

Feature Package 3

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# TRIAD-S Installation

TRIAD<sup>®</sup>

A NEW DIMENSION IN BUSINESS COMMUNICATIONS

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*STARPLUS<sup>TM</sup> Triad-S*

**Installation Manual**

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2	8-99	<input type="checkbox"/> Feature Package 2 {FP2} enhancements have been added. <input type="checkbox"/> Manual content contains extensive revisions.
2.1	12-99	Manual content has been revised.
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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.



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## 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 to be in compliance with the Underwriters Laboratories (UL) 1459. The *Triad-S* System is authorized to bear the NRTL/C marking.

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## 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."*

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## 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."





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# 2

# Installation

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



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## 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
- Keypad and Terminal Installation
- Basic Installation Check-Out
- System Programming and Verification

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

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## 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.

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- The location must have access to a *dedicated* 110 Volt AC ( $\pm 10\%$ ), 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.

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## KSU Installation

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

### *Mounting the Basic KSU*

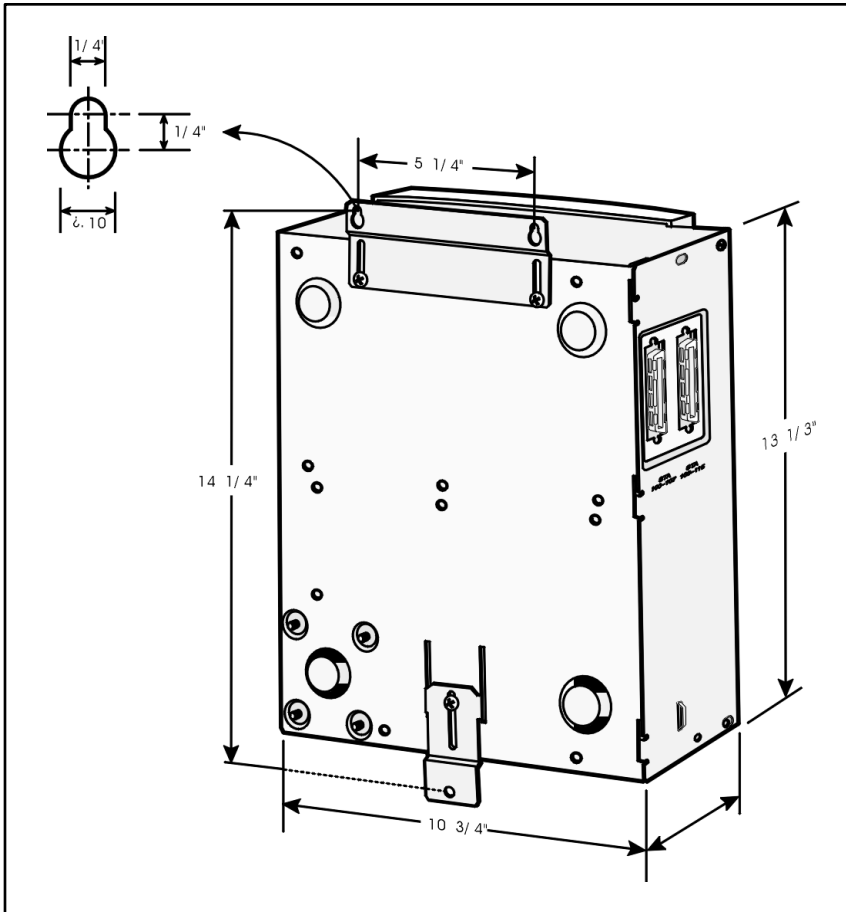
The Basic KSU consists of a plastic cover, a metal base frame designed for wall mounting. Before installing BKSU on the wall, two wall mounting plates that are assembled in the bottom side of the BKSU, must be extended for mounting. The KSU must NOT be mounted on a masonry or dry-wall surface; a wooden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

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### *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.

