advanced calibration options.

Note: Changing the advanced options can significantly change the Call Processor performance. For details, call Ellipsys technical support at 1-800-668-3547.

To calibrate a Ground-Start circuit, see Figure and follow these steps:

1. Make sure the circuit is idle, then click Read Volts. The on-hook Tip and Ring voltages appear.
2. Make a test call and hang up.
3. Scroll back to the beginning of the call and click Freeze.
4. Record the on-hook and off-hook Tip and Ring voltages.

5. Calculate the network threshold by taking the average of the on-hook and off-hook Tip voltage values.
For example, on-hook Tip is 35 and off-hook Tip is 17. The average value, $(35 + 17) / 2 = 26$.
6. Calculate the station threshold by taking the average of the on-hook and off-hook Ring voltage values.
7. Enter these calculated values in appropriate Voltage Magnitude fields.
8. Click Apply to stay in the Manual Calibration window or click OK to return to the Analog Setup window.

Setting Up a Digital Session

Use the Digital Setup window to define circuits for a session. See Figure 22. The window appears automatically when you start a live session on an E2D that is set to operate in CAS mode. Alternately, to reach this window from the Digital Signaling window, click Setup.

Digital Setup, Session = CAS Session 1 (live)

Side 1: location 1A1
 Framing: Auto, LCode: AMI
☐ Signal, ☐ Alarm, ☐ Sync, ☐ Error
 Channels 1-24: Raw

Side 2: location 1A2
 Framing: Auto, LCode: AMI
☐ Signal, ☐ Alarm, ☐ Sync, ☐ Error
 Channels 1-24: Raw

Configuration Settings
 Save, Restore, Delete

Ch	Circuit Type	Circuit Identity
1	T1 Raw Events	Circuit Id ?
2	T1 Raw Events	Circuit Id ?
3	T1 Raw Events	Circuit Id ?
4	T1 Raw Events	Circuit Id ?
5	T1 Raw Events	Circuit Id ?
6	T1 Raw Events	Circuit Id ?
7	T1 Raw Events	Circuit Id ?
8	T1 Raw Events	Circuit Id ?
9	T1 Raw Events	Circuit Id ?
10	T1 Raw Events	Circuit Id ?
11	T1 Raw Events	Circuit Id ?
12	T1 Raw Events	Circuit Id ?
13	T1 Raw Events	Circuit Id ?
14	T1 Raw Events	Circuit Id ?
15	T1 Raw Events	Circuit Id ?
16	T1 Raw Events	Circuit Id ?
17	T1 Raw Events	Circuit Id ?
18	T1 Raw Events	Circuit Id ?
19	T1 Raw Events	Circuit Id ?
20	T1 Raw Events	Circuit Id ?
21	T1 Raw Events	Circuit Id ?
22	T1 Raw Events	Circuit Id ?
23	T1 Raw Events	Circuit Id ?
24	T1 Raw Events	Circuit Id ?

1A
 DFM: 1
 T1 System: ☒ A, ☐ B
 Facility Id: facility_1A
 T1 Faults: DFM 2A, DFM 2B
 T1 Sys Detail
 01/10/03 10:37

Figure 22. Digital Setup Window

To set up a digital session, follow these steps:

1. At the right-hand side of the window:
 - a. Select the number for the DFM with the circuits you want to configure.
 - b. Select a T1 system (A or B) to configure.
 - c. Optionally, enter the Facility Id.
2. At the top left-hand side of the window:
 - a. Optionally, enter the locations for Side 1 and Side 2.
 - b. Choose the Framing and LCode (line code) for Side 1 and Side 2. Either set them to Auto so the system detects the framing and line code or hard-set them from the drop-down menus.
 - c. Check or uncheck channel pairs to analyze; to analyze all channels, check All.. If you know which circuits are faulty, check only those circuits to make the analysis information easier to understand.
3. At the center-right side of the window, for each selected channel:
 - a. Select a circuit type. If all circuits are the same type, set the type for Channel 1, then check All like Ch 1.
 - b. Optionally, enter a Circuit Identity, such as the station number.
4. The ECA software defaults to the T1 line from the network at A1 on the E2D and the T1 line from the station at A2. If the T1 cords are reversed on a Loop-Start or Ground-Start circuit, click the arrow between Side 1 and Side 2 to reverse the network and station sides.
5. To save a setup, at Configuration Settings in the top right-hand corner of the window, type a name, such as "T1," then click Save.
6. To apply a saved setup to your current session, select it from the pull-down list, then click Restore.
7. To remove a saved setup, select it from the pull-down list, then click Delete.
8. When all parameters are set, click OK. The Digital Signaling window appears.

Chapter 4

Look at a Session

The ECA software monitors call progress events on selected circuits and lists the data about those events in various formats. This chapter provides details about looking at and analyzing the call progress events on the circuits that you monitor.

Analog Signaling Windows

The analog signaling windows show call progress event and line transitions in the live session for the circuits connected to the E4A. Details about the processed call progress events and line transition reasons that appear on these windows follow the window descriptions.

To access the Analog Signaling window from the Analog Setup window, click OK, or from the Session Management window, click Signaling; see Figure 23 and Table 8. To view details about four consecutive circuits from the Analog Signaling window, click More Detail; see Figure 24 and Table 9.

The screenshot displays the 'Analog Signaling, Session = Analog 911 (live)' window. It features a grid of 12 channels (Ch 1 to Ch 12) arranged in two rows of six. Each channel has a 'Raw Events' section with a 'Raw' button and a timer. Channels 5 through 8 are labeled '911 PSAP' and show 'Idle' status with a timer. Channels 9 through 12 also have 'Raw Events' sections with 'Raw' buttons and timers. On the right side, there are buttons for 'More Detail', 'Setup', 'Refresh', and a 'Total Calls' counter showing '8'. At the bottom, there are buttons for 'Review', 'Session Mgmt', 'Digital Signaling', and 'T1 Sys Detail'. The bottom right corner shows the date and time '07/16/03 11:12'.

Ch 1	Raw Events	Ch 2	Raw Events	Ch 3	Raw Events	Ch 4	Raw Events
	Raw		Raw		Raw		Raw
	00:01:50		00:01:50		00:01:50		00:01:50

Ch 5	911 PSAP	Ch 6	911 PSAP	Ch 7	911 PSAP	Ch 8	911 PSAP
	Idle		Idle		Idle		Idle
KP408186781888ST		KP408186781888ST		KP408186781888ST		KP408186781888ST	
T 0 R-47 I 1	00:00:10	T -2 R-45 I 1	00:00:00	T -2 R-45 I 1	00:00:10	T -2 R-44 I 1	00:00:10

Ch 9	Raw Events	Ch 10	Raw Events	Ch 11	Raw Events	Ch 12	Raw Events
	Raw		Raw		Raw		Raw
	00:01:50		00:01:50		00:01:50		00:01:50

More Detail
Setup
Refresh
Total Calls
8
T1 Sys Detail
07/16/03 11:12

Review Session Mgmt Digital Signaling

Figure 23. Analog Signaling Window

Table 8. Analog Signaling Window Descriptions

Name	Description
Channel Event Area Protocol Ckt ID State Digits Supervision Elapsed Time	• Protocol shows the channel number and type of call processor • Circuit ID; set in Analog Setup window • Circuit state: - Raw shows no Call Processor selected for the channel - Cal shows Call Processor selected and calibration in process - Busy shows call in progress - Idle shows inactive channel • Most recently dialed digits, such as 18004476070 or 7122. • Supervision shows circuit voltage: - T shows Tip voltage, such as -8 V - R shows Ring voltage, such as -35 V - I shows Loop current, such as 28 mA • Time since last call or length of call in progress.
More Detail	Click to go to the Signaling Detail window.
Setup	Click to go to the Setup window.
Total Calls	Number of calls in this session.
Review	Click to go to the Analog Analyze window.
Session Mgmt	Click to go to the Session Management window.
Digital Signaling	Click to toggle between digital and analog circuits.

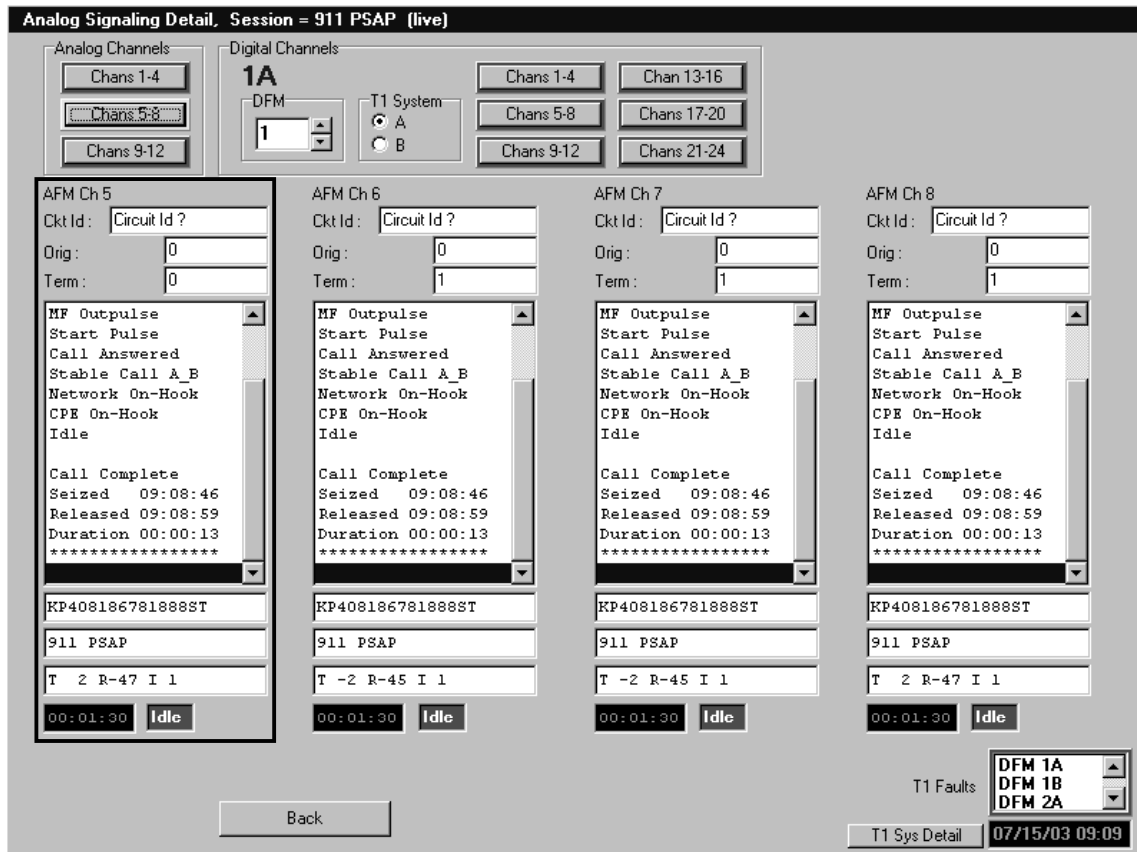


Figure 24. Analog Signaling Detail Window

Table 9. Analog Signaling Detail Window Descriptions

Name	Description
Analog Channels	Click to select a set of four consecutive analog circuits.
Channel Event Area	- Channel ID shows the AFM and channel - Ckt ID from the Analog Setup window. - Orig: The number of originating calls. - Term: The number of terminating calls. - Event Log shows details of the most recent call progress events or line transition reasons for this circuit - Most recently dialed digits. - Protocol shows the Call Processor selected for the channel. - T shows Tip voltage, such as -8 V - R shows Ring voltage, such as -35 V - I shows Loop current, such as 28 mA - Time since last call or length of call in progress.

Name	Description
Circuit status	Raw shows no Call Processor selected for the channel Cal shows Call Processor selected and calibration in process Busy shows call in progress Idle shows inactive channel
Back button	Click to return to the Signaling window.

Digital Signaling Windows

The digital signaling windows show call progress event and line transitions in the live session for the circuits connected to the E2D. Details about the processed call progress events and line transition reasons that appear on these windows follow the window descriptions.

To access the Digital Signaling window from the Digital Setup window, click OK, or from the Session Management window, click Signaling; see Figure 25 and Table 10. To view details about four consecutive circuits, from the Digital Signaling window, click More Detail; see Figure 26 and Table 11.

The screenshot displays the 'Digital Signaling, Session = Training 1 (live)' window. It features a grid of 24 channels (Ch 1 to Ch 24) arranged in 6 rows and 4 columns. Each channel has a status indicator (Stable Call, Busy, Idle, Raw) and a numeric display showing call numbers or event codes. Below each status indicator is a row of 16 small circles, each labeled with a letter (A, B, C, D) and a number (1-4), representing line transitions. A timer for each channel shows the duration of the event (e.g., 00:00:10, 00:13:10). On the right side, there are controls for '1A' (DFM), 'T1 System' (A/B), 'Fac Id' (102T1SJ02-SF01), and buttons for 'More Detail', 'Setup', 'Refresh', and 'Total Calls' (22). At the bottom, there are buttons for 'Review', 'Session Mgmt', 'Analog Signaling', 'Supervision', and 'Simulated Calls', along with a date and time stamp '01/13/03 17:00'.

Figure 25. Digital Signaling Window

Table 10. Digital Signaling Window Descriptions

Name	Description								
Channel Event Area <table border="1"> <tr> <td>Channel ID</td><td>Protocol</td></tr> <tr> <td>Event</td><td>State</td></tr> <tr> <td colspan="2">Digits</td></tr> <tr> <td>ABCD bits</td><td>Elapsed Time</td></tr> </table>	Channel ID	Protocol	Event	State	Digits		ABCD bits	Elapsed Time	- Channel number and type of call processor, such as T1 Loop-Start, T1 Ground-Start, or T1 Feature group D - Most recent call progress event or line transition reason, such as Stable Call or DP Dialing. - Circuit State: Raw shows no Call Processor selected for the channel Busy shows call in progress Idle shows inactive channel - Most recently dialed digits, such as 18004476070 or 7122. - Status of ABCD bits for digital channels; side 1 on left; side 2 on right. - Time since last call or length of call in progress.
Channel ID	Protocol								
Event	State								
Digits									
ABCD bits	Elapsed Time								
DFM	Select a DFM.								
T1 System	Select T1 system A or system B								
Fac Id	Facility or Span ID								
More Detail	Click to go to the Signaling Detail window.								
Setup	Click to go to the Setup window.								
Total Calls	Number of calls in this session.								
T1 Faults	Shows which T1 circuits have faults								
Review	Click to go to the Digital Analyze window.								
Session Mgmt	Click to go to the Session Management window.								
Analog Signaling	Click to toggle between digital and analog circuits.								
Supervision	Click to go to the Supervision window where you can view DFM information; current Signal, Sync, Alarm and Error status; and ABCD bits on the channels; and select a DFM								
Simulated Calls	Click this button to use to the optional Simulated Calls feature on the E2D. For details, see Chapter currently 12.								

