STARPLUS™ *Triad-S*

Installation Manual

Issue 4.0 - April 2002

Issue	Release Date	Changes
2	8-99	☐ Feature Package 2 {FP2} enhancements have been added. ☐ Manual content contains extensive revisions.
2.1	12-99	Manual content has been revised.
3	5-00	Manual content has been reformatted.
3.1	8-00	Manual content has been revised.
3.2	3-01	Manual content has been revised for correctness and clarity.
4.0	4-02	Feature Package 4 {FP4} and flexible numbering enhancements have been added.

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1 Introduction

This manual provides the information necessary to install and maintain the *STARPLUS Triad-S* System. The described features are based on the current software release. If any of these features do not work on your system, call your sales representative regarding upgrading your system.

This chapter describes and illustrates the components that may be used with the *STARPLUS Triad-S*™ System.
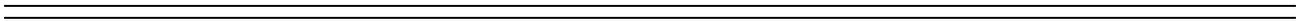
Regulatory Information (U.S.A.)

The Federal Communications Commission (FCC) has established rules which allow the direct connection of the *Triad-S™* System to the telephone network. Certain actions must be undertaken or understood before the connection of customer provided equipment is completed.

Telephone Company Notification

Before connecting the *Triad-S™* System to the telephone network, the local serving telephone company must be given advance notice of intention to use customer provided equipment and provided with the following information:

Telephone Numbers

The telephone numbers to be connected to the system.

Triad-S Systems Information

☐ The Ringer Equivalence Number also located on the KSU: 1.3B

☐ The USOC jack required for direct interconnection with the telephone network: RJ11C

FCC Registration Numbers

☐ For systems configured as a key system: (button appearances) DLPKOR-24039-KF-E

☐ For systems configured as a Hybrid system: (dial access codes) DLPKOR-24026-MF-E

Incidence of Harm

If the telephone company determines that the customer provided equipment is faulty and possibly causing harm or interruption to the telephone network, it should be disconnected until repairs can be made. If this is not done, the telephone company may temporarily disconnect service.

Changes in Service

The local telephone company may make changes in its communications facilities or procedures. If these changes should affect the use of the *Triad-S™* System or compatibility with the network, the telephone company must give written notice to the user to allow uninterrupted service.

Maintenance Limitations

Maintenance on the *Triad-S™* System is to be performed only by the manufacturer or its authorized agent. The user may not make any changes and/or repairs except as specifically noted in this manual. If unauthorized alterations or repairs are made, any remaining warranty and the software license for the system will be voided.

Hearing Aid Compatibility

All *Triad-S™* Digital Telephones are Hearing Aid Compatible, as defined in Section 68.316 of Part 68 FCC Rules and Regulations.

UL/CSA Safety Compliance

The *Triad-S™* System has met all safety requirements and was found be in compliance with the Underwriters Laboratories (UL) 1459. The *Triad-S™* System is authorized to bear the NRTL/C marking.

Notice of Compliance

The *Triad-S™* System complies with rules regarding radiation and radio frequency emissions by Class A computing devices. In accordance with FCC Standard 15 (Subpart J), the following information must be supplied to the end user:

"This equipment generates and uses RF energy and if not installed and used in accordance with the Instruction Manual, may cause interference to Radio Communications. It has been tested and found to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference, when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference."

Toll Fraud Disclaimer

"While this device is designed to be reasonably secure against intrusions from fraudulent callers, it is by no means invulnerable to fraud. Therefore, no express or implied warranty is made against such fraud including interconnection to the long distance network."

"While this device is designed to be reasonably secure against invasion of privacy, it is by no means invulnerable to such invasions. Therefore, no express or implied warranty is made against unlawful or unauthorized utilization which results in the invasion of one's right of privacy."

2 Installation

This chapter describes the procedures and steps necessary to install the *Triad-S* System.
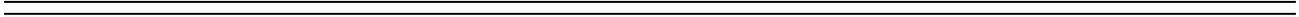
Introduction

As with any sophisticated communications device, installation of the *STARPLUS Triad-S™* System requires the care and forethought of a competent technician. To assure easy servicing and reliable operation, several factors must be considered when planning the system installation. The installation proceeds in these major steps:

☐ Site Preparation

☐ KSU and Power Supply (PS) Installation

☐ PCB Installation

☐ System Wiring

☐ Keyset and Terminal Installation

☐ Basic Installation Check-Out

☐ System Programming and Verification

Installing the *Triad-S™* System is quick and efficient if installation instructions are followed.

Site Preparation

General Site Considerations

The first step is to locate an acceptable site for the common equipment (KSUs, boards, etc.). When locating a mounting site for the KSUs, the following points must be considered:

☐ The KSUs are designed for wall mounting and should not be mounted directly to a masonry or plasterboard wall. It is recommended that a 1/2 inch plywood backboard be firmly mounted to the wall, and the KSU and MDF be mounted to the backboard.

☐ The location must have access to a *dedicated* 110 Volt AC (±10%), 60 Hz, single-phase circuit with a circuit breaker or fuse rated at 15 amps. A 3-wire parallel blade grounded outlet should be within approximately 6 feet of the lower left rear of the BKSU mounting.

☐ The location must have access to a good earth ground, such as a metallic cold water pipe without non-metallic joints. The ground source should be located as close as possible to the system.

☐ The system should be located in an area that is well ventilated with a recommended temperature range of 68°-78° F and a relative humidity range of 5-60% (non condensing).

☐ The system should be located within 25 feet of the telephone company's termination point. Also, the location should be within the prescribed station loop lengths for all keysets and terminals. If existing cabling is used, its location and conduits should be considered. Station wiring should be in the building. Station ports are not designed for installation outside of the building.

☐ Protection from flooding, flammable materials, excessive dust and vibration.

☐ The site should be away from radio transmitting equipment, arc-welding devices, copying machines and other electrical equipment capable of generating electrical interferences.

    ☐   Operation of this equipment in a residential area is likely to cause interference. In which case the user, at his own expense, is required to take any necessary measures to correct the interference.

Backboard Installation

A wooden backboard is recommended for all installations and must be installed when the location has masonry or plasterboard walls. A 1/2-inch plywood material is sufficient for most installations. The backboard should be mounted at a convenient height, about three feet above the floor and be bolted in various places to distribute the weight of the system.

Space should be available on the bottom side of the backboard for the MDF cabling and for optional equipment such as a music source, battery backup, etc. It is recommended that the location of each major item be roughly sketched on the backboard as an installation layout.

Verify On-Site Equipment

Once the equipment installation site is identified and a dedicated AC outlet, earth ground, and lighting and ventilation are available, verify that all equipment required is on-site and was not damaged during shipment. Unpack the KSUs to assure there is no shipping damage. Note that a mounting template is packed with the BKSU; this template is required later in the installation. Check that the type and quantity of boards received is correct and optional equipment and a Power Line Surge Protector are on-site. Do NOT unpack the individual boards at this time.

If any equipment is damaged or missing, notify the appropriate personnel to correct the situation.

KSU Installation

The *STARPLUS Triad-S*™ System consists of a Basic KSU (BKSU) cabinet.

Mounting the Basic KSU

The Basic KSU consists of a plastic cover, a metal base frame designed for wall mounting. Before installing BKSU on the wall, two wall mounting plates that are assembled in the bottom side of the BKSU, must be extended for mounting. The KSU must NOT be mounted on a masonry or dry-wall surface; a wooden backboard is required.

A mounting template is included with the BKSU. This template can be used to drill pilot holes for mounting screws. Please note that the template provides screw hole locations for the BKSU and EKSU. The BKSU is mounted with three #10 or larger, 1 1/2 inch or longer screws. Drill pilot holes in the three locations marked, insert the screws and tighten leaving about 1/2 inch exposed.

Figure 2-1: Basic KSU
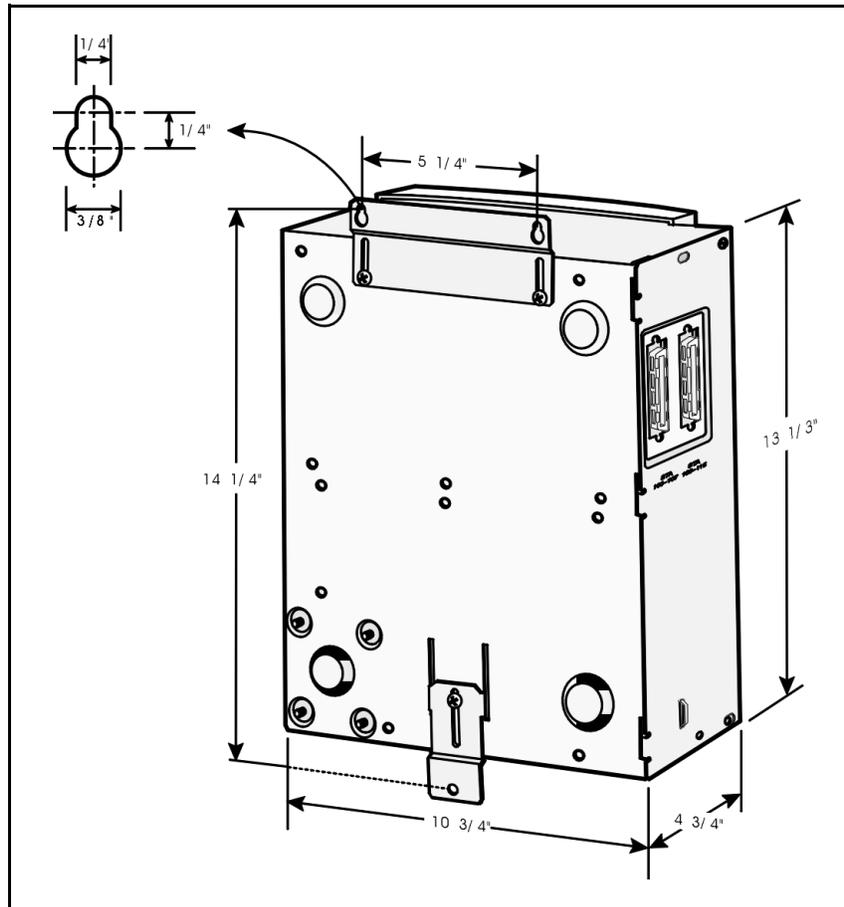
Figure 2-2: Basic KSU Mounting Holes and Installation

Mounting the Expansion KSU (EKSU)

The Expansion KSU consists of a plastic cover, a metal base frame designed for wall mount installation. The EKSU contains a power transformer and expansion interface board (EIB). The EKSU MUST be mounted above the BKSU. Before installing the BKSU on the wall, the wall mounting plate that is assembled in the bottom side of the EKSU, must be extended for wall mounting and the fastener provided with the EKSU must be assembled with the EKSU.

After positioning the EKSU above the BKSU:

1. Mark the location of the two screws to mount the BKSU. The EKSU must NOT be mounted on a masonry or dry wall surface; a wooden backboard is required. The EKSU is mounted with two #10 or larger, 1 ½ inch or longer screws.

2. Drill pilot holes in the two locations marked, insert the screws and tighten leaving about ½ inch exposed.

3. Mount the Expansion KSU on the screws and tighten the screws securely.

Interconnection is achieved via an amphenol type connector and power cable. The amphenol connector is included and connects the EKSU to the BKSU on the right side through connectors labeled EXP as shown:
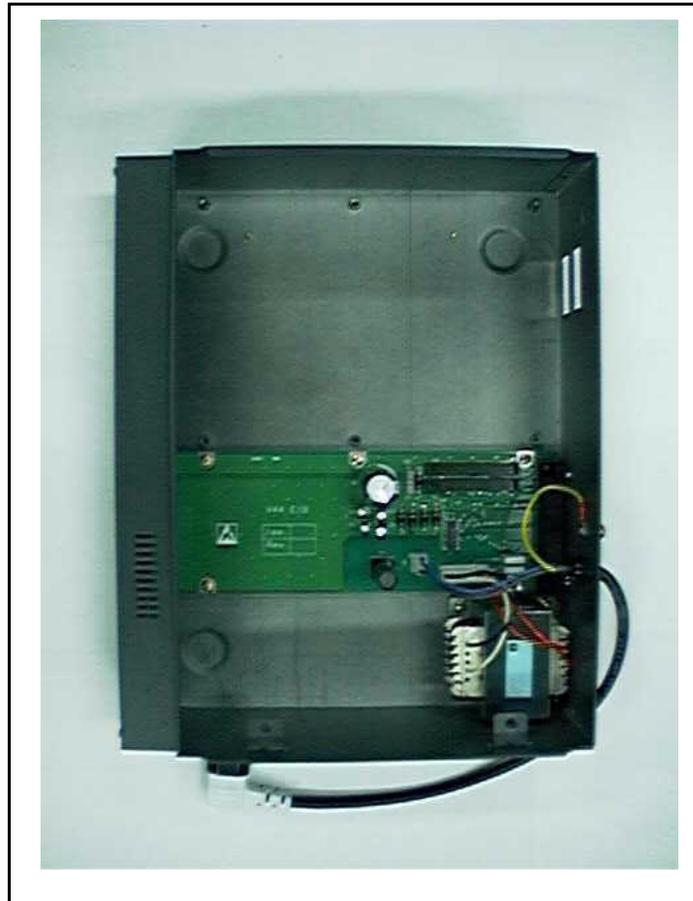
Figure 2-3: Expansion KSU
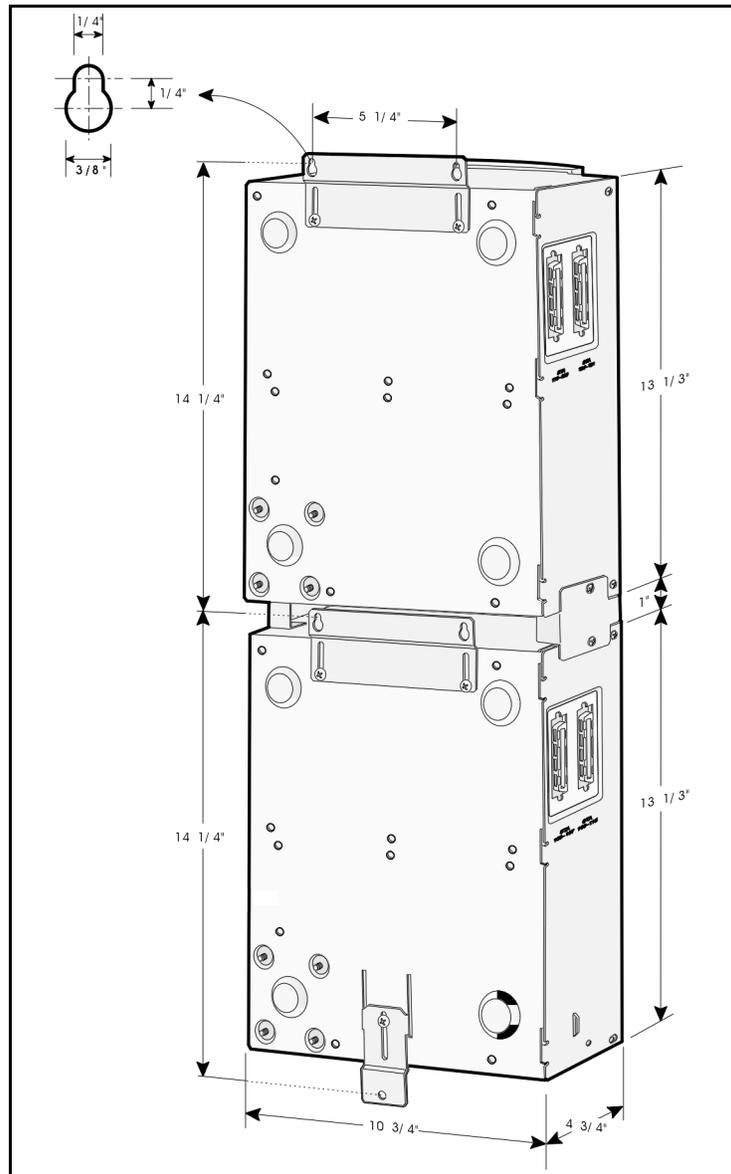
Figure 2-4: BKSU and EKSU Mounting Holes and Installation

Battery Backup Unit (BBU) Installation

The BBU provides power for the system during a power failure. The BBU connects to the *Triad-S™* via the connector on the bottom of the BKSU. The external gel cell batteries must provide 24V DC. This is generally accomplished by connecting two 12-volt batteries in series.

The BBU provides charging current to the batteries during normal AC power operation at a maximum of about 0.5 amp. During battery operation, the BBU discontinues battery operation if AC power is restored or the battery voltage is too low to maintain proper system operation.

The time the system operates on batteries is dependent on several elements, including: battery charge state, condition of the batteries, capacity of the batteries, and the system size (number of station ports).

The following chart gives the approximate backup time in ampere hours for two system sizes and different battery capacities.

Battery Capacity	16 Port	32 Port
10 AH	4 Hour	1.75 Hour
20 AH	8 Hour	3.5 Hour

KSU Grounding

To ensure proper system operation and for safety purposes, a good earth ground is required. A metallic COLD water pipe usually provides a reliable ground. Carefully check that the pipe does not contain insulated joints that could isolate the ground. In the absence of a COLD water pipe, a ground rod or other source may be used.

A #12 insulated AWG or larger copper wire should be used between the ground source and the KSU (BKSU and EKSU, respectively). The wire should be kept as short as possible (recommended 25 feet or less).

1. Remove about 1 1/2 inches of insulation from both ends. Attach one end of the wire to the Ground Lug on the lower side of the Basic and on the lower side of the Expansion KSU by inserting the wire under the lug screw, then tighten the screw securely.

2. Attach the other end of the wire, as appropriate, to the ground source.

3. Take a DC resistance reading and an AC volt reading between the chassis ground point (cold water pipe) and AC ground (third wire AC ground). The limit is 5V AC and 5 Ohms DC resistance. If a higher reading is obtained, choose a different chassis ground point and repeat this step until a suitable ground point is found.

Power Line Surge Protection

The AC outlet should be equipped with a power surge protection device or UPS. Systems using such devices are more resistant to damage from power line surges than unprotected systems. Power line surges often occur during normal operations and during violent thunderstorms.

Installation of a surge protector meeting the specifications described in the following paragraph may prevent or minimize the damage resulting from power line surges.

The isolation transformer/surge protector should be: 15 amp self-contained unit that plugs into a standard grounded 117V AC wall outlet. The wall outlet must be designed to accept a 3-prong plug (two parallel blades and a ground pin). The protector should be fast and capable of protecting transients greater than 200 volts.