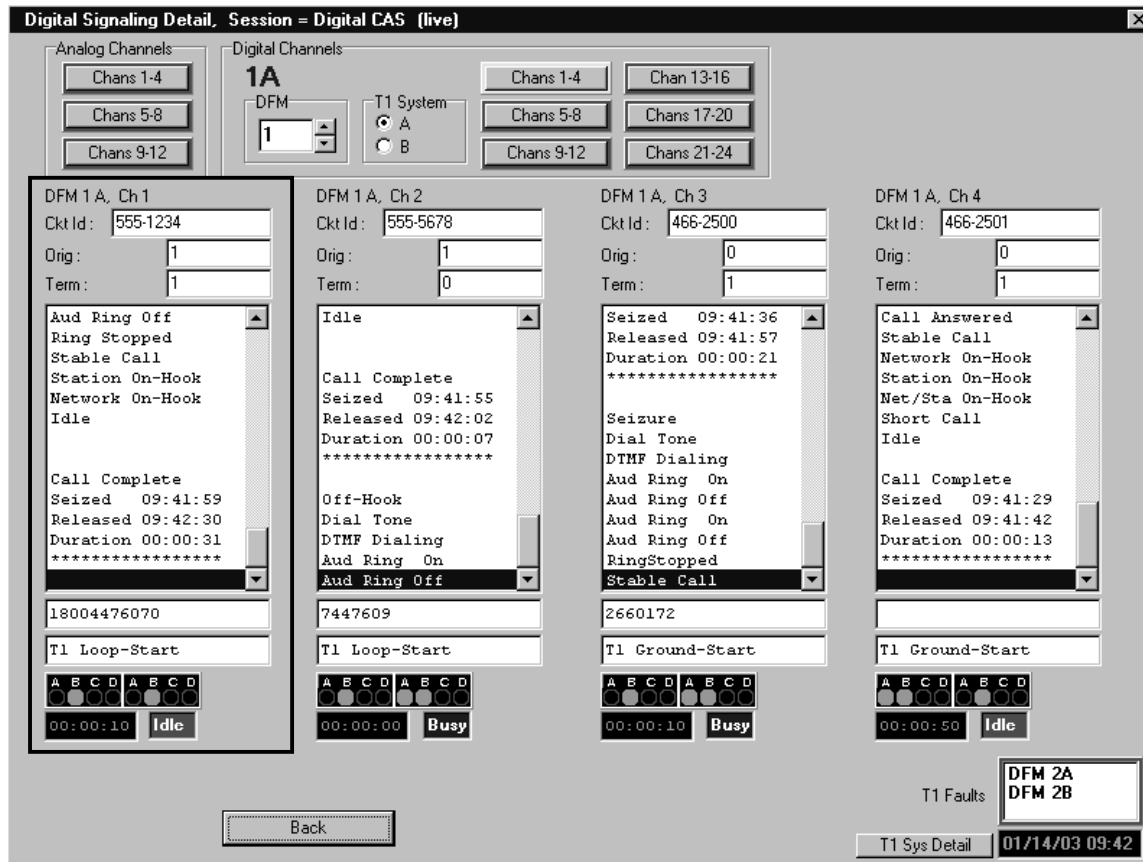


Figure 26. Digital Signaling Detail Window

Table 11. Digital Signaling Detail Window Descriptions

Name	Description
Analog Channels	Click to select a set of four consecutive analog circuits.
DFM	Select a DFM.
T1 System	Select T1 system A or system B).
Digital Channels	Select a set of four consecutive digital channels.

Name	Description
Channel Event Area	- Shows the DFM, T1 system, and channel; or the AFM and channel - Ckt ID from the Digital Setup window. - Orig: The number of originating calls. - Term: The number of terminating calls. - Event log shows details of the most recent call progress events or line transition reasons for this circuit - Most recently dialed digits. - Call Processor selected for the channel. - Status of ABCD bits for digital channels; side 1 on left; side 2 on right. - Time since last call or length of call in progress. - State shows: - Raw shows no Call Processor selected for the channel and offers Digits button; click to view the Digits Display dialog box - Busy shows call in progress - Idle shows inactive channel
Back	Click to return to the Signaling window.
T1 Faults	Shows which T1 circuits have faults

Analyzing Calls

You can analyze calls in either an archived or a live session through the information in these windows:

- Analyze window, also known as the Review window
- Call Statistics window
- Call Filtering window
- Call List window

Review Calls

In the Analyze window, you select various channels with the calls you want to analyze. To reach the Analyze window, go to either the Session Management or Signaling window and click Review. The Analyze window provides some basic information about each channel; see Figure 27 and Table 12. The Analog window is similar to the Digital Analyze window; differences are noted in Table 12.

Digital Analyze, Session = Test Session 1 (live)

DFM 1 A, Ch 1 T1 Loop-Start Review Id: 555-1234 Total: 26	DFM 1 A, Ch 2 T1 Loop-Start Review Id: 555-5678 Total: 25	DFM 1 A, Ch 3 T1 Ground-Start Review Id: 466-2500 Total: 23	DFM 1 A, Ch 4 T1 Ground-Start Review Id: 466-2501 Total: 18	DFM 1 A, Ch 5 T1 Wink-Start DTMF Review Id: Ellipsys-0 Total: 15	DFM 1 A, Ch 6 T1 Wink-Start DTMF Review Id: Ellipsys-1 Total: 19
DFM 1 A, Ch 7 T1 Wink-Start DP Review Id: TG 525-0 Total: 26	DFM 1 A, Ch 8 T1 Immed-St. DP Review Id: TG 613-4 Total: 26	DFM 1 A, Ch 9 T1 Immed/Wink DTMF Review Id: ACME Ltd. Total: 17	DFM 1 A, Ch 10 T1 911 PSAP Review Id: 911-Trk 3 Total: 16	DFM 1 A, Ch 11 T1 Feature Group D Review Id: Trk 4001 Total: 19	DFM 1 A, Ch 12 Raw Events Review Id: Circuit Id ? Total: 0
DFM 1 A, Ch 13 Raw Events Review Id: Circuit Id ? Total: 0	DFM 1 A, Ch 14 Raw Events Review Id: Circuit Id ? Total: 0	DFM 1 A, Ch 15 Raw Events Review Id: Circuit Id ? Total: 0	DFM 1 A, Ch 16 Raw Events Review Id: Circuit Id ? Total: 0	DFM 1 A, Ch 17 Raw Events Review Id: Circuit Id ? Total: 0	DFM 1 A, Ch 18 Raw Events Review Id: Circuit Id ? Total: 0
DFM 1 A, Ch 19 Raw Events Review Id: Circuit Id ? Total: 0	DFM 1 A, Ch 20 Raw Events Review Id: Circuit Id ? Total: 0	DFM 1 A, Ch 21 Raw Events Review Id: Circuit Id ? Total: 0	DFM 1 A, Ch 22 Raw Events Review Id: Circuit Id ? Total: 0	DFM 1 A, Ch 23 Raw Events Review Id: Circuit Id ? Total: 0	DFM 1 A, Ch 24 Raw Events Review Id: Circuit Id ? Total: 0

1A
 DFM

T1 System
☒ A
☐ B

Fac Id: 102T1SJ02-SF01

T1 Faults
 DFM 2A
 DFM 2B

01/14/03 14:03

Figure 27. Digital Analyze Window

Table 12. Digital Analyze Window Descriptions

Item	Description
Channel information	Lists the name of the channel and the type of call processor selected for the channel
Review for channel	Click to select a specific channel for analysis
Id	Lists the channel ID information
Total	Lists the number of calls on the channel
Review All	Click to select all the channels for analysis
Clear All	Click to deselect all channels
Analog/Digital Review	Click to toggle the window between the analog and digital channels
Begin	Click to go to the Call Statistics window or, if there are no calls on the selected circuits, you can go to the Raw Events Browser
Back	Click to return to the previous window
DFM	Select a specific DFM (not on Analog Analyze window)
T1 System	Select system A or system B (not on Analog Analyze window)
Fac Id	Shows the facility identifier (not on Analog Analyze window)

Use the controls and buttons to select channels to analyze. Typically, you can select Review All at the beginning of a session in order to get a general overview, then as you isolate the problem, return to the Analyze window to select a specific channel to analyze.

You can analyze only one type of circuit at a time. If you select more than one type of circuit for analysis, the Circuit Type Selection dialog appears. Select one type of circuit to view in the Call Statistics window, then click OK.

Click Begin to go to the Call Statistics window. If a session has been underway for some time and if you have selected several channels, it may take the ECA a few seconds to access the information and display the Call Statistics window.

Call Statistics and Call Lists

The Call Statistics window provides categories of information about calls made on circuits connected to the E2D or E4A. Figure 28 shows a typical Call Statistics window. These categories include:

- Summary totals all calls and categories
- Unusual Actions totals events that the Call Processor lists as possible sources of problems.
- Trouble Actions totals events that the Call Processor lists as known problems.
- Call Disposition totals all events that occurred during calls.

Note: The Call Statistics window updates automatically during a live session.

Call Statistics, Session = Test Session 1 (live)

T1 Wink-Start DTMF Call Statistics, Calls From All Channels

Call Summary	Unusual Actions - Originating Side	Call Disposition
66 ☒ All Calls	0 ☒ Digit During Busy	0 ☒ Voice Call
37 ☒ Trouble Actions - All	0 ☒ False Seizure/Test Call	0 ☒ MODEM Call
37 ☒ Unusual Term. Side	0 ☒ Digit During Reorder	0 ☒ FAX Call
0 ☒ Unusual Orig. Side	0 ☒ Short Call (under 4 sec)	52 ☒ Orig. Side 1 Call
		14 ☒ Orig. Side 2 Call
		29 ☒ Call Answered
		0 ☒ Abandon During Ringing
		0 ☒ Busy
		0 ☒ Abandon During Digits
		0 ☒ Open Switch Interval
		15 ☒ Mid-Call Digits
		0 ☒ Facility Error
		0 ☒ Process Manually
		52 ☒ Side 1 Disc. First
		14 ☒ Side 2 Disc. First

Unusual Actions - Terminating Side	Trouble Actions - Originating Side	Trouble Actions - Terminating Side
0 ☒ Incomplete Wink	0 ☒ Circuit Open Over 5 Sec	37 ☒ No Wink
0 ☒ Long Wink (Over 350ms)	0 ☒ Digits Before Wink	0 ☒ Reorder
37 ☒ No Wink After 4 Sec	0 ☒ No Digits	
0 ☒ Short Call (under 4 sec)		
0 ☒ Short Wink (under 100ms)		

Call List Back Report ☒ Call Filtering Filters Are Logical: ☒ Or ☐ And T1 Sys Detail 01/14/03 14:25

Figure 28. Call Statistics Window

To collect statistics about a call action or event that appears in these categories, check the box next to that action or event. To clear all checkboxes, uncheck All Calls. In addition, you can refine the call list; check Call Filtering near the bottom of the window and select a logical Boolean (Or or AND) operator for the filters. For details on Setting call filters, see Call Filtering in this chapter. For explanations of call actions and events for various types of circuits, see Call Progress Events in Appendix A.

Each call has at least two dispositions; for example, the series of actions of making a call, hearing a busy tone, and then hanging up is analyzed as an Originating Call, a Busy, and a Station Disconnected First. Table 13 shows the categories of call summaries.

Table 13. Call Summary Categories

Field Name	Total of...
All Calls	Calls during this session.
Trouble Actions - All	Calls, both originating and terminating, that encountered trouble.
Unusual Actions - Terminating Side	Calls on the terminating side that encountered unusual actions.
Unusual Actions - Originating Side	Calls on the origination side that encountered unusual actions.

To select types of calls for detailed analysis, check or uncheck the various individual statistics and categories on the Call Statistics window, then to refine the list, such as by duration, date, or digits, use Call Filtering. For details on options in the Call Statistics, see Table 14.

Table 14. Call Statistics Window Options

Item Name	Description
All Calls	Select or deselect all categories.
Call Filtering	Click to set up filters to refine the statistics lists.
Filters Are Logical	If you select individual categories (not All Calls), you can set the filter logic; OR searches list calls that match any checked category; AND searches list calls that match all checked categories.
Call List	Click to go to the Call List window; or, if you checked Call Filtering, goes to the Call Filtering dialog.
Back	Click to return to the Review (Digital Analyze) window.
Report	Click to create a report; see Chapter 5.

Filter Calls

Use the Call Filtering dialog to narrow the list of calls that you see. The AND/OR search logic that you set on the Call Statistics window applies to the options that you set in Call Filtering. See Figure 29.

Figure 29. Call Filtering Dialog

Follow these steps:

1. To set the Sorting Order, click Call Seizure Time or Call Release Time.
2. To filter calls by duration, check Duration Filtering, then set the upper and lower length limits at Between Minutes and And Minutes.
3. To filter by time and date, check the Date/Time Filtering. If this is not checked, the current date and time are used.
4. Type start and dates and times in the From and To date and time fields; press Tab to move between the fields
5. To filter on a dialed number, check Digit Filtering, then click the type of digits to filter for, either Dialed Digits or Mid-Call Digits.
6. Set the upper and lower length phone number limits at the Digit Count fields.
7. To search for a specific number sequence, In the Digits field, type a search combination string.

Note To search for an MF key pulse or MF start digits, start the string with "KP" and/or end the string with "ST." Use a period as a wild card; for example "555.01" filters calls for numbers that start with 555 and end with "01."

8. Click a Digit Comparing option:

Selection	Digits Field	Result
Match Exactly	5556321	Only calls to 5556321
Match any	8	Any phone number with an 8
Match first	1510	All calls to area code 510
Match last	000	All phone numbers that end with 000

9. When you are done, click OK. The ECA selects call records according to the characteristics you selected; the Call List window appears.

Analyzing Events

Use the information in the Call List, Call Detail, Processed Events Browser, and Raw Events Browser windows to view and analyze the events for specific calls. The top of each window lists details for the selected call; see Table 15.

Table 15. Call Event Window Fields and Controls

Item Name	Description
Chan	Number of the circuit for this call.
Chan ID	Name of the circuit for this call.
Sys Call #	Number of this call out of the total number of calls collected by the ECA.
Ch Call #	Number of this call for this circuit.
Seized Time	Time when this call started.
Released Time	Time when this call ended.
Duration	How long this call lasted.
Direction	Direction (terminating or originating).
Disposition	Final action for this call.
Dialed digits	The number of and actual digits that were dialed to start the call.
Mid-call Digits	The number of and actual digits that were dialed during the call.

Call List Window

The Call List window lists calls, in chronological order, that meet the call statistics and filtering characteristics that you chose. The top of the window lists details for the highlighted call; see Figure 30 and Table 16.

To view processed or raw events for a particular call, right click on the call and select Processed Events or Raw Events from the pop-up menu or click the Processed Events or Raw Events buttons.

Note: The Call List window does not update during a live session. To view new calls, click Back to return to the Call Statistics window, choose the call type again, then return to the Call List.

Call List, Session = Test Session 1 (archived)

Chan : 1A - 1 Chan Id : 555-1234 Sys Call # : 629 Ch Call # : 70

Seized : 01/14/03 14:41:33 Released : 01/14/03 14:42:04 Duration : 0:00:31

Direction : Originating Disposition : Normal

11 Dialed Digits : 18004476070

0 Mid-Call Digits :

T1 Locations
Side 1 : Network Side
Side 2 : Customer/CPE Side
Fac Id : 102T1SJ02-SF01

Ch	Call	Ch Id	Digits	Seized Time	Disp	Dir
1A - 2	665	555-5678	444	01/14/03 14:44:59	Network Trouble	Orig
1A - 1	656	555-1234		01/14/03 14:44:09	Normal	Term
1A - 2	653	555-5678	7447609	01/14/03 14:43:44	Normal	Orig
1A - 1	645	555-1234	18004476070	01/14/03 14:43:19	Normal	Orig
1A - 2	644	555-5678	444	01/14/03 14:43:04	Network Trouble	Orig
1A - 1	637	555-1234		01/14/03 14:42:23	Normal	Term
1A - 2	630	555-5678	7447609	01/14/03 14:41:39	Normal	Orig
1A - 1	629	555-1234	18004476070	01/14/03 14:41:33	Normal	Orig
1A - 2	624	555-5678	444	01/14/03 14:40:55	Network Trouble	Orig
1A - 1	619	555-1234		01/14/03 14:40:37	Normal	Term
1A - 1	611	555-1234	18004476070	01/14/03 14:39:47	Normal	Orig
1A - 2	610	555-5678	7447609	01/14/03 14:39:46	Normal	Orig
1A - 2	605	555-5678	444	01/14/03 14:39:06	Network Trouble	Orig
1A - 1	602	555-1234		01/14/03 14:38:52	Normal	Term
1A - 1	595	555-1234	18004476070	01/14/03 14:38:02	Normal	Orig
1A - 2	591	555-5678	7447609	01/14/03 14:37:56	Normal	Orig
1A - 2	588	555-5678	444	01/14/03 14:37:22	Network Trouble	Orig
1A - 1	583	555-1234		01/14/03 14:37:06	Normal	Term
1A - 2	578	555-5678	7447609	01/14/03 14:36:17	Normal	Orig
1A - 1	576	555-1234	18004476070	01/14/03 14:36:16	Normal	Orig

Call Filtering Progress
Filter Progress: 100% Elapsed Time: 0:00:07 Calls Matching Filter: 148

T1 Faults
DFM 2A
DFM 2B

T1 Sys Detail
01/14/03 14:50

Call Detail Back Processed Events Raw Events Report

Figure 30. Call List Window

Table 16. Call List Window Fields and Controls

Item Name	Description
Ch	Channel number for the selected call.
Call	System number assigned to the selected call.
Ch ID	User-defined name given to the circuit (same as 2).
Digits	Dialed digits.
Seized/Released Time	Date and time the call was seized or released.
Disp	Disposition of call.
Dir	Direction of call, terminating, originating or unknown.
Pop-up menu	Right click on a call, then select Processed Events or Raw Events to view events for that call.
Call Filtering Progress pane	Shows percent of calls filtered, the elapsed time, and how many calls meet the selected characteristics.
Call Detail button	Click to go to the Call Detail window for more information about the selected call.
Back button	Click to return to the Call Filter dialog.

Item Name	Description
Processed Events button	Click to go to the Processed Events Browser.
Raw Events button	Click to go to the Raw Events Browser.
Report button	Click to create a report.

Call Detail Window

The Call Detail window provides details about circuit benchmarks, call dispositions, and trouble or unusual station or network actions for a selected call. See Figure 31 and Table 17.

Call Detail, Session = Test Session 1 (archived)

Chan: 1A-6 Chan Id: Ellipsys-1 Sys Call #: 643 Ch Call #: 53

Seized: 01/14/03 14:42:52 Released: 01/14/03 14:43:04 Duration: 0:00:12

Direction: Originating Side 1 Disposition: Terminating Side Trouble

0 Dialed Digits 0 Mid-Call Digits

T1 Locations

Side 1: Network Side

Side 2: Customer/CPE Side

Fac Id: 102T1SJ02-SF01

Call Disposition - Orig. Side 1 Call
Call Disposition - Side 1 Disc. First

Trouble Actions - Terminating Side - No Wink
Unusual Actions - Terminating Side - No Wink After 4 Sec

Prev Call Next Call

T1 Faults: DFM 2A, DFM 2B

T1 Sys Detail: 01/14/03 15:26

Call List Processed Events Raw Events Report

Figure 31. Call Detail Window

Table 17. Call Detail Window Controls

Item Name	Description
Prev Call and Next Call buttons	Click to move to the previous or next call on the call list.
Call List button	Click to go to the Call List window.
Processed Events button	Click to go to the Processed Events Browser.
Raw Events button	Click to go to the Raw Events Browser.
Report button	Click to create a report.

Processed Events Browser

The Processed Events Browser shows call progress events for a selected call. See Figure 32. Some invalid events, such as talk on digits, miscellaneous voltage events, or invalid tones, are suppressed. When you go to this window, the initial events for the selected call appear. Scroll to view other events for this call or other calls in the session. Table 18 describes fields in the main event pane. Processed events include normal call progress events; calls are identified by an idle to idle transition.

Processed Events Browser, Session = Test Session 1 (archived)

Chan: 1A - 5 Chan Id: Ellipsis-0 Sys Call #: 649 Ch Call #: 44

Seized: 01/14/03 14:43:36 Released: 01/14/03 14:44:48 Duration: 0:01:12

Direction: Originating Side 1 Disposition: Normal

4 Dialed Digits: 2523

9 Mid-Call Digits: 4973#233*

T1 Locations:
Side 1: Network Side
Side 2: Customer/CPE Side
Fac Id: 102T1SJ02-SF01

Event ID#	Time of Day	SinceLast Event	SinceLast Supv.	CPT Dur	Event	Call Status
1344	14:43:36.381	29.267	29.267		1100 0000	Side 1 Off-Hook
1345	14:43:36.531	150	150		1100 1100	Begin Wink
1346	14:43:36.734	203	203		1100 0000	Wink
1347	14:43:36.885	151			DTMF 2 On	DTMF Dialing
1348	14:43:36.945	060			060 DTMF Off	
1349	14:43:37.015	070			DTMF 5 On	
1350	14:43:37.095	080			080 DTMF Off	
1351	14:43:37.165	070			DTMF 2 On	
1352	14:43:37.240	075			075 DTMF Off	
1353	14:43:37.311	071			DTMF 3 On	
1354	14:43:37.387	076			076 DTMF Off	
1355	14:43:38.187	800			Aud Ring On	Audible Ring On
1356	14:43:39.487	1.300		1.300	Aud Ring Off	Audible Ring Off
1357	14:43:43.528	4.041			Aud Ring On	Audible Ring On
1358	14:43:44.829	1.301		1.301	Aud Ring Off	Audible Ring Off
1359	14:43:48.929	4.100			Aud Ring On	Audible Ring On
1360	14:43:50.179	1.250		1.250	Aud Ring Off	Audible Ring Off
1361	14:43:53.180	3.001	16.446		1100 1100	Call Answered
1362	14:43:53.680	500			Status Change	Stable Call

Prev Call Next Call

Detection accuracy: Fine ?

Call Detail Call List Raw Events Report

T1 Faults: DFM 2A, DFM 2B

T1 Sys Detail

01/14/03 15:34

Figure 32. Processed Events Browser

Table 18. Processed Events Browser Fields and Controls

Item Name	Description
Event ID#	A number that the ECA assigns to the event.
Time of day	Time that the event occurred.
Since last event	Accumulated time from the preceding event.
Since last superv.	Time, in milliseconds, since the last change of supervision.
CPT Dur	Length of call progress tone, in milliseconds.
Event	Type of event, such as voltage change, dial tone, or audible ring.
Call Status	State during the call, such as off-hook, dialing, ringing on or off, or stable.

Item Name	Description
Prev/Next Call buttons	Click to move to the previous or next call on the call list.
Detection Accuracy	Shows current accuracy; click "?" for information about timing accuracy. See Appendix B.
Call Detail button	Click to go to the Call Detail window.
Call List button	Click to go to the Call List window.
Raw Events button	Click to go to the Raw Events Browser.
Report button	Click to create a report.

Raw Events

The Raw Events Browser shows low-level of information about call progress events for a session. See Figure 33. When you go to this window, the initial events for the selected call appear. Scroll to view other events for this call or other calls in the session. Table 19 describes fields in the main event pane.

Raw Events Browser, Session = Test Session 1 (archived)

Chan: 1A-5 Chan Id: Ellipsys-0 Sys Call #: 649 Ch Call #: 44

Seized: 01/14/03 14:43:36 Released: 01/14/03 14:44:48 Duration: 0:01:12

Direction: Unknown Disposition: Event Not In Call

0 Dialed Digits 9 Mid-Call Digits: 4973#233*

T1 Locations
Side 1: Network Side
Side 2: Customer/CPE Side
Fac Id: 102T1SJ02-SF01

Date	Time of Day	Since Last Event	Event
01/14/03	14:43:36.381	29.267	Signaling 1100 XXXX
01/14/03	14:43:36.531	150	Signaling XXXX 1100
01/14/03	14:43:36.734	203	Signaling XXXX 0000
01/14/03	14:43:36.885	151	DTMF 2
01/14/03	14:43:36.945	060	DTMF Off
01/14/03	14:43:37.015	070	DTMF 5
01/14/03	14:43:37.095	080	DTMF Off
01/14/03	14:43:37.165	070	DTMF 2
01/14/03	14:43:37.240	075	DTMF Off
01/14/03	14:43:37.311	071	DTMF 3
01/14/03	14:43:37.387	076	DTMF Off
01/14/03	14:43:38.187	800	Aud Ring
01/14/03	14:43:39.487	1.300	CPT Off
01/14/03	14:43:43.528	4.041	Aud Ring
01/14/03	14:43:44.829	1.301	CPT Off
01/14/03	14:43:48.929	4.100	Aud Ring
01/14/03	14:43:50.179	1.250	CPT Off
01/14/03	14:43:53.180	3.001	Signaling XXXX 1100
01/14/03	14:43:55.330	2.150	DTMF 4

T1 Faults: DFM 2A, DFM 2B

Detection accuracy: Fine ?

Call Detail Call List Processed Events Report

T1 Sys Detail

01/14/03 15:47

Figure 33. Raw Events Browser

Table 19. Raw Events Browser Fields and Controls

Item Name	Description
Date and Time of Day	When the event occurred.
Since last event	Time, in milliseconds, since the last event.
Event	Type of event; signaling events include both sets of ABCD signaling bits and "XXXX" indicates no change; for digital calls, "N <-U" shows originating calls, "N-> U" shows terminating call.
Detection Accuracy	Shows current accuracy; click "?" for information about timing accuracy. See Appendix B.
Call Detail button	Click to go to the Call Detail window.
Call List button	Click to go to the Call List window.
Processed Events button	Click to go to the Processed Events Browser.
Report button	Click to create a report.

Working in ISDN and GR303 Modes

The E2D works with three ISDN/GR303 options:

- CAS/ISDN Call Analyzer monitors ISDN call setup message events and bearer channel CAS call progress events and digits through a hybrid call processor; it is limited to one ISDN FAS PRI per session.
- Enhanced ISDN Call Analyzer captures messages on Facility Associated Signaling (FAS) and Non-Facility Associated Signaling (NFAS) D-Channels. Depending on the E2D configuration (Preditor or EBX), it can capture calls for up to 25 NFAS PRIs. Use this for detailed call analysis; message decoding for National, AT&T and Nortel ISDN protocol suites; hex message data; and session export/playback.
- GR303 TMC/CSC Call Analyzer captures TMC or CSC call setup messages on the primary and backup GR303 signaling channels. Like ISDN, use this for detailed call analysis, message decoding, HEX message data, and session export/playback. It identifies calls by non-concentrated facility channels, which are identified by structured CRV formula or configuration data.

Windows Unique to ISDN and GR303 Modes

Some windows are common to the digital modes, but not used for analog monitoring.

Facility Group Management Window

Use the Facility Group Management window to set up a group of facilities that make up an ISDN service. In a FAS environment (23 B channels and 1 D channel on a single T1 system), a group has only one facility. In an NFAS environment, a group may include several facilities controlled by a D channel on one of the facilities; it may include a backup D channel. This window provides real-time information for signals on the D channel and other channels in the group; see Figure 34 and Table 20.

In Enhanced ISDN mode, the D channel may carry signaling information for T1 circuits or B channels on facilities that are not connected to the E2D. The E2D automatically finds the non-monitored T1 circuits and adds their Facility ID to the group so you can analyze all D-channel events.

Note In CAS ISDN mode, the E2D captures both the D channel and the in-band tones and digits on the B channels. The ISDN service must be FAS (one D channel for 23 B channels). Although the E2D normally monitors only one FAS ISDN circuit, you can create more Facility Groups to monitor up to four FAS circuits in CAS ISDN mode.

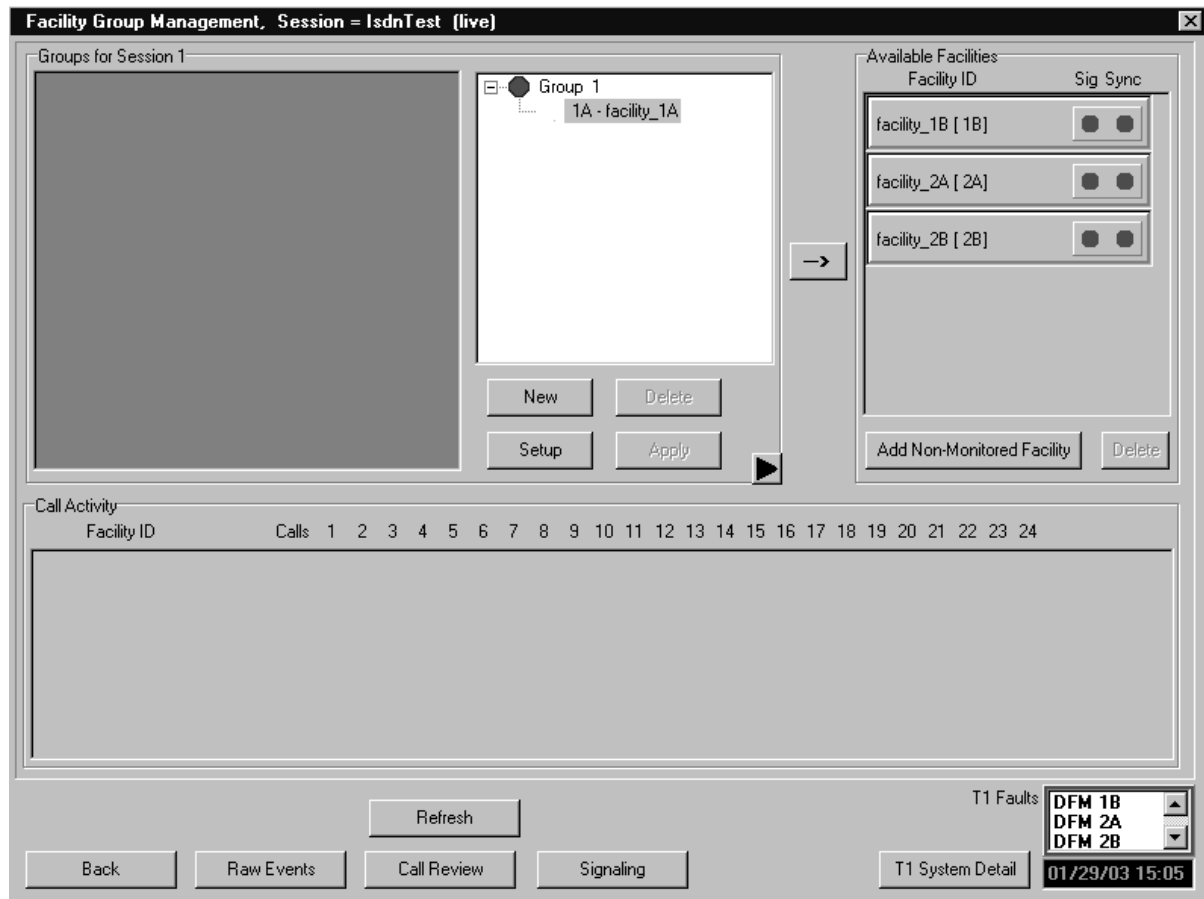


Figure 34. Facility Group Management Window

Table 20. Facility Group Management Fields and Controls

Item Name	Description
Selected Session	Your name for this session
Groups for Session	Lists D channel information for the current group
Group list pane	List of all groups in the current session
New button	Click to create a group and assign the T1 systems
Setup button	Click to configure a group, opens the Facility Group Setup dialog; see Figure 35 and Table 21