Lightning Protection

The system provides secondary protection per UL 1459 specifications. Primary protection circuitry is the installer's responsibility and should be installed per the National Electric Code (NEC).

KSU AC Power Plug

Before plugging the KSU power cord into the AC source (grounded, 3-prong AC outlet required):

1. Verify the power switch of the BKSU is off.
2. Plug the KSU power cord into the AC outlet and turn the power switch on.

    The red LED on the MPB illuminates.

PCB Installation

PCB Handling and General Installation

  DO NOT install or remove any boards with power applied.

Power must be turned off prior to installation or removal of the PCBs.

The system cards contain digital circuitry which are extremely reliable, but can be damaged by exposure to excessive static electricity. When handling PCBs, a grounded wrist strap should be used to protect the boards from static discharges. Also, use common sense when handling PCBs.

Example: Do not place a PCB in locations where heavy objects might fall on the PCB and damage components.

BKSU and Main Processor Board Assembly

The main processor board (MPB) is installed in the BKSU at the factory before the shipment. The MPB contains a lithium dry cell to maintain memory and real-time clock functions. The battery is soldered to the MPB and connected to the circuitry by an ON-OFF dip switch (SW2). Make sure the dip switch SW2 is ON before database programming.

Before programming the system, switch 1 (SW1) should be placed in the ON position and powered off and on to initialize the system database to default. Once the database is initialized, switch 1 (SW1) should be placed in the OFF position to protect the database.

Shown below is the dip switch position functions:

MPB PCB Marking	Dip Switch Position	Function
SW1	ON	Flush the database
	OFF	Retain the database

Figure 2-5: BKSU Dip Switches

The MPB may be equipped with 3 daughter boards: MODU for modem access to the system, DTMF-A for additional DTMF receivers, and an MISB for two serial ports.

Software for the system is contained on two chips labeled U1 and U2 in the Program Module Unit (PMU) module.

The BKSU provides miscellaneous features:

☐ One external page port that is connected to transformers, providing a 600 ohm impedance.

☐ Two music inputs that are connected to transformers, providing a 600 ohm impedance.

☐ Two independent dry relay contacts rated at 1 amp, 24V DC.

☐ A DTMF receiver.

These features are provided through the amphenol connector on the front edge of the CKIB installed in the first slot of the BKSU. These features are controlled by system software.

Modem Unit (MODU)

The Modem Unit provides an asynchronous modem for access to the system database and remote maintenance. The module is optionally installed on the BKSU's MPB and includes a 9600 baud modem. The modem may be accessed from any station or CO. The MODU port is independent of the MISB RS232C ports, enabling system database access, etc., without interrupting the SMDR output.

Installing the MODU

1. Using a grounding strap, unpack the MODU from its anti-static bag in the packing box.
2. Locate the CN6 connector (outlined) on the MPB.
3. Locate the CN1 connector on the MODU.
4. Position the MODU so the CN1 matches with CN6 on the MPB.
5. Push the MODU onto its connector, making sure it is properly seated.
6. Match the screw hole on the MODU PCB bracket with the screw hole on the base frame.
7. Insert a screw and tighten the screws securely.

This completes the MODU installation.
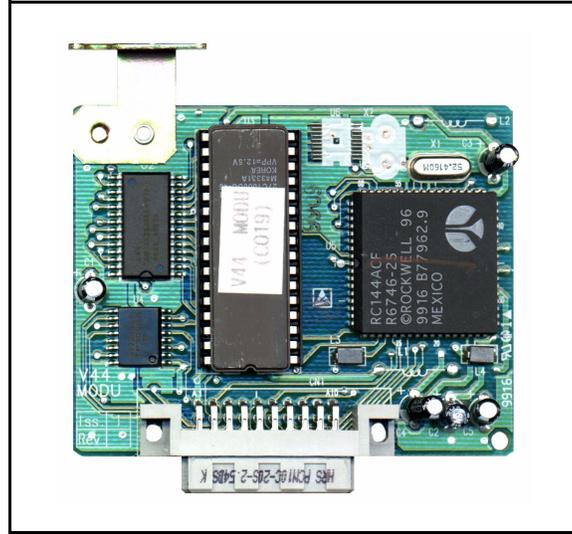
Figure 2-6: Modem Unit (MODU)

The modem may not always connect at 9600 bps. If you encounter a situation where you cannot connect at 9600 bps, change your computer's baud rate to 4800 bps.

Miscellaneous Interface Service Board Installation

The Miscellaneous Interface Service Board (MISB) contains the second external music source (MOH/BGM) and two serial ports.

Installing the MISB

1. Using a grounding strap, unpack the MISB from its anti-static conductive bag in the packing box.
2. Locate the CN15 connector (outlined) on the MPB.
3. Locate the CN3 connector on the MISB.
4. Position the MISB so that CN3 matches CN15 on the MPB.
5. Push the MISB onto it's connector making sure it is properly seated.
6. Match the screw hole on the MISB PCB bracket with the screw hole on the base frame.
7. Insert a screw and tighten the screws securely.

   This completes the MISB installation.

When the MISB is installed in the Triad-S and the system is powered up with dip switches 6 and 7 in the on position, power up will take about 60 seconds. However, if the dip switches are off, power up will take only 20 seconds.

The MISB has an eight position dip switch. The following table lists the functions of each switch.

Table 2-1: MISB Dip Switches

Dip Switch	Function
1	Not used
2	Not used
3	Not used
4	ON: XOFF/XON OFF: CTS/RTS
5	Not used
6	ON: Execute H/W tests at start-up OFF: Skip H/W tests at start-up
7	ON: Display start-up status OFF: Do not display start-up status
8	Not used
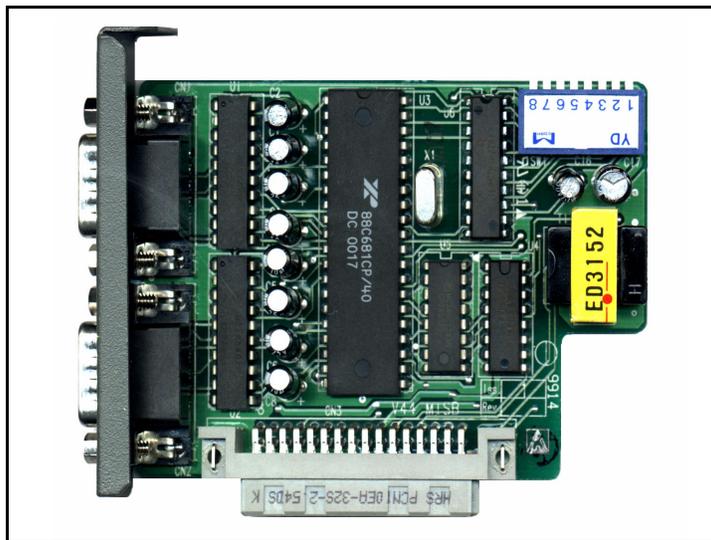
Figure 2-7: Miscellaneous Interface Service Board (MISB)

DTMF-A Unit

The DTMF-A provides an additional four DTMF receivers that may be used for detecting the DTMF signal from the single line telephone port or central office line.

When using an analog voice mail system, the single on-board DTMF receiver is not adequate to supply dial tone to single line devices and handle the demands placed on it by voice mail. Therefore a DTMF-A must be installed.

Installing the DTMF-A

1. Using a grounding strap, unpack the DTMF-A from its anti-static conductive bag in the packing box.
2. Locate the CN13 and CN14 connectors (outlined) on the MPB.
3. Locate the CONN5 and CONN6 connectors on the DTMF-A.
4. Position the DTMF-A so CONN5 and CONN6 match CN13 and CN14 on the MPB.
5. Push the DTMF-A onto its connector making sure it is properly seated.

    This completes the DTMF-A installation.

Figure 2-8: DTMF-A

Message Wait Unit (MSGU)

The Message Wait Lamp Relay Control (MSGU) provides message wait lamp relay control for message lamp single line telephones. The MSGU board mounts on the CSIB as a daughter-board-type arrangement. The CSIB interfaces with mechanical 90V AC ringers and 95V DC lights on 2500-type phone sets.