Item Name	Description
Delete button	Click to remove an inactive group from the list; you cannot remove an active group during a live session
Apply button	Click to include the group in the ECA session
Arrow button	Adds the facility to the group
Available Facilities list; Facility ID	Lists names of all available facilities in group.
Sig	T1 signal status
Sync	Framing sync status
Add Non-Monitored Facility button	Click to enter the name of a new facility
Delete button	Click to remove a facility from those available
Call Activity pane Facility ID	Lists name of current monitored facilities
Calls, 1 - 24	Shows call activity for each channel: Green shows idle; blue shows call in progress; gray shows archived information; P shows the primary D channel; B shows the backup D channel.
Refresh button	Click to update the Call Activity pane.
Back button	Click to return to the previous window.
Raw Events button	Click to go to the Raw Events window.
Call Review button	Click to go to the Call Review window.
Signaling button	Click to go to the Signaling window.
T1 System Detail button	Click to go to the T1 System Detail window

Figure 35. Facility Group Setup Dialog

Table 21. Facility Group Setup Fields and Controls

Item Name	Description
Side 1/Side 2	Names for the Network and User sides of the facilities
Facility ID	Lists the name of the facility
Interface ID	Set the number for the interface; for ISDN always starts at interface 0; GR303 always starts at interface 1
Framing	Set the Type of Framing used in the circuit
LCode	Set the Type of Line Coding used in the circuit
D Channel setup	
Facility ID	Select a facility from the pull-down
Channel	Set the channel number
Circuit ID	Type the name for the circuit
HDLC Coding	Click the type of HDLC Coding; most ISDN D channels used normal coding

Sig	T1 Signal status; Red shows pulses; Green shows pulses present;
Sync	Synch status; Red shows no frame synch; Green shows frame in sync
Alarm	Alarm status; Red shows alarm(s) present; Green shows no alarms
Error	Error status; Red shows errors present; Green shows no errors
Save button	Click to save the setup and close the dialog

T1 System Detail Window

Use the T1 System Detail window to view information about current and past alarms and errors on the T1 lines that are connected to the E2D; see Figure 36 and Table 22. Indicators for alarms and errors appear for both sides of the circuit; for each side, the left column shows historic events and the right column shows current events.

To access the T1 System Detail window from the Detected Facility Monitors window or other windows in the system, click T1 System Detail.

The screenshot shows the 'T1 System Detail, Session = None' window. It is divided into two main sections for Side 1 and Side 2. Each side has a list of events with 'Hist.' and 'Curr.' columns, a 'T1 Signal Level' indicator with an 'Ok' button, and a 'Clear All' button. Below these are three input fields for 'BPV Counts', 'Ft/Fs or CRC6 Error', and 'Frame Bit Error', each with a 'Reset Counts' button. At the bottom, there is a row of status indicators for 'T1 Pulses', 'Sync', 'Alarm', 'Errors', 'AMI', 'B&ZS', 'D4', 'ESF', and 'SLC-96' for both sides. To the right of this row is a '1A' section with a 'DFM' dropdown set to '1', a 'T1 System' section with radio buttons for 'A' and 'B', and a 'T1 Faults' section showing 'DFM 2A' and 'DFM 2B'. A 'Back' button is at the bottom left, and a date/time stamp '01/13/03 16:40' is at the bottom right.

Figure 36. T1 System Detail Window

Table 22. T1 System Detail Fields and Controls

Name	Description
Signal Loss	No received T1 signal (192 consecutive zeros); Red alarm
Frame Sync Loss	E2D is not synchronized to the incoming T1 data stream; Red alarm
Receive Pulse Density	T1 signal fails to meet pulse density requirements: maximum 15 zeros, 12.5% ones pulse density measured in 1 second intervals
Excessive Zeros	More than 15 consecutive zeros detected for AMI or more than seven consecutive zeros detected for B8ZS
Yellow Alarm	Remote alarm detected
All 1s	An unframed all 1s signal detected; Blue alarm
Timing Slips	T1 reference is DFM 1, Side A, Line 1; T1 signals on other inputs are off frequency, compared to this reference
Frame Bit Error	In D4 mode, shows terminal framing (Ft) error; in ESF mode, shows framing pattern sequence (FPS) error
Ft/Fs or CRC6 Error	In D4 mode, shows Ft/Fs framing error; in ESF mode, shows CRC6 code words error
Severely Errored Framing	Two out of six framing bits (Ft or FPS) are received in error
Loop Up Code Detected	A repeating pattern of 00001 detected
Loop Down Code Detected	A repeating pattern of 001 detected
BPV Counts	Number of bi-polar violations
Ft/Fs or CRC6 Error	Number of Ft/Fs framing errors (D4) or CRC6 errors (ESF)
Frame Bit Error	Number of Ft framing errors (D4) or FPS errors (ESF)
T1 Signal Level	T1 signal level; Green is OK or Yellow is low
Clear All button	Click to clear all alarms
Halt/Resume button	Click to toggle between pausing and restarting update
Reset Counts button	Click to reset the error counters
T1 Pulses	Incoming T1 pulses; shows Green when T1 pulses are received, Red when no incoming signal
Sync	D4 or ESF frame synchronization; Green is in sync; Red is lost sync
Alarm	Shows real-time T1 alarms, blue, yellow, or red
Errors	Shows real-time T1 errors
AMI and B8ZS	Shows type of line code detected
D4, ESF, and SLC-96	Shows type framing pattern detected
DFM	Select a specific DFM
T1 System	Select system A or system B
T1 Faults	Shows which T1 circuits have faults
Back button	Click to return to the previous window

Working in CAS/ISDN Mode

The ECA CAS/ISDN call analyzer captures the in-band DTMF, MF, and Call progress tones used over ISDN PRI facilities while providing Dialed Digit (Called Party Number), Calling Party Number, Redirected Number, Called Number, Display information and Cause Codes from the associated ISDN message data. It does not decode messages or analyze detailed call-handling.

Because many ISDN PRI applications substitute ISDN PRI trunks for CAS T1 trunks, you can capture and analyze in-band events on every channel of a FAS PRI while analyzing ISDN call handling events.

Figure 37 shows how the CAS/ISDN application monitors a PRI. It first captures ISDN messages on the D-Channel, then uses the message events similar to supervision event information in a CAS call processor. When the proper Call State occurs, CAS/ISDN enables digit and tone receivers for the channel identified in the ISDN message(s), then tracks the CAS portion of the call like a standard CAS call. CAS/ISDN handles call termination through these ISDN message states: Disconnect, Release, and Release Complete.

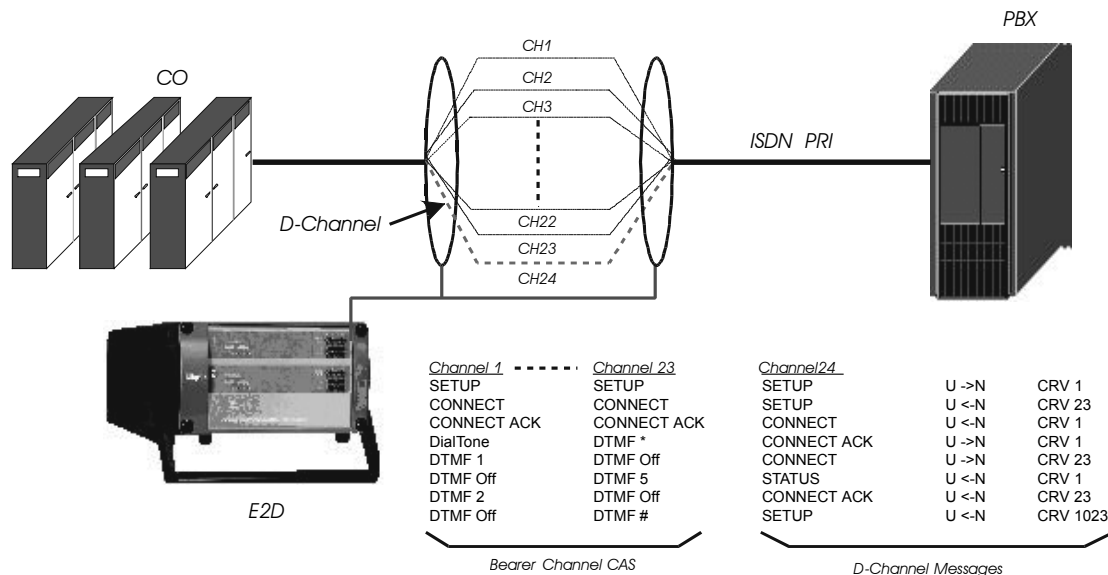


Figure 37. CAS/ISDN Monitoring a PRI

When you connect to a session in ISDN/CAS mode, the Detected Facility Monitors window opens. Verify that the installed facilities (DFMs) appear, then check status for the facilities. For each detected facility that you will monitor, follow these steps:

1. Set the connection mode according to Table 23.

Table 23. T1 Connection Setting in CAS/ISDN Mode

E2D Connected at...	Set Mode to...
DSX	Monitor
DCS	Terminate
D4 Channel Bank	Bridged
AT NIU (non-isolated)	Bridged
At NIU (isolated)	Monitor
T1 CSU	Monitor

2. Enter a Facility Name (optional).
3. Click Session Mnmt; the Session Management window appears to start a live session. To record any of the ISDN events that the E2D monitors, you must run a live session. For details about the Session Management window features, see Chapter 3.
4. In the Session Management window, click Start. The Start Session dialog appears. For details about the Start Session dialog features, see Chapter 3.
5. In the Start Session dialog, set up these parameters:
 - Type a Session Name
 - Set up a Timed session restart, if needed
 - Type Comments
6. Click OK, then click Facility Group Management. The Facility Group Management window appears.
7. In the center pane, click New. A new group with a default name appears on the list of groups.
8. Type a name for the group. The group appears in red until you set it up.
9. At list of Available Facilities in the right-hand pane, click a Facility ID, then click the arrow to add it to the list of groups.
10. To remove a facility, in the center pane, click the group name, then click the arrow to delete it from the list of groups.
11. To add a non-monitored facility, follow these steps:
 - a. In the right-hand pane, click Add Non-Monitored Facility.
 - b. In the Enter a Name dialog, type a facility name and click OK. The name appears with a ~ in the list of Available Facilities.
 - c. At the list of Available Facilities, click that facility name, then click the arrow to add it to the list of groups.

12. On the Facility Group Management window, select the group and click Setup, follow these steps:
 - a. In the Facility Group Setup dialog, type names for Side 1 and Side 2. All ISDN facilities must be connected in the same orientation; if needed, click the arrow to reverse the sides.
 - b. Select values for Framing and LCode.
 - c. Set the Interface ID for each Facility assigned to the Group. For ISDN, the first Interface ID is 0.
 - d. In the D-Channel Setup pane, for the Primary, then the optional Backup D channels, select the Facility ID, Channel, set the circuit ID circuit, and click the type of HDLC coding. Most ISDN D channels use normal HDLC coding.
 - e. Click Save.
13. In the Facility Group Management window, click the group name, then click Apply. The window shows real-time D channel and Call Activity for the group.
 - Green shows idle
 - Blue shows call in progress
 - Grey shows an archived session (information is not real-time)
 - P shows the primary D channel
 - B shows the backup D channel

You can view the Raw Events for the circuit, the Call List, set Call Filtering, and view the Signaling Detail.

Working in Enhanced ISDN Mode

Use Enhanced ISDN mode to monitor up to six NFAS PRIs, or up to 25 NFAS PRIs with the E2D EBX option, by capturing ISDN messages on the Primary and Backup D-Channels. For features, see Chapter 1.

Enhanced ISDN mode does not support in-band digit or call progress tone detection. For these features, see CAS/ISDN in this chapter.

When you connect to a session in Enhanced ISDN mode, the Detected Facility Monitors window opens. Verify that the installed facilities (DFMs) appear, then check status for the facilities. For each detected facility that you will monitor, follow these steps:

1. Set the Connection mode.
2. Enter a Facility Name (optional).
3. Click Session Mnmt; the Session Management window appears to start a live session. To record any of the ISDN events that the E2D monitors, you must run a live session. For details about the features in the Session Management window, see Chapter 3.
4. In the Session Management window, click Start. The Start Session dialog appears. For details about the features in the Start Session dialog, see Chapter 3, Figure, and Table.

5. In the Start Session dialog, set up these parameters:
 - Type a Session Name
 - Set up a Timed session restart, if needed
 - Type Comments
6. Click OK, then click Facility Group Management.. The Facility Group Management window appears.
7. In the center pane, click New. A new group with a default name appears on the list of groups.
8. Type a name for the group. The group appears in red until you set it up.
9. At the list of Available Facilities in the right-hand pane, click a Facility ID, then click the arrow to add it to the list of groups.
10. To remove a facility, in the center pane, click the group name, then click the arrow to delete it from the list of groups.
11. To add a non-monitored facility, follow these steps:
 - a. In the right-hand pane, click Add Non-Monitored Facility.
 - b. In the Enter a Name dialog, type a facility name and click OK. The name appears with a ~ in the list of Available Facilities.
 - c. At the list of Available Facilities, click that facility name, then click the arrow to add it to the list of groups.
12. On the Facility Group Management window, select the group and click Setup, then follow these steps:
 - a. In the Facility Group Setup dialog, type names for Side 1 and Side 2. All ISDN facilities must be connected in the same orientation; if needed, click the arrow to reverse the sides.
 - b. Select values for Framing and LCode.
 - c. Set the Interface ID for each Facility assigned to the Group. For ISDN, the first Interface ID is 0.
 - d. In the D-Channel Setup pane, for the Primary, then the optional Backup D channels, select the Facility ID, Channel, set the circuit ID circuit, and click the type of HDLC coding. Most ISDN D channels use normal HDLC coding.
 - e. Click Save.

13. In the Facility Group Management window, click the group name, then click Apply. The window shows real-time D channel and Call Activity for the group.

- Green shows idle
- Blue shows call in progress
- Grey shows an archived session (information is not real-time)
- P shows the primary D channel
- B shows the backup D channel

You can view the Raw Events for the circuit, the Call List, set Call Filtering, and view the Signaling Detail.

Working in GR303 Mode

Use the GR303 mode option to monitor Timeslot Management Channel (TMC) or Common Signaling Channel (CSC) GR303 systems. For features, see Chapter 1.