Installing the MSGU

1. Using a grounding strap, unpack the MSGU module from its anti-static conductive bag in the packing box.
2. Locate the CN1 and CN2 connectors on the MSGU module.
3. Locate the CN1 and CN2 connectors on the CSIB (outlined).
4. Position the MSGU module so CN1 and CN2 match CN1 and CN2 connectors on the CSIB, respectively.
5. Push MSGU module onto connectors and ensure it is properly seated.
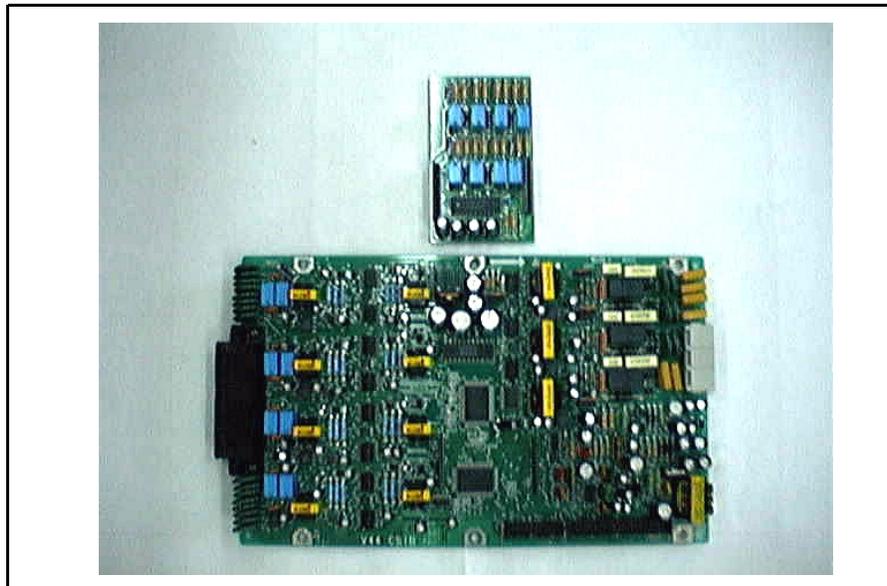
Figure 2-9: Message Wait Unit (MSGU)

CKIB/CSIB Installation

There are two types of expansion boards available: CKIB and CSIB. These boards include 3 loop start CO line interfaces and 8 digital key telephone interfaces (CKIB), or 3 loop start CO line interfaces and 8 single line telephone interfaces (CSIB).

Installing the CKIB/CSIB

1. Using a grounding strap, unpack the CKIB/CSIB from its anti-static conductive bag and six standoffs from the auxiliary bag in the packing box.
2. Unscrew the six screws from the CKIB/CSIB installed in the first slot of the BKSU or EKSU.
3. Insert the standoffs to secure the first card to the BKSU or EKSU.
4. Position the CKIB/CSIB on the six standoffs so the screw holes match.
5. Insert the screws and tighten them securely.
6. Connect the flat cable with the MPB in the BKSU or the EIB in the EKSU. The CKIB cable is labeled CN4; the CSIB cable is labeled CN5.

   This completes the MSGU module installation.
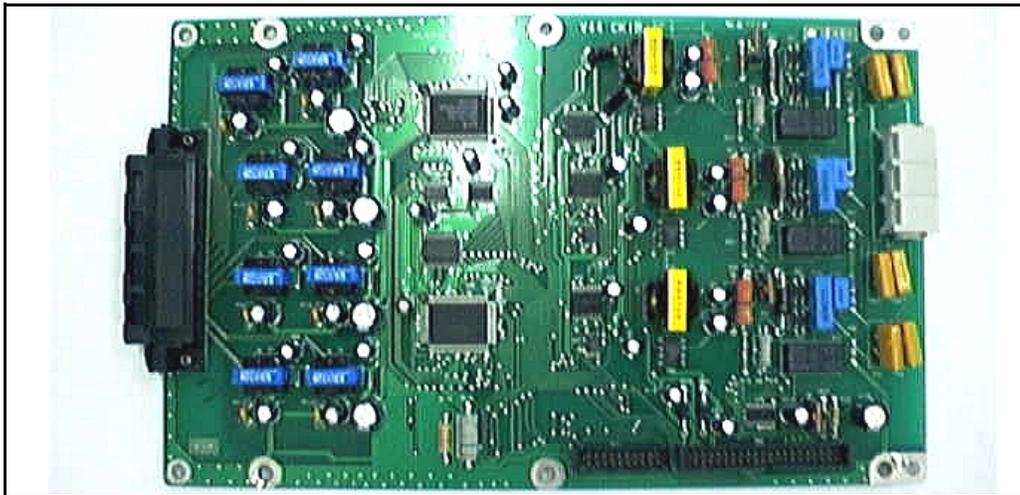
Figure 2-10: CKIB Board
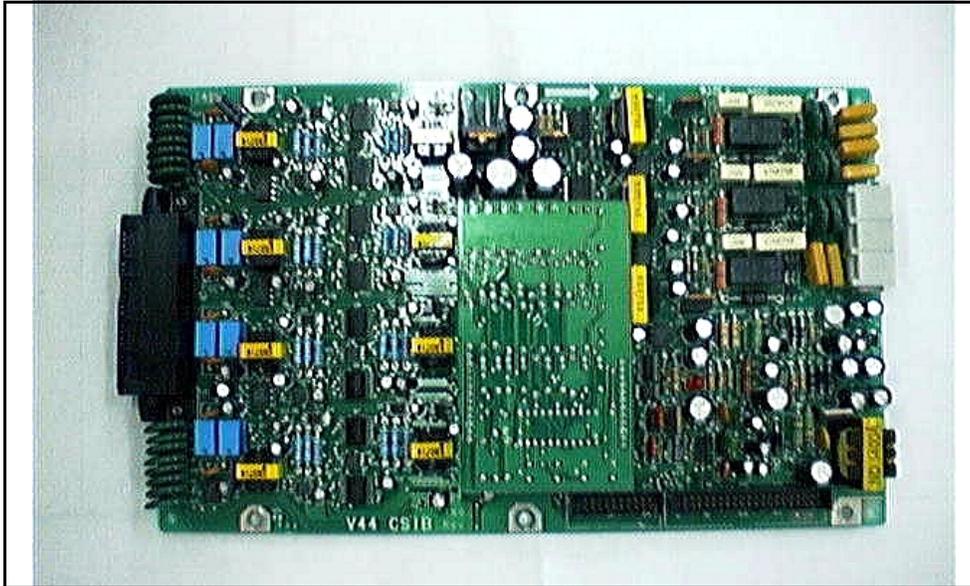
Figure 2-11: CSIB Board with MSGU Mounted

Each CKIB or CSIB has 3 loop start CO line interfaces. The loop start CO/PBX lines are connected to RJ-11 connectors on the right side of each board.

CKIB/CSIB Wiring

There is one 50-pin female amphenol connector on the left side of the board. This enables the system to be cabled to the main distribution frame (MDF). A 25-pair telephone cable must be prepared with mating connectors to extend the interface circuits to the MDF. The cables should be routed through the cable clamps at the bottom of the KSU to the MDF. These cables are terminated on industry standard 66MI-50 type punch down blocks. It is recommended that 66MI-50 split blocks with bridging clips be used to simplify troubleshooting and to quickly isolate any faults.

Table 2-2: CKIB/CSIB Wiring

Pair	Pin #	Color	CKIB Desc.		CSIB Desc.		Pair	Pin #	Color	CKIB Desc.	CSIB Desc.
1	26 1	WH/BL BL/WH	Data-T1 Data-R1	DKTU1	Tip Ring	SLT1	14	39 14	BK/BN BN/BK		
2	27 2	WH/OR OR/WH	Data-T2 Data-R2	DKTU2	Tip Ring	SLT2	15	40 15	BK/SL SL/BK		
3	28 3	WH/GN GN/WH	Data-T3 Data-R3	DKTU3	Tip Ring	SLT3	16	41 16	YL/BL BL/YL		
4	29 4	WH/BN BN/WH	Data-T4 Data-R4	DKTU4	Tip Ring	SLT4	17	42 17	YL/OR OR/YL		
5	30 5	WH/SL SL/WH	Data-T5 Data-R5	DKTU5	Tip Ring	SLT5	18	43 18	YL/GN GN/YL		
6	31 6	RD/BL BL/RD	Data-T6 Data-R6	DKTU6	Tip Ring	SLT6	19	44 19	YL/BN BN/YL		
7	32 7	RD/OR OR/RD	Data-T7 Data-R7	DKTU7	Tip Ring	SLT7	20	45 20	YL/SL SL/YL	EXPIT EXPIR	
8	33 8	RD/GN GN/RD	Data-T8 Data-R8	DKTU8	Tip Ring	SLT8	21	46 21	VI/BL BL/VI	MOHIT MOHIR	
9	34 9	RD/BN BN/RD					22	47 22	VI/OR OR/VI	BGM/MOH2T BGM/MOH2R	
10	35 10	RD/SL SL/RD					23	48 23	VI/GN GN/VI	RELAY1T RELAY1R	
11	36 11	BK/BL BL/BK					24	49 24	VI/BN BN/VI	RELAY2T RELAY2R	
12	37 12	BK/OR OR/BK					25	50 25	VI/SL SL/VI		
13	38 13	BK/GN GN/BK									

Wiring for External Page, MOH/BGM, and Relay is available only at the first board position of the BKSU.

Station Wiring

The following provides details on the interconnection of each type station interface board and station jack.

Only the first pair (green, red) on the jack should be connected to the KSU. No other pairs should be connected.

Digital Keyset

Wiring from the CKIB to the station jack requires single pair cable (2 or 3 pair is recommended). Digitized voice, signaling and battery are sent over this pair.
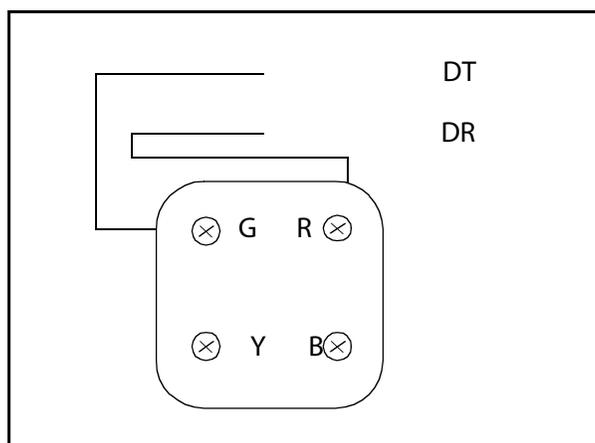
Figure 2-12: Digital Station Jack Wiring

Single Line Telephone

The CSIB is wired to SLT devices with single pair cabling to provide talk battery, voice and signaling to and from the SLT.
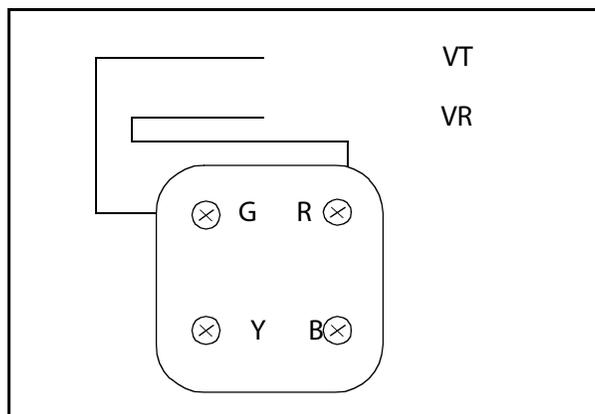
Figure 2-13: Single Line Telephone Wiring

Wall Mounting the Digital Key Telephone

To wall mount the digital key telephone, it is necessary to use the wall mount bracket and a standard type jack designed for 630-type wall hanging applications. Refer to *Figure 2-14* on the following page.

1. Remove the handset from the cradle and locate the plastic retainer in the bottom of the hook-switch well area.

2. Push the plastic retainer slowly upward until it is free.

3. Locate the tab on the plastic retainer, making sure it is toward you, then place it back into its holder.

4. Slide the plastic retainer all the way down into its channel. Part of the retainer remains above its holder to hold the handset secure for the wall mount configuration.

5. Turn the telephone over and unplug the line cord. If the cord is not plugged into the wall jack assembly, reroute the line cord through the access channel on the top of the telephone. If the line cord is plugged into the wall jack assembly, run the line cord through the hole provided and plug it into the connector on the back of the telephone.

6. Line up the hooks on the top and bottom of the wall mount bracket so they can engage with the slots cut into the bottom of the telephone base. Insert the bottom hooks first.

7. Slide the mounting bracket slowly downwards until the top tabs slide into the top slots and snap into place.

8. Match the two key hole slots on the base plate with the lugs on the 630-A type jack and align the modular connector, then slide the telephone into place.

9. Place the handset onto the retainer.

   The telephone is now ready to use.

Mounting Bracket Tabs

Wall Mounting Holes
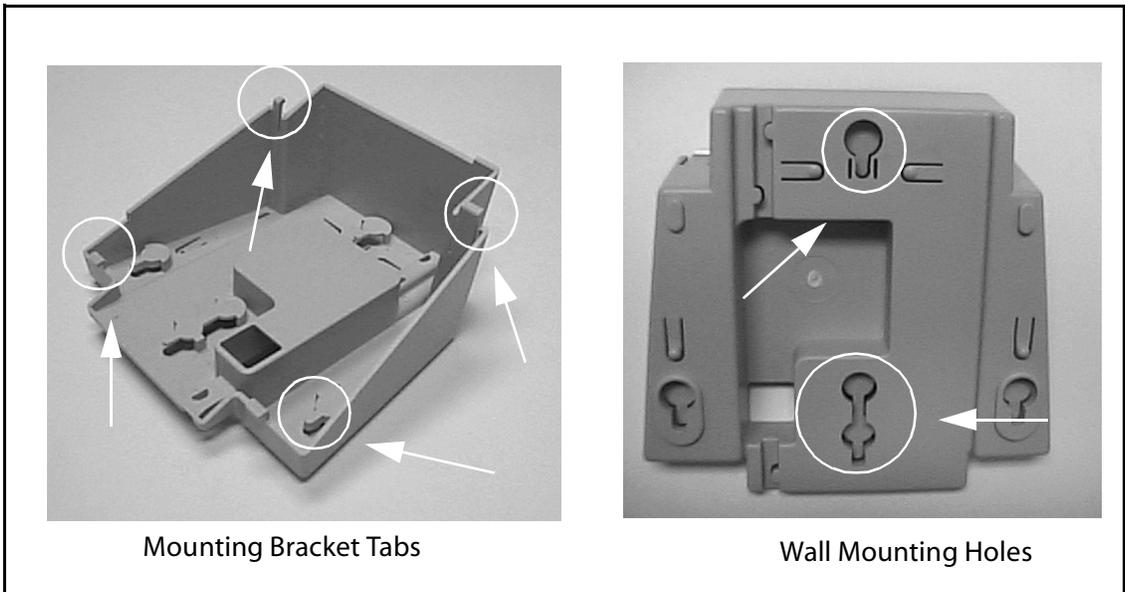
Figure 2-14: Digital Key Telephone Wall Mounting

Headset Installation

The *STARPLUS Triad-S™* digital key telephones were designed to operate with industry standard electret mic compatible modular headset adapters and operator headsets.

Modifying Digital Telephone to Support External Headset

1. Plug the headset adapter cord into the vacant handset jack on the key telephone base.
2. Plug the telephone handset cord into the headset adapter box where indicated by the headset manufacturer's instructions.

   Refer to *Station Programming* in the *System Programming Manual* for instructions on enabling headset operation. After programming, the station can enable or disable headset mode by dialing a code. When headset mode is active at the station, the ON/OFF button controls the on-hook or off-hook status. While headset mode is active, features such as on-hook dialing and hands free speakerphone operation are inoperable.

Caller ID Interface Unit Installation

The Caller Identification Interface Unit receives the data from the telephone company and sends the data, in ASCII RS-232C format to the KSU.

Connecting the Cable Port (9081-00)

1. Select the correct RS-232 cable.
2. Connect one end of the cable on the desired MSIB I/O port (1 or 2).
3. Connect the other end to the 1480-00 I/O port marked RS232.

   Figure 2-15 illustrates the connections for the TCI Caller ID Interface Unit.
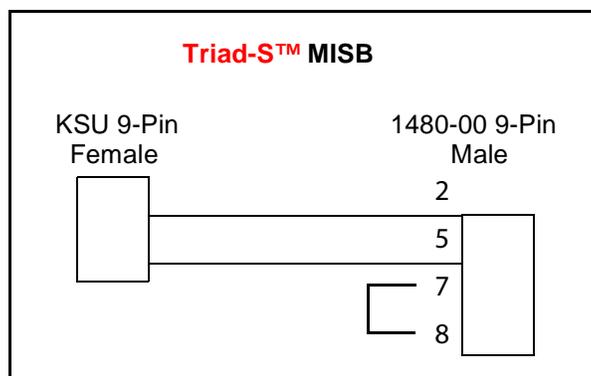
Figure 2-15: Caller ID Cable Connections

Switch Settings

S1 dip switches select the signaling protocol of the RS-232 OUT connector to assist in matching signals from the 1480-00 with those of the DTE device. S2 dip switches control two major functions:

☐ Switches 1-5 configure the 1480-00 to the DTE device for baud rate, data bits, and parity.

☐ Switches 6-8 select the unit number for the 1480-00 when multiple units are connected in series. If a single unit is used, switches 6-8 are set for Unit #1.

Set the switches on the 1480-00 as follows:

		S1	**S2**
(UP)	**On**		
(DOWN)	**Off**		
		1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
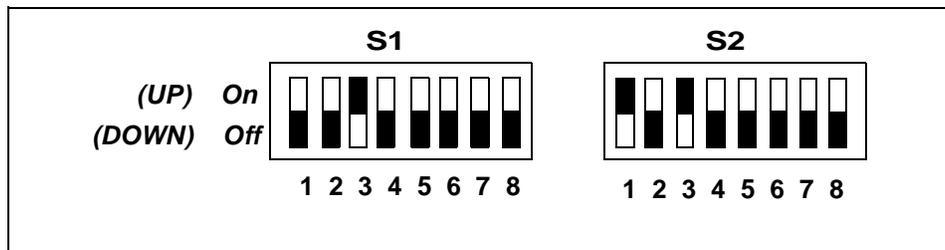
Programming Caller ID

ICLID Enable

1. Verify the programming for ICLID enable, ✳✳3226, Flash 56.
2. Press Button [1].
3. Dial [1] on the keypad and press HOLD.

I/O Ports

1. Verify the programming for the I/O ports, ✳✳3226, Flash 15.
2. Select the I/O port, Button 1, 2 (SIU1, SIU2).
3. Dial [5] on the keypad and press HOLD to select 2400 baud.

CO Lines

1. Verify the programing for the CO lines, ✳✳3226, Flash 40.
2. Enter the CO line range for the Caller ID Unit.
3. Press HOLD.
4. Press Button [21] (Page C).
5. Press Button [2], ring delay timer.
6. Enter 04 (minimum) and press HOLD.
7. Reset the system and Caller ID Unit.

SMDR

The SMDR feature provides detailed records of all outgoing and/or incoming, long distance only or all calls. The SMDR Qualification Timer determines the time needed to determine a valid SMDR call for reporting purposes. By default, this timer is set to 30 seconds and is variable from 00-60 seconds in one second increments. This feature is enabled or disabled in system programming. By default, SMDR is disabled and set to record long distance calls only.