Note: The GR303 mode does not support in-band digit or call progress tone detection. You can use standard and custom ECA CAS Call Processors with GR303 signaling channel monitors to analyze calls. For details, contact Ellipsys.

Connect the E2D to the GR303 Primary and Backup signaling channels. The ECA analyzes the GR303 messages and turned them into call records. Calls are qualified according to the GR303 Channel/Call setup messages, timer, Cause Code, and message sequencing. Figure 38 shows how the E2D connects to a GR303 system.

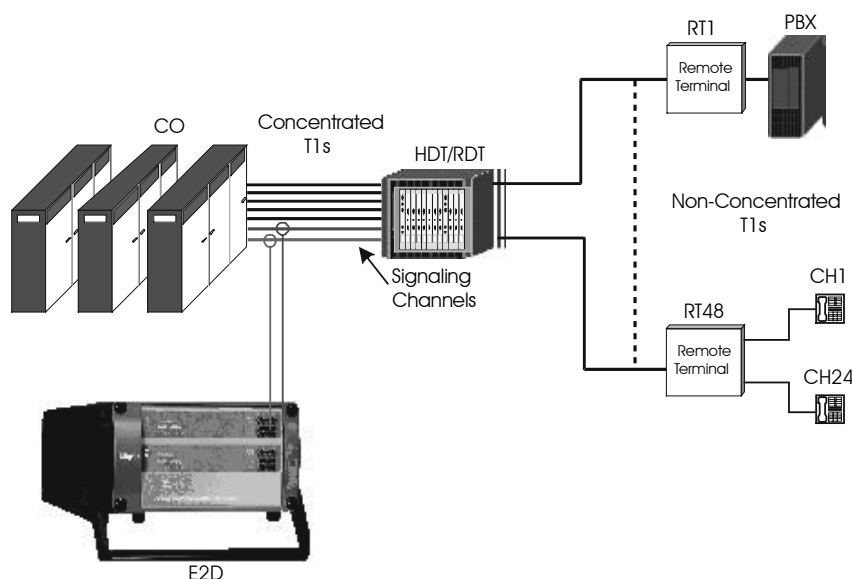


Figure 38. E2D Connected to a GR303 System

When you connect to a session in GR303 mode, the Detected Facility Monitors window opens. Verify that the installed facilities (DFMs) appear, then check status for the facilities; see Chapter 3. For each detected facility that you will monitor, follow these steps:

1. Set the Connection mode to Monitor, Terminate, or Bridged.
2. Enter a Facility Name (optional).
3. Click Session Mnmt; the Session Management window appears to start a live session. To record any of the GR303 events that the E2D monitors, you must run a live session. For details about the features in the Session Management window, see Chapter 3.
4. In the Session Management window, click Start. The Start Session dialog appears. For details about the features in the Start Session dialog, see Chapter 3, Figure, and Table.
5. In the Start Session dialog, set up these parameters:
 - Type a Session Name.
 - Set up a Timed session restart, if needed.
 - Type Comments, if needed.
6. Click OK. The Facility Group Management window appears.
7. In the center pane, click New. A new group with a default name appears on the list of groups.
8. Type a name for the group. The group appears in red until you set it up.
9. At list of Available Facilities in the right-hand pane, click a Facility ID, then click the arrow to add it to the list of groups.
10. To remove a facility, in the center pane, click the group name, then click the arrow to delete it from the list of groups.
11. To Add a non-monitored facility, follow these steps:
 - a. In the right-hand pane, click Add Non-Monitored Facility.
 - b. In the Enter a Name dialog, type a facility name and click OK. The name appears with a ~ in the list of Available Facilities.
 - c. At the list of Available Facilities, click that facility name, then click the arrow to add it to the list of groups.

12. On the Facility Group Management window, select the group and click Setup, then follow these steps:
 - a. In the Facility Group Setup dialog, type names for Side 1 and Side 2. All ISDN facilities must be connected in the same orientation; if needed, click the arrow to reverse the sides.
 - b. Select values for Framing and LCode.
 - c. Set the Interface ID for each Facility assigned to the Group. The primary interface ID is typically 1 and the backup is typically 2.
 - d. In the D-Channel Setup pane, set values for the Primary TMC channel, then for the optional Backup TMC channel. Select the Facility ID, Channel, set the circuit ID circuit, and click the type of HDLC coding.
 - e. Click Save.
13. In the Facility Group Management window, click the group name, then click Apply. The GR303 monitor captures and decodes the TMC messages and builds non-concentrated facilities in groups of 24 call reference values (CRVs) for record-keeping. The monitor takes up to 20 minutes to build the facilities, depending on time of day, amount of call traffic, and the size of the system. The window shows real-time TMC channel and Call Activity for the group.
 - Green shows idle
 - Blue shows call in progress
 - Grey shows an archived session (information is not real-time)
 - P shows the primary TMC channel
 - B shows the backup TMC channel

You can view the Raw Events for the circuit, the Call List, set Call Filtering, and view the Signaling Detail.

Chapter 5

Reports, File Transfers, and Working Locally

This chapter explains how to work with the ECA files, both online and locally, to create reports and analyze faults in either CAS or ISDN mode.

On the ECA, the report information is saved in either of these directories:

- ECA inactive: D:\Archive\Cspinstall\Cpdata32\Reports
- ECA active: D:\User1\Cspinstall\Cpdata32\Reports

You can use WS_FTP_Pro software to download the file to your PC. On your PC, you can open the report file with a word processor or a spreadsheet program, then format the report and print it. The data is space-delimited. To view or print the report in column order, use 10 point, New Courier font.

Creating Reports

From the Call Statistics or Call Detail Windows, follow these steps:

1. Click Report. A message appears that shows the size of the report; click Yes.
2. In the Report Filename dialog, enter a name for the file; names are limited to eight alphanumeric characters.
3. Click OK; the file is downloaded to the ECA: D:\Cpdata32\reports.

From the Call List window, follow these steps:

1. Click Report; the Report Selection options appear at the lower left corner of the window.
 - Print Selected Calls Only includes only the highlighted calls
 - Print All Calls includes all calls, highlighted or not
 - Print Call List includes only the list of calls
 - Print Processed Events includes processed events for each call
2. Click OK. A message appears that shows the size of the report; click Yes.
3. In the Report Filename dialog, enter a name for the file; names are limited to eight alphanumeric characters.
4. Click OK; the file is downloaded to the ECA: D:\Cpdata32\reports.

From the Processed or Raw Events Browsers, you must set time parameters to select a range of information for the report; follow these steps:

1. Click Report; the Report Selection options appear at the lower left corner of the window.
 - To generate a report that includes all events, check All.
 - To select a group of events in the events list, highlight the starting event and click Select Start, then highlight the ending event and click Select End. The starting and ending times and dates appear in the time and date fields.
2. Click OK. A message appears that shows the size of the report; click Yes.
3. In the Report Filename dialog, enter a name for the file; names are limited to eight alphanumeric characters.
4. Click OK; the file is downloaded to the ECA: D:\Cpdata32\reports.

Transferring Files

To transfer a report, ended session, or archived session to your local PC, follow these steps:

1. Set up a communication path to the ECA through the LAN or a dialup modem; you do not need Terminal Server to transfer the file.
2. On your PC, launch WS_FTP_Pro; the Connection dialog appears.
3. In the Connection dialog, at the Host name, enter the IP address (LAN or dialup) for the ECA. At the UserID and Password, check Anonymous. Click Connect; the WS_FTP_Pro window appears.
4. In the Local System pane, navigate to and double click folder Cpdata32 that you will transfer the files to; the folder is created automatically the first time you run ECA Local Mode.
5. In the Remote Site pane, navigate to the folder in one of these paths:
 - ECA inactive, report: D:\Archive\Cspinstall\Cpdata32\Reports
 - ECA active, report: D:\User1\Cspinstall\Cpdata32\Reports
 - ECA inactive, archived CAS or ISDN session: D:\Archive\Cspinstall\Cpdata32
 - ECA inactive, archived CAS/ISDN session: D:\Archive\Eca_241\Cpdata32
 - ECA active, ended CAS or ISDN session: D:\User1\Cspinstall\Cpdata32
 - ECA active, ended CAS/ISDN session: D:\User1\Eca_241\Cpdata32
6. In the selected folder, click the file name. To select additional files, press Ctrl and click each file.
7. At the center of the window, click the Left arrow to transfer the files to your PC.

Analyzing Locally

After you transfer an archived session to the Local Mode CPAdat32 folder in your PC, you can analyze it without being connected to the ECA.

To move the ECA Local Mode software from the ECA to your PC, then install it, follow these steps on your PC:

1. On the C:\ drive, create a folder and name it Cspinstall.
2. Launch WS_FTP_Pro and access the ECA.
3. On the ECA D:\ side of the WS_FTP_Pro window, open the CSPinstall folder and highlight Cspinst33EBX.exe.
4. On the PC side of the window, navigate to and open the Cspinstall folder.
5. At the center of the window, click the Left arrow to transfer Cspinst33EBX.exe to your PC.
6. Close WS_FTP_Pro.
7. From Windows Explorer, open the Cspinstall folder.
8. Launch Cspinst33EBX.exe.
9. The WinZip self-extractor appears; enter the Unzip path as C:\Cspinstall. Click Unzip; then when it is done, click OK and Close.
10. Refresh the View for the Cspinstall folder, then launch file LocalEcaInstall3.3.C.bat. The installation runs automatically.
11. Go to the Cpsinstall folder and launch eca.exe. At the License dialog, click the I Agree button; the Detected Facility Monitors window (CAS Mode) or the ISDN Session Management window (ISDN Mode) appears.
12. Click the Quit Application button to close the ECA program.
13. If you have the CAS/ISDN option, go to the Eca_241 folder and launch Dgui.exe. At the License dialog, click the I Agree button; the Detected Facility Monitors window (CAS Mode) or the ISDN Session Management window (ISDN Mode) appears.
14. Click the Quit Application button to close the ECA program.

To use the ECA software in local mode to analyze a downloaded session, follow these steps:

1. Choose an application on your local PC:
 - For the CAS or Enhanced ISDN applications, go to the Cspinstall folder and launch eca.exe.
 - For the CAS ISDN application, go to the Eca_241 folder and launch Dgui.exe.
2. When the Ellipsys license window appears, click I Agree; the software opens in either ISDN or CAS mode.
 - The ISDN Session Management window appears in ISDN mode.
 - The Detected Facility Monitors window appears with "AFMs" in the upper right corner in CAS Mode; click Session Mgmt to go to the Session Management window.
3. If necessary, change modes.
 - To change from CAS to Enhanced ISDN mode:
 - a. In the Detected Facility Monitors window, click ECA Setup, then click Set Operation Mode.
 - b. In the Selected Mode dialog, click ISDN, then click Apply, and at the message to restart, click No.
 - c. Click Quit Application.
 - d. Launch eca.exe again, click I Agree, and begin work in the correct mode.
 - To change from Enhanced ISDN to CAS mode:
 - a. In the ISDN Session Management window, click ECA Setup, then click Set Operation Mode.
 - b. In the Selected Mode dialog, click CAS, then click Apply, and at the message to restart, click No.
 - c. In the ISDN Session Management window, click Back, then click Quit Application.
 - d. Launch eca.exe again, click I Agree, and begin work in the correct mode.

To review an archived and transferred ISDN or GR303 session in ISDN mode, at the Session Management window, highlight it, and then click Calls in the Group Review box.

To review an archived and transferred session in CAS mode, at the Session Management window, highlight it and click Review.

Chapter 6

Simulate Calls

The Simulated Calls optional feature allows you to simulate, record, and monitor an originating call on one of the 24 channels of a T1 facility connected to an E2D. If the call terminates on a T1 connected to the E2D, you can monitor both ends. Use a simulated call to test a PBX or switch channel by channel, or to isolate trouble on a specific circuit. You can send test tones during the call and set parameters for digits, such as on/off times, power, and frequency.

You can make automatic or manual simulated calls. Automatic simulated calls allow you to make a sequence of originating calls on a circuit with a selected Call Processor. Manual simulated calls allow you to make an originating call on any type of circuit (including raw) and manually control all call progress events during the call.

Caution: *Making a simulated call means that you originate a call on a channel that may be in use. Take care to avoid disrupting customer service.*

The ECA saves simulated calls in the session information; you can analyze them in the Call List window.

Connecting T1 Lines in Drop and Insert Mode

You can connect the E2D in drop and insert mode to T1 DSX-1 or Digital Cross-Connect System (DCS) lines without interrupting service.

To connect the E2D to a DSX-1, see Figure 39 and follow these steps:

1. Obtain four bantam patch cords and two 100 Ω terminating plugs.
2. Plug a bantam patch cord into the T1 Side 1 MON jack and the E2D A1 BRDG/MON jack.
3. Plug a bantam patch cord into the T1 Side 2 MON jack and the E2D A2 BRDG/MON jack.
4. Plug a bantam patch cord into the E2D A2 OUT jack and the T1 Side 2 IN jack.
5. Immediately plug a 100 Ω terminator into the T1 Side 1 OUT jack.
6. Plug a bantam patch cord into the E2D A1 OUT jack and the T1 Side 1 IN jack.
7. Immediately plug a 100 Ω terminator into the T1 Side 2 OUT jack.
8. In to ECA software, go to the T1 System Detail window and check for errors or alarms, then go to the Signaling window and verify that traffic appears to be normal.

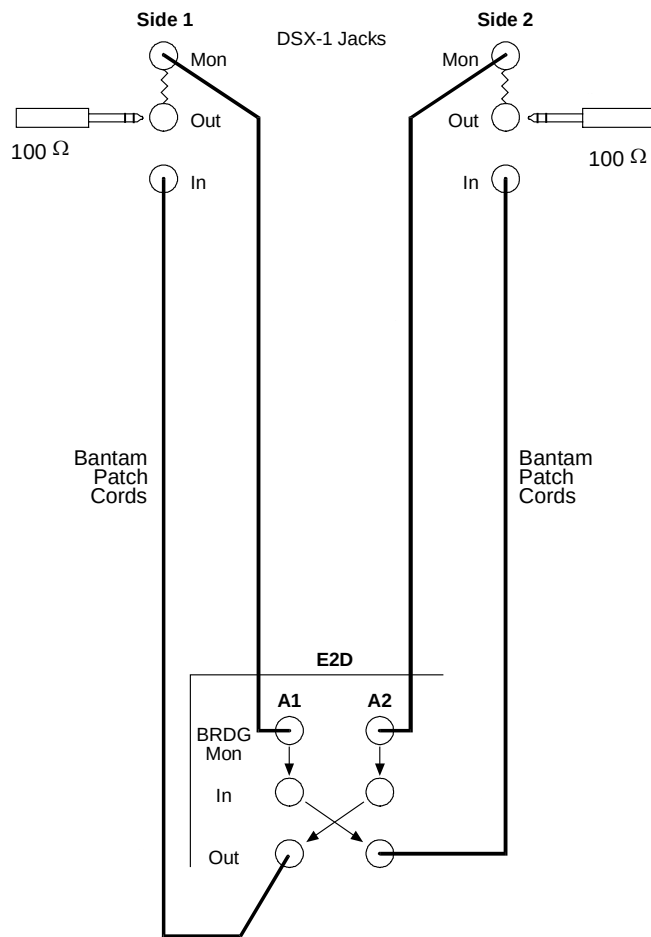


Figure 39. Connecting the E2D and a DSX-1 for Drop and Insert

To connect the E2D to a DCS, see Figure 40 and follow these steps:

1. Obtain four bantam patch cords.
2. Plug a bantam patch cord into the DCS Test Port 1 OUT jack and the E2D A1 IN jack.
3. Plug a bantam patch cord into the DCS Test Port 2 OUT jack and the E2D A2 IN jack.
4. Plug a bantam patch cord into the DCS Test Port 2 IN jack and the E2D A2 OUT jack.
5. Plug a bantam patch cord into the DCS Test Port 1 IN jack and the E2D A1 OUT jack.