A printout format of 80 characters maximum or 30 characters maximum may be selected in system programming. The standard format is 80 characters per line. A 30 character format generates three lines per message.

If the SMDR feature is enabled, the system starts collecting information about the call as soon as it starts and terminates when the call ends. If the call was longer than 30 seconds, the following information is printed:

```
80 character format - Outbound Call to a Dialed Number:
         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
AAAA BBB HH:MM:SS HH:MM MM/DD/YY HCCCCCCCCCCCCCCCCCCCCCCCCC GGGGGGGGGGGG (CR)(LF)
STA  CO TOTAL    START   DATE   DIALED
1100 001 00:00:38 13:57 01/15/01 O2956006
```

```
80 character format - Outbound Call to an Extension:
         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
AAAA BBB HH:MM:SS HH:MM MM/DD/YY HCCCCCCCCCCCCCCCCCCCCCCCCC GGGGGGGGGGGG (CR)(LF)
STA  CO TOTAL    START   DATE   DIALED
1100 031 00:00:08 13:58 01/15/01 O2108                                        **
  **CALL TO HOWARD
```

```
80 character format - Outbound Call to an Extension:
         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
AAAA BBB HH:MM:SS HH:MM MM/DD/YY HCCCCCCCCCCCCCCCCCCCCCCCCC GGGGGGGGGGGG (CR)(LF)
STA  CO TOTAL    START   DATE   DIALED
1102 031 00:00:11 13:59 01/15/01 O2101                                        **
  **CALL TO STA2101
```

```
80 character format - Inbound Call from an Extension:
         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
AAAA BBB HH:MM:SS HH:MM MM/DD/YY HCCCCCCCCCCCCCCCCCCCCCCCCC GGGGGGGGGGGG (CR)(LF)
STA  CO TOTAL    START   DATE   DIALED
1100 031 00:00:03 13:59 01/15/01 I2108                                        **
  **HOWARD CALLING                                  - continued on next page -
```

```
80 character format - Inbound Call to a Station From CO Line 1 with No Caller ID:
         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
AAAA BBB HH:MM:SS HH:MM MM/DD/YY HCCCCCCCCCCCCCCCCCCCCCCCCC GGGGGGGGGGGG (CR)(LF)
STA  CO TOTAL    START   DATE   DIALED
1100 001 00:00:04 13:59 01/15/01 I
```

```
LEGEND:
 - AAAA = Station originator or Trunk on DISA and Off-Net (CO Line) calls.
 - BBB  = Outside line number
 - HH:MM:SS = Duration of call in Hours, Minutes and Seconds
 - HH:MM = Time of day (start time) in Hours and Minutes
 - MM/DD/YY = Date of Call
 - H = Indicates call type:
     "I" = Incoming*
     "O" = Outgoing
     "T" = Transferred*
     "U" = Unanswered calls for ICLID SMDR call records
 - CC....CC = Number dialed
 - GG....GG = Last Account code entered (optional)
 - (CR) = Carriage return
 - (LF) = Line Feed
```

Figure 2-16: SMDR Printout

3   System Check-Out

Prior to actual power up and initialization, check out the *STARPLUS Triad-S™* System to avoid start up delays or improper loading. A step-by-step checklist is provided for this purpose.
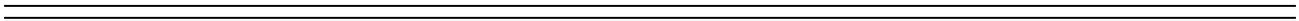
Preliminary Procedures

1. Make sure the Basic Key Service Unit (BKSU) is properly grounded to cold water pipe or earth ground.
2. Verify that all expander modules are firmly seated onto their connectors.
3. Inspect the MDF for shorted wiring and improper polarity that would affect the Digital Terminal or DSS console.
4. Make certain the lithium battery switch (SW2) on the MBU of the BSKU is set to the ON position to enable the battery backup option.
5. Make sure the MDF cables connected to the KSU are secure and are plugged into the correct position.

Power Up Sequence

The power up sequence involves 1) the proper application of AC power to the system and 2) defaulting the system. A successful power up is assured if the installation checklist is followed.

1. Plug the AC power cord of the Key Service Unit into the dedicated 117V AC outlet.
2. Remove the BKSU cover, set SW1 on the MBU to the ON position. Set (SW2) (BATT) to the ON position.
3. Turn the power switch of the KSU to ON.
4. Set (SW1) on the MBU to the OFF position to retain changes to the database.

   The system is ready for programming. If problems occur, refer to *Chapter 4, "Maintenance and Troubleshooting."*

Table 3-1: Power Supply Tests

Voltage Destination	Voltage Reading	Test Point Location
117V AC	+117V AC, ±10%	Commercial Power Source

4 Maintenance and Troubleshooting

This chapter provides a guideline for isolating and resolving functional problems that may be encountered due to improper use or component failure of the *STARPLUS Triad-S™* Systems. Other failures, such as no dial tone from the central office, must also be considered as an overall troubleshooting procedure.
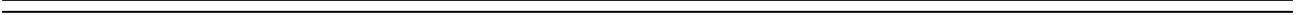
System Programming and Verification

System operation should be verified as per the programmed customer database once all customer database programming is completed. A hard copy of the customer database can be printed from the system and should be kept on-site and up to date for future reference.

System must be initialized before the customer database is programmed.

The *STARPLUS Triad-S™* Systems are highly-featured digital switches and, as such, feature activation can sometimes be mistaken for improper operation. First, verify all programmable features are enabled for the phone or function in question. Then compare the suspected improper operation with the feature operation description to determine which feature is causing conflict. Be aware that some features can *override* others and take precedence in operational priority. Then make the necessary programming changes in customer database programming to acquire the desired operation.

If feature operation is not the cause of the suspected problem, then general troubleshooting procedures should be employed. Use these basic guidelines to determine the cause of a reported problem:

1. Verify that system programming is correct and that the suspected feature, circuit or function was enabled in programming.
2. Check the installation cabling/wiring and connectors for cuts, shorts or loose connections.

   By verifying correct operation for each segment of the installation and system, the source of the problem is isolated and can thereby be identified and resolved.

Telephone and Terminal Troubleshooting

This section discusses general functions on a variety of key telephones and terminals available for use on the system. It is assumed that basic troubleshooting skills in the identification and resolution of basic problems are already possessed (e.g., static/noise heard on conversation, one phone only; Replace worn handset cord).

Chapter 4 - Maintenance and Troubleshooting

Keyset Self Test

The *STARPLUS Triad-S™* System contains a test mode feature that supports the off-line testing of digital keysets and DSS units. The term off-line means that the unit under test is operationally disconnected from the switch during the test operation. Keysets not under test continue to operate in the normal manner. Tests are provided to verify the keyset and DSS LED, LCD, and keyboard button operations.

☐ The test mode is entered by taking a keyset's handset off hook.

☐ Pressing the SPEED button and dialing [7#] on the dial pad disconnects the keyset from the system and brings up the Test Mode Menu on the keyset's LCD. The test mode is exited by putting the handset back on hook. This reconnects the keyset to the system.

Test Mode Menu -- The menu allows the operator to select a test mode by pressing the mode number at the dial pad. The operator can always return to the main test menu by pressing [##].

```
SELECT 1:LCDLED  2:KEYBTN  3:DSSBTN
```

Keyset LCD/LED Test

This test outputs a series of continuously repeated LCD string messages to LCD lines 1 and 2. The set of strings consists of the letters A through X and a through x. The next set of strings are:

```
"PICKUP  TRUCK  SPEED  ZONE !"
"*** STANDING BACK ***"
```

The strings are alternately displayed on lines 1 and 2 of the LCD display.

Keyset Button Test

1. Press a keyset button to turn on the LED and display an LCD message identifying the button number.

```
PRESS KEYSET BUTTONS
DIGIT1                    <--------
```

Each time the selected button is pressed it sequences through the table of flash rates available.

Table 4-1: Flash Rates

Button	IPM	Type
01	On	Steady
02	30	Flash
03	60	Flash
04	60	Double Wink
05	240	Flash
06	240	Flutter
07	480	Flash
08	480	Flutter
09	15	Flash
10	120	Flash
11	120	Flutter
12	30	Double Flash
13	480	Double Wink
14	480	Double Flash

2. Press the dial pad keys to display an LCD message that indicates which digit was pressed.

   Depressing the H-T-P switch from one position to another displays one the following words: H_POS, T_POS, or P_POS.

3. Test LEDs independently of the Keys by pressing the flex LED button.

DSS LED/Button Test

When the DSS test is selected and a DSS test is invoked, ALL DSS units associated with the keyset are placed in the test mode.

```
PRESS DSS BUTTONS
                              <----------
```

If no DSS unit is associated with the keyset, the keyset display indicates NO DSS. The DSS LED test causes all the LEDs to light steady. All LEDs remain lit steady until a DSS flex button is pressed. Pressing a DSS button turns on the DSS button LED and displays an LCD message on the associated keyset identifying the DSS button number (01 to 48). This button also turns off the previously selected flex LED.

```
PRESS DSS BUTTONS
BTN01                         <----------
```

Conditions

Test mode interrupts the normal operation of a keyset or DSS.

Key Telephones/Terminals

The following actions apply to multi-line key telephones:

Table 4-2: Key Telephones/Terminals

Symptom	Action
No power to keyset	Verify that keyset is connected to correct type of station card.
No handsfree answer-back on intercom	On digital keysets, the mode of intercom answer is programmable.
CO line/station button will not access CO line/station	Check flexible button programming for that button.
Speakerphone does not work	Check station programming for speakerphone enable.
	Verify phone is a speakerphone model.
Cannot call another intercom station	Check off hook preference programming.
No camp-on signals or override to phone	Check station programming for override enable

Single Line Telephones

The following applies to all 2500 type single line telephones connected to the system.

Table 4-3: Single Line Telephone

Symptom	Action
Phone will not dial out	Verify correct SLT type programmed in station identification. Verify line group access programming.
No ringing to phone	Check CO line ringing assignments in programming.
Message waiting lamp does not work	Check station ID assignment in programming.
	Make sure the MSGU is installed on the CSIB.
Cannot call another intercom station	Check off hook preference programming. Put all unused CO lines in a CO line group not currently being used.

DSS/DLS Console

The following applies to DSS/DLS Consoles:

Table 4-4: DSS/DLS Console

Symptom	Action
Buttons on DSS/DLS do not function as labeled	Check station identification assignment in programming for correct DSS map assignment.
Pressing buttons on DSS does not activate keyset	DSS must be assigned to keyset in station ID programming.
No power	Verify unit is connected to the correct type station board (digital or electronic).

CO Line Card Functions

The system can be equipped with either a CKIB or CSIB line interface card. Each card type contains three (3) Loop Start CO lines.

Table 4-5: CO Line Loop Start Board (CKIB/CSIB Board)

Symptom	Action
3 loop start CO lines on the system do not work	Check or change card. Check CO line demarcation.
CO line(s) does not ring	Check CO line ring assignment in programming.
Noise or cross-talk on the line	Check CO line at demarcation for cross-talk. Check with different card at different station.

System Functions

The following functions are related to system resources and the common equipment boards controlling them.

Table 4-6: System Functions

Symptom	Action
Basic KSU and MBU	
Complete system failure	Verify that power switch is on, power cord is plugged in. Check power LED on MBU (left edge of card). Verify PMU was installed with software.
Any correctly activated feature does not work properly	Check system programming related to specific feature.
Loss of system intercom dial tone and call processing tones	Check off hook preferences, headset mode, and verify on another telephone.
Loss of customer database programming	Verify status of initialization switch, database backup battery connection, battery voltage, and system programming.
Customer database cannot be programmed	Verify that no one else is accessing database programming. Check RS232 cable and verify programming was performed from Station 100.
Modem Unit (MODU)	
Cannot access system database programming remotely	Verify modem installation and programming. Check modem baud rate.
Miscellaneous Interface Service Board (MISB)	
Music Channel 2 is not functioning	Verify MSU is installed and check music source.
Cannot communicate with external devices	Check the baud rate programming and the COMM port selection and cable.
DTMF Receiver Unit (DTMF-A)	
DTMF single line telephones cannot dial out	Verify DTMF-A is installed.

Remote Maintenance

General Overview

The Remote Maintenance feature allows authorized personnel to survey system, slot configuration information and programming. This can be done through the optional modem or data terminal connected via the RS-232C port on the optional MISB Module. The commands are entered from a keyboard and are limited to those listed.

Overview of Maintenance Commands

There are four basic commands available in the Remote Maintenance feature. All commands begin with a single character, followed by a space, another character and an optional digit or digits. All commands are terminated with the <Enter> key.

Maintenance Password

The Maintenance feature, like Programming, is entered via a six-character alphanumeric string. The password prompt is given by pressing <Enter> at the device connected to the RS232 port. After the prompt displays, enter the password, then press <Enter>. Proper entry of the password displays the maintenance prompt. The Maintenance password is: CONFIG

Exit Maintenance

The Exit command terminates the current Maintenance feature session. The Exit command format is: maint>x

```
maint>?
command list:
 c       - clear log error trace
 d s[nn] - dump system or slot configuration data
           [nn] specifies an optional slot number parameter
           no parameter indicates that the entire system will be dumped
           examples:
                       maint>d s    (dumps entire system configuration)
                       maint>d s2   (dumps slot 2 configuration, etc.)
 d b    (dumps busy device.)
 d e    (dumps event trace.)
 d p    (dumps pp que error counts.)
 r cxxx (reset coline)
 r kxx  (reset cab/slot)
 r sxxx (reset station)
 d r    (dumps RCVR configuration.)
 d r01  (toggle RCVR 01 stat & dumps configuration)
 f p    (flush pp que error counts)
 t0..4  - set trace (off,soft start,cold start,soft/cold start,error
log
 x      - exit maint
 ?      - help menu
```

Figure 4-1: Maintenance Help Menu

System Configuration

Figure 4-2 is a configuration of the *STARPLUS Triad-S*™ System and displays what is printed when the installer types **d<space>s** at the maint> prompt.

```
maint>d s
  SLOT        CARD   CKTS    SERV STAT    BRD OPTS    FW VER.
---------     ----   ----    -----------  ----------  ---------
  00          LCOB    3         INS           0         00-0
  01          DTIB    8         INS           0         00-0
  02          LCOB    3         OOS           0          -0
  03          DTIB    8         OOS           0          -0
  04          LCOB    3         OOS           0          -0
  05          DTIB    8         OOS           0          -0
  06          LCOB    3         OOS           0          -0
  07          DTIB    8         OOS           0          -0
              MPB               INS          V44       P01-FFFF
 OPTION       MISB              INS                     00-0
 OPTION       MEMU              INS                     00-0
```

Figure 4-2: System Configuration

Where:

☐ **Column 1** lists the card slot.

☐ **Column 2** lists card type of that card slot.

☐ **Column 3** lists card status:

OOS status can indicate the entire card is out of service, or a specific station is not installed or installed but not operational.

INS status can indicate a specific station is installed and operating correctly.

☐ **Column 4** lists card options.

☐ **Column 5** lists firmware version of card.

Station Configuration

Figure 4-3 illustrates what is printed out when the installer types **d<space>s1** at the maint> prompt.

```
maint>d s1
   SLOT      CARD   CKTS    SERV STAT    BRD OPTS    FW VER.
 ---------   ----   ----   -----------  ----------  ---------
    01       DTIB    8        INS           0          00-0

   STA
 FLEX-FIX-PORT    TYPE          STATUS    LCD    STATE
 -------------  --------      ----------  -----  -----
  100-100-005   SP 24BTN        INS        Y     IDLE
  101-101-006   SP 24BTN        INS        Y     IDLE
  102-102-007   SP 24BTN        INS        Y     IDLE
  103-103-008   SP 24BTN        INS        Y     IDLE
  104-104-009   DVM             INS        N     IDLE
  105-105-00a   DVM             INS        N     IDLE
  106-106-00b   SP 24BTN        OOS        N     KEY_ID_UN
  107-107-00c   SP 24BTN        OOS        N     KEY_ID_UN
```

Figure 4-3: Station Configuration

Column	Indicates:
1	Station Number
2	Station Type (keyset, DSS, SLT)
	Keyset - ID 0 = Key station
	DXX 1 = DSS Map 1 DXX 2 = DSS Map 2 SLT - ID 6 = SLT SLT w/Lamp - ID 7 = SLT w/Message Waiting
3	Status: ☐ **OOS** status can indicate the entire card is out of service; a specific station is not installed; or installed but not operational. ☐ **INS** status can indicate a specific station is installed and operating correctly.
4	Whether or not the station has an LCD Display
5	State of the device

CO Line Configuration

Figure 4-4 illustrates a representation of what is printed out for slot two when a LCOB is installed in that slot and:

The installer types **d<space>s2** at the `maint >` prompt.

```
maint>d s2
   SLOT        CARD    CKTS    SERV STAT     BRD OPTS     FW VER.
 ---------     ----    ----   -----------   ----------   ---------
    02         LCOB     3        OOS             0           -0

  CO-PORT         STATUS      Grp Type   PULSE/DTMF   CO/PBX   STATE
 --------    ----------------  ---  ----   ----------   ------   -----
   4-00d     OOS, Bothway      1    2       DTMF         CO      WAIT_IDLE
   5-00e     OOS, Bothway      1    2       DTMF         CO      WAIT_IDLE
   6-00f     OOS, Bothway      1    2       DTMF         CO      WAIT_IDLE
```

Figure 4-4: CO Line Configuration

Column	Indicates:
1	CO Line Number
2	Status: □ **OOS** status can indicate the entire card is **o**ut **o**f **s**ervice. □ **INS** status can indicate a board station is **in-s**ervice and operating correctly. Incoming = Incoming CO line calls are allowed Outgoing = Outgoing CO line calls are allowed Bothway = Both incoming and outgoing CO line calls are allowed For example, Outgoing Enabled indicates the CO line is active in the system. Outgoing Disabled indicates that the Attendant has disabled the CO line for outgoing access.
3	CO Line Group Number
4	CO Line Type: □ 0 = None □ 1 = Data □ 2 = Loop Start □ 3 = Ground Start □ 4 = DID □ 5 = TIE □ 6 = TIE-DNIS □ 7 = TIE-ANI
5	Whether CO Line is Pulse or DTMF (programmable option)
6	Whether CO Line is a CO Line or a PBX Line (programmable option)
7	CO line State

Event Trace Buffer

The Event Trace Buffer is used to store and dump event traces (up to 30) that occur just prior to a *STARPLUS Triad-S™* System soft or hard restart. These can then be reviewed by authorized personnel to aid in system troubleshooting.