Note: These steps include generic DCS "TL1" input commands, for details, see the documentation for your DCS.

6. Access the DCS and set up the Equipment/Facility monitor mode of test access; use this TL1 command: `CONN-TACC-T1::TEST PORT 1, FROM, TO::MONEF;`

This provides the T1 signals from the circuit under test to the E2D, which can now auto-configure for the correct Framing and Line Code, in order to pass these T1 signals to the E2D OUT jacks.

Note: You can manually pre-set the framing and line code in the E2D Digital Setup Window.

7. Go to the T1 System Detail window and verify that the E2D is framed up to the T1 signal. Clear any T1 faults.
8. To provide intrusive test access in the DCS, use this TL1 command:
CHG-ACCMD-T1::TEST PORT 1::SPLTEF;

The DCS changes the test access from the monitor mode to split mode and routes the T1 signals from the Equipment and Facility sides through the E2D.

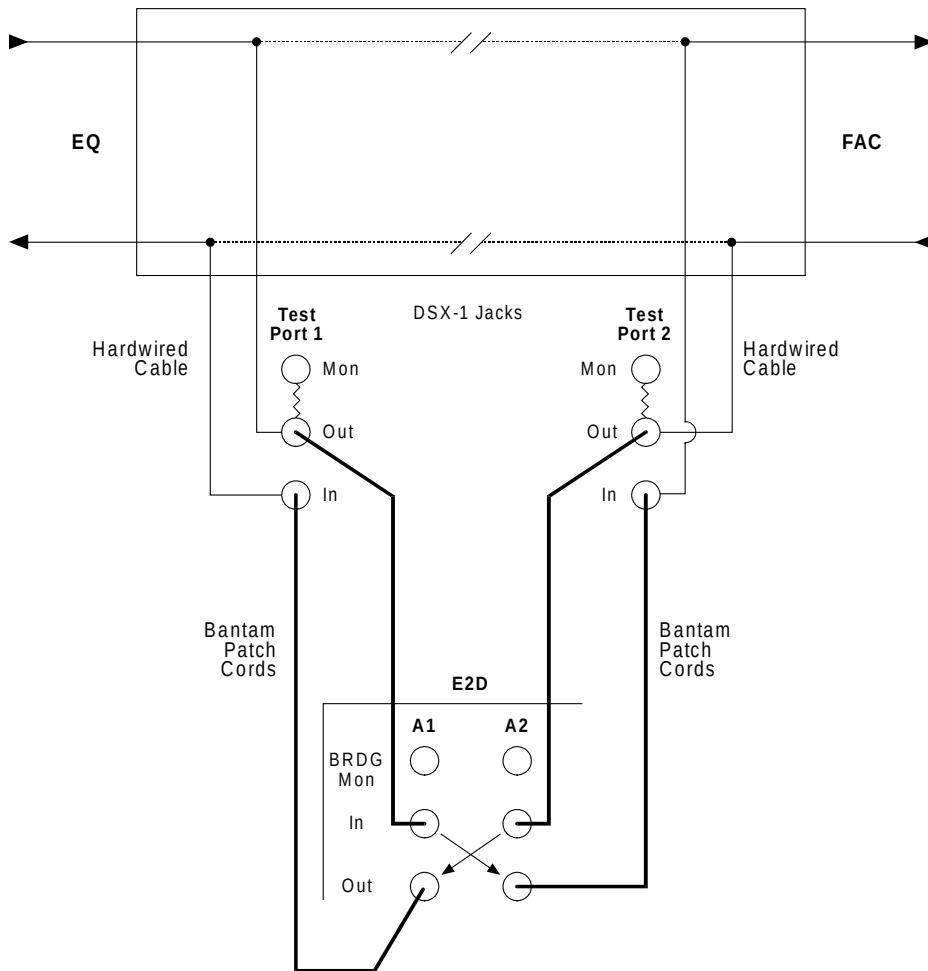


Figure 40. Connecting the E2D and a DCS for Drop and Insert

To set up the ECA, follow these steps:

1. Go to the Session Management window and start a live session, then go to the Setup window to set up the T1 circuits. You can simulate calls only in a live session on active circuits.
2. Go to the Signaling window and click the Simulated Calls button, then at the Warning dialog, click OK.
3. In the Drop and Insert Window, select the DFM and the T1 System for the simulated call; see Figure 41.

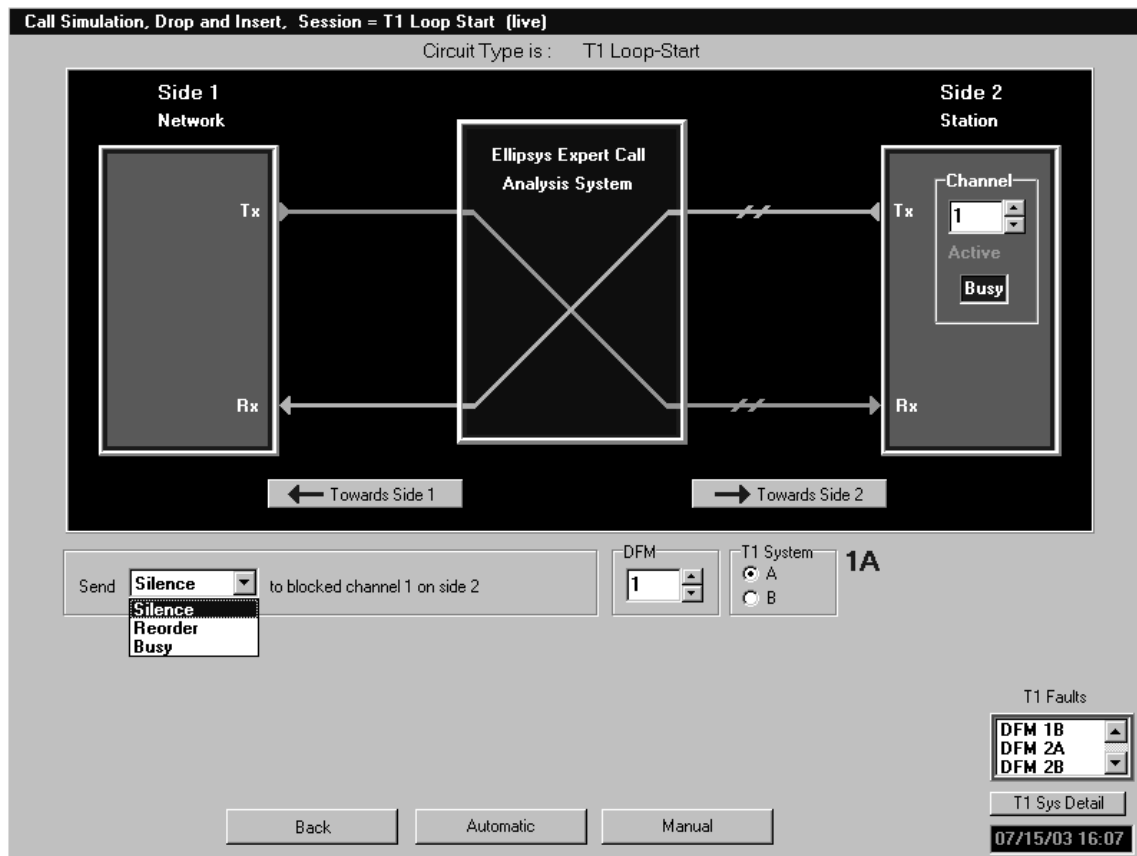


Figure 41. Call Simulation Window

4. In the circuit diagram, select an active channel for the call and check that channel's status. If the channel is Busy, you may interrupt customer service.
5. Select the direction to send the originating call, click Toward Side 1 or Toward Side 2. The side that you send the originating call from is blocked; the channel display appears on that side.
6. Select the type of signal, Silence, Reorder, or Busy, to Send to the blocked side.
7. If you have not selected a call processor (a Raw circuit), the Supervision popup appears; set the ABCD bits to Idle according to your protocol.
8. Click Automatic to make simulated calls on your selected Call Processor; click Manual to make a simulated call on any type of circuit; or click Back to return to the Signaling window.

Making Automatic Simulated Calls

The options for Automatic Simulated Calls vary according to the type of the circuit and, in certain cases, the direction of the call. The side is not actually dropped until you place a call.

Additional Monitor Window

The Additional Monitor window is available in any of the Simulated Calls windows; it shows the terminating side of a simulated call if that side is connected to the E2D. To use the window, follow these steps:

1. In any Simulated Calls window, click Additional Monitor.
2. In the Additional Monitor window, choose the DFM, click the T1 System, and choose the Channel.
3. To close the window, click Cancel.

Wink-Start, Ground-Start, or Loop-Start Toward Network Side

To make automatic simulated calls on a Wink-Start DTMF circuit or on a Ground-Start or Loop-Start circuit toward the Network side (where the Station side has been blocked), follow these steps:

1. If necessary, choose the Digit Type; only certain types of Call Processors support more than one type of digit.
2. Set these options as needed:
 - Send Test Tone During Call, then click a Tone frequency and power Level
 - Call Timing
 - Digit Parameters
3. To create a Call List, at the left-hand side of the window, type a number in the digit field or click the dial key pad, then click Add to place it on the Call List.
 - You can highlight a number, then click Insert to place the new number above the highlighted number or click Delete to remove the highlighted number.
 - To save a Call List, type in the field to the left of the Save button, then click Save.
 - To open a list, select it from the pull down the list to the left of the Restore button, then click Restore.
 - To delete a list, select it and click Delete.
 - To repeat the Call List automatically, check Repeat.
4. To begin the list of simulated calls, click Start; to interrupt the calls, click Stop.
5. To make a single simulated call, enter the number and click Call. Click Stop to end the call and click Clear to delete the number.

6. You can monitor the call progress events at the right side of the window. To monitor other channels that are connected to the ECA, such as the terminating call, click Additional Monitor.
7. Click Back to return to the Drop and Insert window or click Signaling to go to the Signaling window.

Ground-Start or Loop-Start Toward Station side

If you select a Ground-Start or Loop-Start circuit, block the Network side, and make automatic simulated calls toward the Station side, follow these step in the Automatic Simulated Calls window:

1. Set these options as needed:
 - Send Test Tone During Call and click a Tone frequency and power Level
 - Call Timing
 - To repeat the call automatically, check Repeat.
2. Click Call. This sends machine Ring On and machine Ring Off to the Station side of the circuit. The process stops when the station side goes off-hook.
3. Click Stop to end the call.
4. You can monitor the call progress events at the right side of the window. To monitor other channels that are connected to the ECA, such as the terminating call, click Additional Monitor.
5. Click Back to return to the Drop and Insert window or click Signaling to go to the Signaling window.

Making Manual Simulated Calls

The options for Manual simulated calls vary according to the type of circuit and, in some cases, the call direction.

Raw, Wink-Start, Ground-Start, or Loop-Start Toward Network Side

To make manual calls on Raw, Wink-Start, or Ground-Start and Loop-Start circuits with the Station side blocked, follow these steps:

1. Choose the Digit Type; this updates the dialing pad at the left.
2. Choose the Dial Mode and Dial Pattern:
 - String and Once sends a sequence one time.
 - String and Repeat sends a sequence twice
 - Immed and Repeat sends one digit repeatedly
 - Immed and Once sends one digit one time.
 - Immed and Continuos sends one digit continuously

3. Set these options as needed:
 - Send Test Tone During Call and click a Tone frequency and power Level
 - Call Timing
 - Digit Parameters
4. If you are using String Dial Mode, type the sequence into the digits field or click the dial key pad.
5. To make a simulated call on a Raw circuit, set ABCD Supervision Bits for Off-Hook for your protocol and click Send in String Dial Mode or dial the digits in Immed Dial Mode. (See Appendix D for information on ABCD signaling bits.)
6. To make a simulated call on any other circuit type, click Off Hook, then click Send in String Dial Mode or dial the digits in Immed Dial Mode.
7. To send a test tone during the call, set the Test Tone options for the frequency and power level, then click Send to start the tone and click Stop to end the tone.
8. To end the call, click On Hook or set the supervision bits for On-Hook.
9. You can monitor the call progress events at the right side of the window. To monitor other channels that are connected to the ECA, such as the terminating call, click Additional Monitor.
10. Click Back to return to the Drop and Insert window or click Signaling to go to the Signaling window.

Ground-Start or Loop-Start Toward Station Side

To make manual calls toward the Station side on Ground-Start and Loop-Start circuits with the Network side blocked, follow these steps:

1. To start a call, click Off Hook; this sends machine Ring On and machine Ring Off to the Station side of the circuit. The Simulated Calls Monitor shows call progress for the terminating call.
2. To send a test tone during the call, set the Test Tone options for the frequency and power level, then click Send to start the tone and click Stop to end the tone.
3. To end the call, click On Hook.
4. You can monitor the call progress events at the right side of the window. To monitor other channels that are connected to the ECA, such as the terminating call, click Additional Monitor.
5. Click Back to return to the Drop and Insert window or click Signaling to go to the Signaling window.

Chapter 7

Troubleshooting

This section describes fault conditions and corrective action for common problems that may occur as you install and use the ECA.

- The ECA does not respond when you make a direct or dial-up connection from a PC.
 - Check that the power is turned on for the E4A or E2D.
- When you dial in to the unit, you get a ring and then a trip, or a ring, but no answer.
 - Plug the dial-in line into the Modem jack on the side panel.
- When you press >Enter> at the License screen, you lose the connection to the ECA.
 - Make sure the I Agree button is highlighted before you press <Enter>.
- On the E4A, the tip and ring voltages are not stable; the circuits show erratic readings.
 - Make sure the unit is connected to a grounded power source, or connect the ground lug on the side panel to a proper ground.

Note: A 3-prong outlet does not always actually provide a ground; wiring in older buildings may have been damaged, disabling the ground.

- You receive numerous "Unexpected events" on a circuit.
 - Set the ON/OFF switch next to the E-LAN jack on the side panel to OFF.
- On an analog circuit, the ECA does not track calls properly; the information that appears on the ECA does not match events that you know are taking place, such as on-hook and off-hook events.
 - The circuit may need to be manually calibrated; see Chapter 3.
- The E4A is connected in monitor mode close to a 5ESS central office and cannot track calls properly.
 - Reconnect in intrusive mode to compensate for characteristics of the 5ESS float voltages.
- Part of an ECA window is not visible on your PC.
 - Reset the screen resolution on your PC to make all of the ECA screen is visible. When you run Terminal Server Client, set the screen resolution to 1024 x 768.