The basic format for the commands are as follows:

Table 4-7: Event Trace Buffer Commands

Command	Function
t<space><return>	Displays the current status of the Event Trace Buffer.
t<space>0<return>	Turns the Trace buffer OFF.
t<space>1<return>	Turns the Trace buffer ON to record events prior to a soft system reset.
t<space>2<return>	Turns the Trace buffer ON to record events prior to a hard system restart.
t<space>3<return>	Turns the Trace buffer ON to record events prior to either a soft reset or a hard system restart.
d<space>e<return>	Dumps Trace Events stored from last system reset (soft or hard).
d<space>b<return>	Permits maintenance personnel to determine the busy status of all the busy keysets and CO Lines in the system, including the T1 lines.
r<space>sXXX<return>	Permits a specific station to be reset.
r<space>cXXX<return>	Permits a specific CO Line to be reset.

Press the Esc key to abort the Data Dump and return to the `maint>` *prompt.*

DTMF Receiver Trace

The CONFIG utility allows technicians to take specific DTMF receivers in/out of service. This is useful for troubleshooting DTMF receiver problems to isolate a specific DTMF receiver that may be faulty.

1. Connect a PC with communication software to the I/O port 1 on the MISB.
2. At the ENTER PASSWORD> prompt, type **CONFIG** and press [ENTER].

Basic Format for Commands:

d<space>r<return> - to display the status of all DTMF receivers in the system.

The display shows the receiver number, cabinet location, card slot location, receiver status, and state of the receiver.

Making a Receiver Busy:

d<space>rXX<return> - Where XX is the specific receiver number to make busy.

Making a Receiver Available:

d<space>rXX<return> - Where XX is the specific receiver number to make available.

Remote System Monitor

General Overview

The Remote System Monitor feature provides access to the installed system for diagnostic purposes. These capabilities benefit service personnel enabling them to support the end user.

Different levels of access, via password, allows authorized personnel to trace, monitor and upload critical information directly from the *STARPLUS Triad-S*™ System. This provides a more accurate means of acquiring system information that leads to a quick resolution of problems that may occur. This is all done without interfering with ongoing call processing or normal system operation, and in many cases may be performed without a site visit. The optional 9600 baud modem is used for remote access.

Capabilities allowed and reserved for this high level troubleshooting include the following:

☐ Monitor Mode
☐ Enable and Disable Event Trace
☐ Dump Trace Buffer (up-load)

Monitor Password

The Monitor feature, like Maintenance, is entered via a six-character alphanumeric string. The password prompt is accessed by pressing the <Enter> key at the PC connected to the MISB. After the prompt displays, type the password, then press <Enter>. Proper entry of the password results in the mon> prompt. The Maintenance password is: ETRACE

The Remote Monitor feature is intended for use only under the guidance and instruction by authorized personnel from VODAVI Technical Support. Care and caution must be observed when using this feature as permanent damage to the software structure can occur.

Help Menu (?)

A convenient Help Menu is provided by typing [**?**]**,** then pressing <Enter>. The following screen displays:

```
mon>?
command list:
 ?         - help menu
 a board   - board-cmd slot,cmd,data1,data2
 b rate    - set baud rate
 c [c]     - dump co data
 d [a][a]  - dump memory
 e [s]     - dump prot sta data
 f         - flush minor alarm log
 g [s]     - dump local sta data
 h         - hdlc status report
 k         - key-cmd sta,cmd,data1...data17
 l         - display minor alarm log
 m add     - modify memory
 n         - display stack trace
 p         - Send Sta Event (Sta Event Data1 Data2)
 q         - Send Sta Event (Sta Event Data1 Data2) & exit monitor
 s [s]     - dump sta data
 t [d]     - set trace key
 x         - exit monitor
```

Figure 4-5: Help Menu

Dump Memory Data

Three options allow the memory structure to be dumped for viewing. The options are entered as follows:

c [c] – Dump CO Line memory structure

s [s] – Dump Station memory structure

d [a][a] – Dump a memory address structure

The data obtained from these commands is in hexadecimal format and is used primarily for manufacturer-level support.

Press the Esc key to abort the Data Dump and return to the mon> *prompt.*

Event Trace Mode

The T command enables and disables the *STARPLUS Triad-S*™ System Trace mode. While the trace mode is enabled events for the trace desired displays on the monitor, printer or PC connected to the *STARPLUS Triad-S*™ System. To view the current status of the trace mode type [**t**] and press <Return> at the mon> prompt, the following screen displays:

```
mon>t

Cmd    Messages     Y/N
---    --------     ---
 B - BOARD EVT  -> N
 C - COL States -> N
 D - Dev PP Cmd -> N
 E - Error Msg  -> N
 H - H/W States -> N
 I - CTI PP Msg -> Y
 K - LCD PP Cmd -> N
 L - LED PP Cmd -> N
 M - MSC States -> N
 P - PCM        -> N
 Q - Que Evt    -> Y    Trace ALL
 S - Stn States -> N

mon>
```

Figure 4-6: Trace Mode Status

1. To enable an Event Trace, type **t<space>** (space bar).
2. Indicate type of trace desired [d], where d is determined as follows:
   - B = Board event trace (traces events associated with PCB)
   - M = Miscellaneous State event trace
   - P = Pulse Coded Modulation (PCM) traces events associated with voice communications
   - C = CO Line (LCOB) States (traces events associated with CO Line activity)
   - S = Station (STA) States (traces events associated with Station activity)
   - E = Error Messages (traces error messages)
   - Q = Queue (QUE) Events (traces queuing events: DTMF receiver, UCD, LCR, etc.)
   - D = Device Command (traces commands to peripheral devices)
3. Enter the specific board, CO line or Station number of the trace desired, or type all when all boards, CO lines or Stations events are desired.
   001-012 = CO Line port
   100-131 = Station location
   All = All Boards, CO lines or Stations

4. Press <Enter> to enable the trace. A screen similar to the following displays:

```
mon>t b

Cmd    Messages    Y/N
---    --------    ---
 B - BOARD EVT  -> Y
 C - COL States -> N
 D - Dev PP Cmd -> N
 E - Error Msg  -> N
 H - H/W States -> Y
 I - CTI PP Msg -> N
 K - LCD PP Cmd -> N
 L - LED PP Cmd -> N
 M - MSC States -> N
 P - PCM        -> N
 Q - Que Evt    -> N
 S - Stn States -> N

mon>
```

Figure 4-7: Enable Event Trace

5. To disable or turn off a particular trace mode, *do not enter* a specific board, CO Line or Station Number (e.g., **t<space>s<return>** to disable station event trace).

To have event traces displayed on the screen, exit the MONitor mode by typing **X** at the mon> prompt. After exiting the event(s), the trace begins as shown in *Figure 4-8* .

> *Unless instructed by personnel at Vodavi Technical Support, do not leave the trace mode enabled for extended time periods. The system dumps the requested event(s) trace which may use up paper or fill memory buffers on the collecting device. It is recommended that the trace events be disabled (turned off) for all event(s) traces before leaving the system site unless otherwise instructed by Technical Support.*

Modify Memory Command

The Modify Memory command is for *engineering use* only.

> *Using this command can alter or damage the Triad-S™ System operating database which can result in system malfunction. If this occurs, power the system down and re-initialize the database, then completely reprogram the customer programming data.*

Exit the Monitor Mode

The Exit command terminates the current Monitor enable/disable session. If Event(s) Trace was or is still enabled, event records display only after exiting the MONitor mode. The Exit command format is: mon> x

```
mon>x
DATE: 02/19/XX TIME: 10:46:33
exiting monitor...

Sta 100: State= IDLE, Evt= Dial Pad (26), Data=1
Sta 100: State= DIALING, Evt= Dial Pad Release (31), Data=1
Sta 100: State= DIALING, Evt= Dial Pad (26), Data=10
Sta 100: State= DIALING, Evt= Dial Pad Release (31), Data=10
Sta 100: State= DIALING, Evt= Dial Pad (26), Data=2
Sta 100: State= DIALING, Evt= DSS (60), Data=2
Sta 100: State= WAIT_DSS_SZ_RSP, Evt= Seize Nak (15), Data=1
Sta 100: State= MISC_TONE, Evt= Dial Pad Release (31), Data=2
Sta 100: State= MISC_TONE, Evt= Key Data (27), Data=52
Sta 100: State= MISC_TONE, Evt= Mon Key (145), Data=-1
Sta 100: State= MISC_TONE, Evt= On Hook (17), Data=0
Sta 100: State= IDLE, Evt= Seize (14), Data=10
Sta 100: State= RINGING, Evt= Aux (34), Data=0
Sta 100: State= RINGING, Evt= Ring Update T/O (151), Data=0
Sta 100: State= RINGING, Evt= Key Data (27), Data=52
Sta 100: State= RINGING, Evt= Mon Key (145), Data=-1
Sta 100: State= TALK, Evt= Ring Update T/O (151), Data=0
Sta 100: State= TALK, Evt= ACD PC Data (254), Data=2
Sta 100: State= TALK, Evt= Key Data (27), Data=52
Sta 100: State= TALK, Evt= Mon Key (145), Data=-1
Sta 100: State= TALK, Evt= On Hook (17), Data=0
```

Figure 4-8: Event Trace

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