Appendix A

Call Progress Events

Call progress events can includes these signals or tones:

- Alert tone, also known as call waiting or call interrupt, 440 Hz
- Audible Ring tone, 440/480 Hz
- Busy signal, 480/620 Hz, 0.5 sec on, 0.5 sec off
- Dial tone, 350/440 Hz
- High tone, also known as zip tone, partial dial tone, or permanent signal tone, (480 Hz)
- Recall signal, also known as stutter dial tone
- Reorder tone, 480/620 Hz, 0.25 sec on, 0.25 sec off
- Ring or machine ring, 20 Hz above 50 V rms

Events for Raw Circuits

Call Progress Event	Description
Alert Tone	Call waiting or call interrupt tone occurred
Aud Ring	Audible ring tone occurred.
Busy/Reord	Busy or reorder tone occurred.
CPT Off	The last occurring call progress tone was removed from the circuit.
Dial Tone	Dial tone occurred.
DTMF x	DTMF digit <i>x</i> occurred; valid digits are 0 through 9, *, #, A, B, C, D.
DTMF Off	The last occurring DTMF digit was removed from the circuit.
Facility Error	A T1 facility error occurred; for details, see Chapter 4.
Mach Ring On	Machine ringing occurred.
Mach Ring Off	The last occurring machine ringing was removed from the circuit.
Mark Event	The Mark Event button on the window was clicked.
Mark Event In	The Mark Event button on the front panel of the E4A was pressed.
Mark Event Out	The Mark Event button on the front panel of the E4A was released.
High Tone	High tone, also known as zip tone, partial dial tone, or permanent signal tone occurred.
MF x	MF digit <i>x</i> occurred; valid digits are 0 through 9, KP, ST, STP, ST2P, ST3P.
MF Off	The last occurring MF digit was removed from the circuit.
Signaling <i>abcd wxyz</i>	Shows the current status of the ABCD signaling bits; <i>abcd</i> is the ABCD bits for side 1 and <i>wxyz</i> is ABCD bits for side 2.
Supv T R I	Shows the current supervision status where T is the tip DC volts, R is the ring DC volts, and I is the loop current in mA; loop current is available only when the circuit is connected intrusively

Events for Loop-Start and Ground-Start Circuits

Call Progress Event	Description
2-Way Call	During a stable call, the station flashed, recall (stutter) dial tone occurred, then the station flashed again, before dialing, to return to a stable call.
3-Way Call	The station flashed to retrieve the party on hold and establish a 3-way call (calling, called, and third parties).
Abdn/Ring No Ans	The station originated a call and hung up before the called party answered; audible ring occurred.
AbdnAfterDialing	The station originated a call, dialed digits, and hung up; no audible ring occurred.
Aud Ring Off	The last occurring audible ring was removed from the circuit.
Aud Ring On	Audible ring occurred.
Busy	Busy tone occurred.
Call Answered	Terminating call was answered; off-hook occurred.
Circuit Open	Circuit open for more than 5 sec; no battery and/or ground detected.
Confirmation DT	The station originated a call, dialed a feature code, and confirmation (stutter) dial tone occurred.
Dialing Over	The station originated a call, dialed digits, and appears to have completed dialing with no digits dialed for longer than 6 sec.
Dial Pulse	An individual dial pulse occurred.
Dial Tone	Dial tone occurred.
Dial Tone Delay	The station originated a call and did not detect dial tone for longer than 4 sec.
DP Dialing	The station originated a call; rotary dial pulses occurred.
DTMF Dialing	The station originated a call; DTMF digits occurred.
Facility Error	A T1 facility error occurred; for details, see the section on the T1 System Detail window
Far End Still Ofh	The station hung up; the far end appears to still be off-hook after 3 sec
Fast Dial - No DT	The station originated a call and began dialing before dial tone occurred.
Flash	The station went on-hook for at least 300 ms, then went off-hook again within 1200 ms.
Idle	The station and network are on-hook and inactive.
Interdigital Time	Time between dial pulse digits.
Interrupt Tone	Call interrupt or call waiting tone occurred
Line Normal	The line (network) is in a normal state after an open interval.
Machine Ring Off	The last occurring machine ringing was removed from the circuit.
Machine Ring On	Machine ringing occurred.
Manual Analysis	This call requires further analysis; unable to follow call flow.

Call Progress Event	Description
Mid-Call Digit	A DTMF digit occurred after the call was stable.
Msg Waiting DT	The station originated a call and message waiting (stutter) dial tone occurred.
Net Disconnect	The network went open for more than 400 ms, causing a network disconnect.
Net/Sta On-Hook	The network and station are both on-hook.
Net Still Off-Hook	The station hung up and the network is still off-hook after 1 sec.
Network On-Hook	The station hung up and the network is on-hook.
Network Seizure	The network went off-hook (seizure), typically just before machine ringing is applied to a Ground-Start circuit.
No Dial Tone	The station hung up after a dial tone delay.
NoDialTone4Sec	The station originated a call, but dial tone was not detected for longer than 4 sec; this is dial tone delay.
No Digits Dialed	The station originated a call and hung up before dialing any digits.
Open Interval	An open switch interval (shorter than 400 ms.) occurred; this is normal for some types of analog switching machines
Party On Hold	A flash occurred from the station, placing the other party on hold.
Permanent Signal	The station originated a call and dialed no digits, or stayed off-hook after a long network disconnect (typically 18-20 sec); the switching machine is applying permanent signal off-hook treatment.
PS Aud Ring Off	Audible ringing was removed from the circuit before permanent signal announcement.
PS Aud Ring On	Audible ringing occurred before permanent signal announcement.
PS Open OSI	The station originated a call and did not dial digits for a long time, typically 18-20 sec; dial tone was removed, then an open switch interval occurred.
Recall Dial Tone	The stations sent a flash and recall (stutter)dial tone occurred.
Release 3-Way	The stations sent a flash and the last leg of a 3-way call was released.
Reorder	Reorder tone occurred.
Ring No Answer	A terminating call was abandoned from the far-end; the called station did not trip machine ringing.
Ring Stopped	Audible ringing has not occurred for more than 5 sec; the call is stable.
Short Call	A terminating call was answered, then the station or the network went on-hook, causing the circuit to go idle within 6 sec; this is unusual and may indicate trouble.
Stable Call	A call is considered stable when: A terminating call is answered; station off-hook. The station originates a call, dials digits and completes dialing with no digits dialed for more than 6 sec; or audible ring (from the far end) stopped with no audible ring for longer than 5 sec.

Call Progress Event	Description
Station Off-Hook	The station was on-hook and is now off-hook.
Station On-Hook	The station was off-hook and is now on-hook.
Steady Recall DT	The station sent a flash and steady (not stutter) recall dial tone was detected; this is unusual and may indicate trouble.
Timed Disconnect	The station answered a terminating call and hung up, then the network stayed off-hook for at least 10 sec. This typically indicates that the far-end caller was not aware of the station disconnect and stayed off-hook until the far-end switch sent a network disconnect to the caller, dropping the caller back to dial tone.

Events Unique to 911 Wink-Start Circuits

Use these definitions for parties A, B, and C:

- A-party: The Public Safety Answering Point (PSAP) where the 911 calls are received.
- B-party: The 911 caller (calling party).
- C-party: A third party that the PSAP adds on or transfers the 911 caller to.

Call Progress Event	Description
A Release C	C-party is released from a stable call with parties A, B, and C; only A and B are on the call.
Abandon Transfer	A-party flashed and B-party was placed on hold; before C-party answered, A flashed again, causing abandoning the transfer; A and B are on the call.
C Answer	A-party flashed and B-party was placed on hold; A has dialed and C-party has apparently answered.
C Aud Ring Off	Audible ring was removed on the C-party side of the circuit.
C Aud Ring On	Audible ring occurred on the C-party side of the circuit.
C Busy	Busy tone occurred on the C-party side of the circuit.
C Reorder	Reorder tone occurred on the C-party side of the circuit.
Dial Tone Delay	During a stable call with parties A and B, A flashed; dial tone did not occur within 4 sec on the network side of the circuit.
Fixed Transfer	During a stable call with parties A and B, A flashed; dial tone occurred on the network and A dialed *2x, *3x, or *4x. This is a "fixed transfer."
Flash A_B_C	During a stable call with parties A, B, and C, A flashed.
Flash A_C	During a stable call with parties A and C, A flashed; now A, B, and C are on the call.
Flash B-Pty Hold	During a stable call with parties A and B, A flashed; now B is placed on hold.
Incomplete ANI	Fewer than 8 MF (ANI) digits occurred on the network side of the circuit.

Call Progress Event	Description
Manual Transfer	During a stable call with parties A and B, a flash occurred on A, then dial tone occurred on the network and A dialed the C-party directly; this is typically a 7- or 11-digit call.
No ANI	No MF (ANI) digits occurred on the network side of the circuit.
On-Hook A_B_C	During a stable call with parties A, B, and C, A went on-hook; if A remains on-hook longer than 1200 ms, then A disconnected; or if A goes off-hook in less than 1200 ms, then A flashed.
On-Hook A_C	During a stable call with parties A and C, A went on-hook; if A remains on-hook longer than 1200 ms, then A disconnected; or if A goes off-hook in less than 1200 ms, then A flashed.
Selective Transfer	During a stable call with parties A and B, A flashed, dial tone occurred on the network, and A dialed *1x; this is a "selective transfer."
Speed Call	During a stable call with parties A and B, A flashed, dial tone occurred on the network and A dialed C using speed-call digits *1x, *2x, *3x, or *4x.
Stable A_B_C	Indicates a stable call with parties A, B, and C.
Stable Call A_B	Indicates a stable call with parties A and B.
Stable Call A_C	Indicates a stable call with parties A and C.
Test Call	MF digit 8 occurred on the network after the MF key pulse (KP) occurred; this alerts the PSAP that a test call is in progress.
Transfer B To C	During a stable call with parties A, B, and C, A went on-hook for longer than 1200 ms; indicates that A disconnected and B was transferred to C.

Events for Wink-Start and Immediate-Start Circuits

Call Progress Event	Description
Aud Ring Off	Audible ring was removed from the circuit.
Aud Ring On	Audible ring occurred.
Begin Wink	The terminating side of the circuit went off-hook; indicates the start of a wink.
Busy	Busy tone occurred.
Call Answered	The terminating side of the circuit went off-hook (answer supervision).
Call Abandon	The originating side of the circuit went on-hook during digit pulsing or audible ringing and before the terminating side went off-hook (answered).
Circuit Open	Circuit went open for more than 5 sec; no battery and/or ground detected.
CPE Off-Hook	The CPE side of the circuit went off-hook; this event applies to 1-way circuits.
CPE On-Hook	The CPE side of the circuit went on-hook; this event applies to 1-way circuits.
Dial Pulse	An individual dial pulse occurred.

Call Progress Event	Description
Dial Tone	Dial tone occurred.
DP Dialing	The originating side of the circuit sent dial pulses.
DTMF Pulsing	The originating side of the circuit sent DTMF pulses (digits).
Facility Error	T1 facility error occurred; for details, see the T1 System Detail window.
False Seizure	The originating side of the circuit went on-hook before digit pulsing occurred; this may have happened before, during, or after the terminating side returned a Wink-Start signal.
Idle	Both sides of the circuit are on-hook and inactive.
Incomplete Wink	The terminating side of the circuit went off-hook to indicate the start of a wink, but did not go off-hook to indicate wink complete within 350 ms; then the originating side went on-hook (time-out abandon) before wink completion.
Key Pulse	An MF key pulse (KP) occurred.
Long Wink	The terminating side of the circuit went off-hook to indicate the start of a Wink-Start signal, but did not go on-hook to indicate wink complete until later than 350 ms.
Manual Analysis	Unable to follow call flow; this call requires further analysis.
Mid-Call Digit	A DTMF digit occurred after the call was stable.
MF Complete	MF pulses (digits) are complete; an MF start pulse (ST) occurred.
MF Pulsing	The originating side of the circuit sent MF pulses (digits).
Network On-Hook	The network side of the circuit went on-hook; this event applies to 1-way circuits.
Network Off-Hook	The network side of the circuit went off-hook; this event applies to 1-way circuits.
No DTMF Digits	The terminating side of the circuit went off-hook or had audible ringing before any DTMF digit pulses occurred.
No KP - 1 Sec	The terminating side of the circuit sent a Wink-Start signal 1 sec ago, but no MF key pulse (KP) has occurred on the originating side; this is unusual and may indicate trouble.
No MF Digits	The terminating side of the circuit went off-hook or had audible ringing before any MF digits were pulsed.
No Wink	The originating side of the circuit went on-hook before a wink occurred on the terminating side.
No Wink - 4 Sec	The originating side of the circuit went off-hook (seizure) 4 sec ago, but no wink occurred on the terminating side of the circuit; this is unusual and may indicate trouble.
Open Interval	An open switch interval shorter than 400 ms. occurred; this is normal for some types of analog switching machines.
Orig(Side1)OnHook	The originating side (side1) of the circuit went on-hook; this event applies to 2-way circuits.

Call Progress Event	Description
Orig(Side2)OnHook	The originating side (side2) of the circuit went on-hook; this event applies to 2-way circuits.
Reorder	Reorder tone occurred.
Seizure	The originating side of the circuit went off-hook.
Short Answer	The terminating side of the circuit went off-hook (answered), then went on-hook within 4 sec; this is unusual and may indicate trouble.
Short Call	The terminating side of the circuit went off-hook (answered), then the originating side went on-hook in less than 4 sec; this is unusual and may indicate trouble.
Short Wink	The terminating side of the circuit went off-hook to indicate the start of a Wink-Start signal, then the terminating side went on-hook to indicate wink complete in less than 100 ms.
Side 1 On Hook	Side 1 of the circuit went on-hook; this event applies to 2-way circuits.
Side 2 On Hook	Side 2 of the circuit went on-hook; this event applies to 2-way circuits.
Stable Call	The terminating side of the circuit went off-hook (answer supervision); and both sides of the circuit have remained off-hook for 1 second.
Start Pulse	A MF start pulse (ST) occurred.
Term(Side1) OnHook	The terminating side of the circuit (side 1) went on-hook; this event applies to 2-way circuits.
Term(Side2) OnHook	The terminating side of the circuit (side 2) went on-hook; this event applies to 2-way circuits.
Wink	The terminating side of the circuit went on-hook to indicate the completion of a Wink-Start signal; 100 to 350 ms is allowed for this event.

Events Unique to Feature Group D Circuits

Call Progress Event	Description
Long Ack Wink	After MF pulsing (digits) completed, the terminating side of the circuit went off-hook to indicate the start an acknowledgment Wink-Start signal, but did not go on-hook to indicate wink complete for longer than 500 ms.
Long First Wink	The terminating side of the circuit went off-hook to indicate the start of a Wink-Start signal, but did not go on-hook to indicate wink complete for longer than 350 ms.
Long Second Wink	After the first stage of MF pulsing (digits) completed, the terminating side of the circuit went off-hook to indicate the start of a second Wink-Start signal, but did not go on-hook for longer than 500 ms to indicate wink complete.
No Ack Wink (4 sec)	It has been 4 sec since MF pulsing (digits) completed, but the terminating Inter-connect Carrier (IC) has not sent an acknowledgment Wink-Start signal.

Call Progress Event	Description
No Ack Wink (8 sec)	It has been 8 sec since MF pulsing (digits) completed, but the terminating Inter-connect Carrier (IC) has not sent an acknowledgment Wink-Start signal.
No ANI	The originating side of the circuit sent an A MF "KP-ST" in place of the calling ANI.
No First Wink (4 sec)	It has been 4 sec since the originating side of the circuit went off-hook (seizure), but the terminating Access Tandem (AT), Inter-connect Carrier (IC), or International Carrier (INC) has not sent a Wink-Start signal.
No Second Wink (12 sec)	It has been 12 sec since originating side of the circuit completed the first stage of MF pulsing (digits), but the terminating Inter-connect Carrier (IC) has not sent a second Wink-Start signal.
No Second Wink (20 sec)	It has been 20 sec since the originating side of the circuit completed the first stage of MF pulsing (digits), but the terminating International Carrier (INC) has not sent a second Wink-Start signal.
Short Ack Wink	After MF pulsing (digits) was complete, the terminating side of the circuit went off-hook to start an acknowledgment Wink-Start signal, then went on-hook to indicate wink complete less than 100 ms later.
Short First Wink	The terminating side of the circuit went off-hook to indicate the start of a Wink-Start signal, then went on-hook to indicate wink complete less than 100 ms later.
Short Second Wink	After the first stage of MF pulsing (digits) completed, the terminating side of the circuit went off-hook to indicate the start of a second Wink-Start signal, then went on-hook to indicate wink complete less than 100 ms later.
Test Call	The originating side of the circuit sent an MF "KP-10X-ST" to indicate a test call.

Events Unique to Lucent PBX Circuits

Call Progress Event	Description
Feature Call	Three-burst machine ringing occurred to indicate that this call originated from a feature such as Automatic Callback, Priority Calling, or Ringback Queuing callback.
Incoming Call	Two-burst machine ringing occurred to indicate that this call originated from an incoming trunk, external tie trunk, or attendant-extended call.
Internal Call	One-burst machine ringing occurred to indicate that this call originated from an internal voice terminal (intercom) or internal tie trunk.
LWC - LED	The tip and ring voltages are cycling for about 1200 ms on-hook and 100 ms off-hook to normally indicate to the station that the Leave Word Calling LED is flashing to indicate that a message is waiting.

Appendix B

Specifications

Physical:

Dimensions: 8.1" H x 13.75" W x 17.9" D (20.6 cm H x 34.9 cm W x 45.5 cm D)

Weight: 20 lbs. (9.0 kg)

Environmental:

Operating Temperature/Humidity: 0° C (uncontrolled humidity) to 50° C at 20% to 80% RH

Storage Temperature/Humidity: -40° C to +60° C at 50% RH

Power: 115 VAC 47-63 Hz

Fuse: 250v, 4 Amp

Shock and Vibration:

E4A, E4AC5, E4AC9 = 45G @ 10 ms duration

E2D, E2DC = 60G @ 10 ms duration

Grounding:

- AC power ground wired to chassis ground
- Front panel jacks wired to chassis ground
- Ground post wired to chassis ground

Complies with:

- UL, FCC Part 15 Class A, CE MARK
- EN55022:1995, Emissions testing
- EN61000-4-2:1995, Electrostatic Discharge Immunity
- EN61000-4-3:1995, Radiated RF Immunity
- EN61000-4-4:1995, Electrical Fast Transient (EFT)/Burst Immunity
- EN50081-1:1992, Generic Emissions Standard for Residential and Commercial Equipment.
- EN55022 (Class A), Radiated & Line Conducted Emissions Requirements
- EN50082-1:1992, Generic Immunity Standard for Residential and Commercial Equipment.
- Bellcore NEBS Level 1 Requirement

Analog Facility Monitor (AFM) Input:

Models E4A, E4AC5, E4AC9

Voltage and Current Detectors:

DC: Range ± 200 V, Resolution ± 1.57 V
Loop Current ± 80 mA, Resolution ± 63 mA
Voltage/current scanning rate: 4 ms

AC: 55 to 110 v RMS

Digit Receivers:

- Dial Pulse:
 - Range: 7.5 to 12 PPS, 45% to 70% break, Interdigit time > 300 ms (Bellcore LSSGR)
- DTMF:
 - Frequency $< \pm 1.0\%$ accepted, $> 3.5\%$ all digits rejected*
 - Level 0 to -25.0 dBm per tone
 - Minimum digit duration, 40 ms
 - Minimum interdigit time, 40 ms
- MF:
 - Frequency $< \pm 1.0\%$ accepted, $> 3.5\%$ all digits rejected*
 - Level 0 to -25.0 dBm per tone
 - Minimum digit duration, 40 ms
 - Minimum interdigit time, 40 ms

* Identification of marginal DTMF or MF transmitters: The DTMF and MF receivers are designed to reject digits closer to 1.5% than 3.5% (example, 2%). This reveals marginal dialing equipment. When the suspect circuit or dialing equipment is identified, you can replace it, or use a digit analyzer for further analysis.

Call Progress

- Tone Receiver (Bellcore Precise Tone Plan, 350, 440, 480, and 620 Hz): 0 to -30.0 dBm per tone
- Call Progress Events detailed lists: See Appendix A

Detection timing accuracy (normal):

- Supervision (on-hook, off-hook, wink, flash) within 4 ms
- Dial Pulse break within 4 ms
- Dial Pulse make within 4 ms
- DTMF digit duration ± 14 ms
- MF digit duration ± 14 ms
- Call Progress Tone duration ± 14 ms
- Machine ring on (20 Hz power ringing) within 100 ms

Digital Facility Monitor (DFM) Input

Models E2D, E2DC

Input Connectors:

- Bantam Jacks
- A1, A2 for the first T1
- B1, B2 for the second T1
- BRDG/Mon jacks for Bridged or Monitor input
- IN jacks for Terminated Input
- OUT jacks for Drop/Insert or Simulation Tests

Framing and Line Codes:

- D4 or ESF framing
- AMI or B8ZS line code
- Automatic alignment to framing and line code
- Manual setting of framing and line code

T1 Signaling Bits:

AB signaling bits for D4 framing; for ESF framing, use A = C and B = D. In the window, Off = blank, On = green.

2-Way Wink

Originating Calls- Side 2 seizes trunk				Terminating Calls, Side 1 seizes trunk			
Side 1/Network/CO	Side 2/Station/PBX			Side 1/Network/CO	Side 2/Station/PBX		
A/B	A/B	A/B	A/B	A/B	A/B	A/B	A/B
Idle	Off/Off	Off/Off	Idle	Idle	Off/Off	Off/Off	Idle
	Off/Off	On/On	Seizes Trunk	Seizes trunk	On/On		
Wink	On/On	On/On			On/On	On/On	Wink
	Off/Off	On/On	Wait for answer	Wait for answer	On/On		
Stable call	On/On	On/On	Stable call	Stable call	On/On	On/On	Stable call

Loop-Start							
Originating Calls				Terminating Calls			
Side 1/Network/CO	Side 2/Station/PBX			Side 1/Network/CO	Side 2/Station/PBX		
A/B	A/B			A/B	A/B		
Idle	Off/On		Idle	Idle	Off/On	Off/On	Idle
	Off/On	On/On	Dial tone request	Ring on	Off/Off	Off/On	
Stable call	Off/On	On/On	Stable call	Ring off	Off/On	Off/On	Wink
					Off/On	On/On	Off-hook
				Stable call	Off/On	On/On	Stable call

Ground-Start							
Originating Calls				Terminating Calls			
Side 1/Network/CO	Side 2/Station/PBX			Side 1/Network/CO	Side 2/Station/PBX		
A/B	A/B			A/B	A/B		
Idle	On/On	Off/On	Idle	Idle	On/On	Off/On	Idle
	On/On	Off/Off	Dial tone request	Tip ground	Off/On	Off/On	
Tip ground return	Off/On	Off/Off		Ring on	Off/Off	Off/On	
	Off/On	On/On	Station off-hook	Ring off	Off/On	Off/On	
Stable call	Off/On	On/On	Stable call		Off/On	On/On	Off-hook
				Stable call	Off/On	On/On	Stable call

Input

- Frequency:
 - 1,544,000 Hz $\pm$ 100 Hz
- Impedance:
 - Bridged = 1000 ohms or greater
 - Term = 100 ohms $\pm$ 5%
 - Monitor = 1000 ohms or greater
- Signal Level:
 - Bridged = +3 dBdsx to -25 dBdsx due to cable loss.
 - Term = +3 dBdsx to -30 dBdsx due to cable loss.
 - Mon = -14 dBdsx to -22 dBdsx due to resistive loss.

T1 Alarm Parameters

- Signal Loss: No received T1 signal (192 consecutive zeros). (Red Alarm).
- Frame Sync Loss: Not synchronized to receive T1 data stream (Red Alarm).
- Remote (Yellow) Alarm: D4 = when bit 2 of 256 consecutive channels is set to zero for at least 254 occurrences.
ESF = when 16 consecutive patterns of 00FF hex are received in the FDL.
- Blue Alarm, Alarm Indicating Signal (AIS), or unframed all ones: When < 3 ms window, 5 or fewer zeros are received.
- Excess zeros: More than 15 consecutive zeros detected.

Digit Receivers:

- Dial Pulse:
 - Range: 7.0 to 12 PPS, 30% to 70% break, Interdigit time >300 ms
 - DTMF:
 - Frequency < $\pm 1.5\%$ accepted, > 3.5% all digits rejected*
 - Level 0 to -30.0 dBm per tone
 - Minimum digit duration, 40 ms
 - Minimum interdigit time, 40 ms
 - MF:
 - Frequency < $\pm 1.5\%$ accepted, > 3.5% all digits rejected*
 - Level 0 to -30.0 dBm per tone
 - Minimum digit duration, 40 ms
 - Minimum interdigit time, 40 ms
- * Identification of marginal DTMF or MF transmitters: The DTMF and MF receivers are designed to reject digits closer to 1.5% than 3.5% (example, 2%). This reveals marginal dialing equipment. When the suspect circuit or dialing equipment is identified, it can be replaced, or a digit analyzer could be used to do further analysis.

Call Progress

- Tone Receiver:
 - Bellcore Precise Tone Plan, 350, 440, 480, and 620 Hz
 - 0 to -30.0 dBm per tone
- Call Progress Events detailed lists: See Appendix A

Detection Timing Accuracy (fine):

- Supervision events including machine ringing (ABCD bits), reported within 3 ms
- DTMF digit duration ± 2 ms
- MF digit duration ± 2 ms
- Call Progress Tone duration ± 2 ms

Appendix C

Product Warranty

Ellipsys Expert Call Analyzers have a warranty against defects in material and workmanship for a period of one year from the date of shipment. During the warranty period, Ellipsys Technologies will, at its option, either repair or replace products that are determined to be defective.

For warranty service or repair, products must be returned to Ellipsys Technologies in their original shipping container at the address listed below. A return authorization must be obtained from our Customer Service Department prior to shipping the product. Please prepay shipping charges to Ellipsys Technologies and we will pay the shipping charges to return the product to the buyer.

Ellipsys Technologies warrants that its software and firmware designated by Ellipsys Technologies for use with this product will execute its programming when properly installed on the product. Ellipsys Technologies does not warrant that the operation of the software or firmware will be uninterrupted or error free.

Limitation of Warranty

The foregoing warranty shall not apply to defects resulting from improper or inadequate care, handling, or shipping of the product by the Buyer. The foregoing warranty shall also not apply to Buyer-supplied software or interfacing, unauthorized modification or misuse of the product, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

No other warranty is expressed or implied. Ellipsys Technologies specifically disclaims any implied warranties of merchantability or fitness for a particular purpose.

Exclusive Remedies

The remedies provided herein are the Buyer's sole and exclusive remedies. Ellipsys Technologies shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

20600 Prairie Street
Chatsworth, CA 91311
Voice 800.668.3547
Fax 818.678.1895
www.ellipsys.net

Field Located E4A Profile Worksheet

E4A Location _____ Company _____
Customer Name _____ Work Phone _____
E4A Modem Number _____ Firmware _____
E4A Serial Number _____ Software Version _____

Channel # _____ ID _____ Ckt. Type _____ Intrusive _____

Calibration Information:

(LS) Station Onhook T= _____ R= _____ Station Offhook T= _____ R= _____
(GS) Network Threshold Onhook T $\geq$ _____ Station Threshold Onhook R $\geq$ _____
(WSMF, WSTT, WSDP, 911) Trunk Idle T= _____ R= _____

Advanced Settings:

(LS, GS) Channel open Tip $\leq$ _____ Channel open Ring $\leq$ _____
(WS/911) Voltage $\leq$ _____ above Tip=Ground - Voltage $\geq$ _____ below Ring=Battery
Report voltage changes $\geq$ _____ which are stable for $\geq$ _____ mSec
Misc. Info. _____

Channel # _____ ID _____ Ckt. Type _____ Intrusive _____

Calibration Information:

(LS) Station Onhook T= _____ R= _____ Station Offhook T= _____ R= _____
(GS) Network Threshold Onhook T $\geq$ _____ Station Threshold Onhook R $\geq$ _____
(WSMF, WSTT, WSDP, 911) Trunk Idle T= _____ R= _____

Advanced Settings:

(LS, GS) Channel open Tip $\leq$ _____ Channel open Ring $\leq$ _____
(WS/911) Voltage $\leq$ _____ above Tip=Ground - Voltage $\geq$ _____ below Ring=Battery
Report voltage changes $\geq$ _____ which are stable for $\geq$ _____ mSec
Misc. Info. _____

Channel # _____ ID _____ Ckt. Type _____ Intrusive _____

Calibration Information:

(LS) Station Onhook T= _____ R= _____ Station Offhook T= _____ R= _____
(GS) Network Threshold Onhook T $\geq$ _____ Station Threshold Onhook R $\geq$ _____
(WSMF, WSTT, WSDP, 911) Trunk Idle T= _____ R= _____

Advanced Settings:

(LS, GS) Channel open Tip $\leq$ _____ Channel open Ring $\leq$ _____
(WS/911) Voltage $\leq$ _____ above Tip=Ground - Voltage $\geq$ _____ below Ring=Battery
Report voltage changes $\geq$ _____ which are stable for $\geq$ _____ mSec
Misc. Info. _____

Channel # _____ ID _____ Ckt. Type _____ Intrusive _____

Calibration Information:

(LS) Station Onhook T= _____ R= _____ Station Offhook T= _____ R= _____
(GS) Network Threshold Onhook T $\geq$ _____ Station Threshold Onhook R $\geq$ _____
(WSMF, WSTT, WSDP, 911) Trunk Idle T= _____ R= _____

Advanced Settings:

(LS, GS) Channel open Tip $\leq$ _____ Channel open Ring $\leq$ _____
(WS/911) Voltage $\leq$ _____ above Tip=Ground - Voltage $\geq$ _____ below Ring=Battery
Report voltage changes $\geq$ _____ which are stable for $\geq$ _____ mSec
Misc. Info. _____



a division of Canoga Perkins

Ellipsys Technologies
A Division of Canoga Perkins, Inc.
20600 Prairie Street
Chatsworth, California 91311-6008 USA
Phone: (800) 668-3547 FAX: (818) 678-1895
Web Site: www.ellipsys.net
Email: support@ellipsys.net