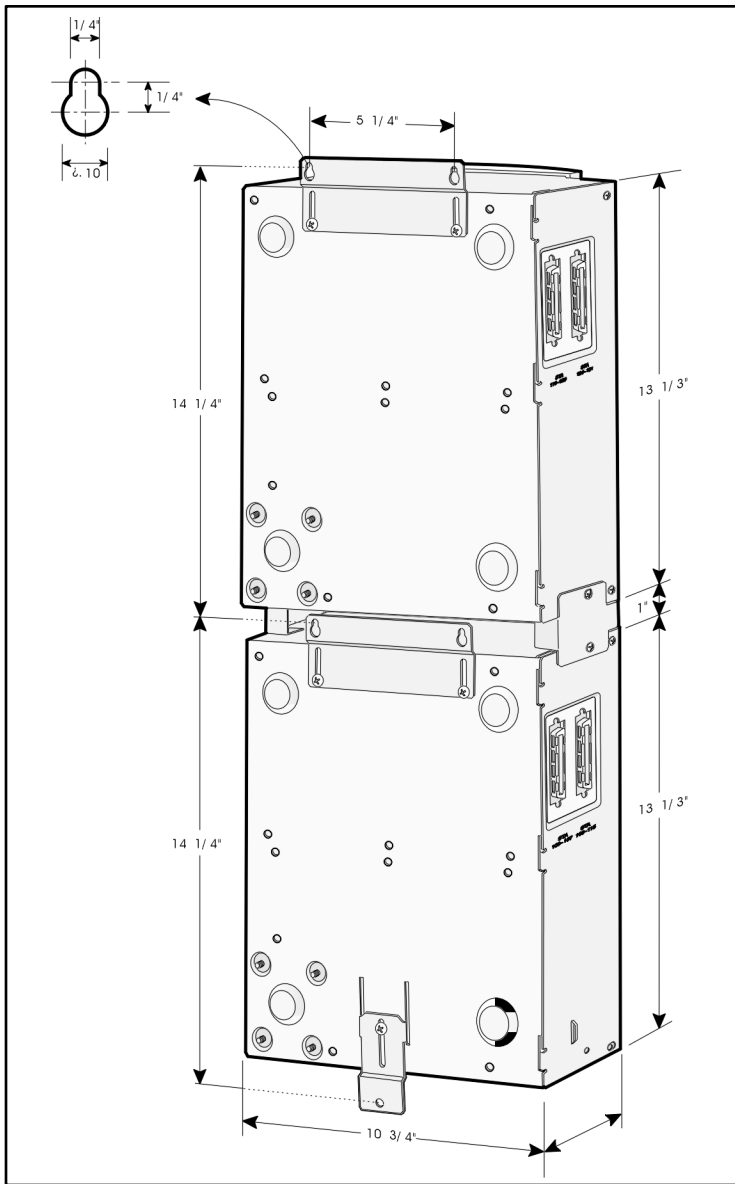
After positioning the EKSU above the BKSU:

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**

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## Battery Charging Unit (BCU) Installation

The BCU provides power for the system during a power failure. The BCU 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 BCU provides charging current to the batteries during normal AC power operation at a maximum of about 0.5 amp. During battery operation, the BCU 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.

<b>Battery Capacity</b>	<b>16 Port</b>	<b>32 Port</b>
10 AH	4 Hour	1.75 Hour
20 AH	8 Hour	3.5 Hour

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## 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.

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## 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.

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## 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-4A for DTMF receiver expansion up to five, and a MISU for two serial ports and a second music source.

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

The MPB provides miscellaneous features:

- ❑ One external page port that is connected to transformers, providing a 600 ohm impedance.
- ❑ One music input that is 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.

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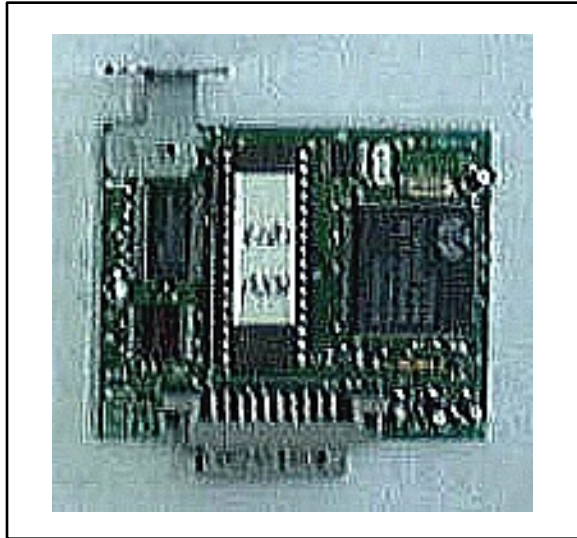
## Modem Unit (MODU)

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 MISU 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 Unit (MISU) Installation

The Miscellaneous Interface Unit (MISU) contains the second external music source (MOH/BGM) and two serial ports.

### Installing the MISU

1. Using a grounding strap, unpack the MISU 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 MISU.
4. Position the MISU so that CN3 matches CN15 on the MPB.
5. Push the MISU onto its connector making sure it is properly seated.
6. Match the screw hole on the MISU PCB bracket with the screw hole on the base frame.
7. Insert a screw and tighten the screws securely.

This completes the MISU installation.

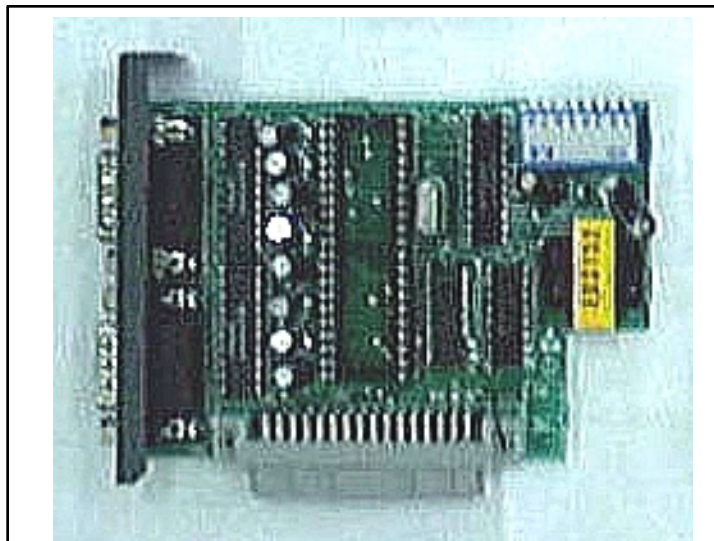


*When the MISU is installed in the **Triad-S** and the system is powered up with dip switches 6 and 7 in the on position, power up will take about 60 seconds. However, if the dip switches are off, power up will take only 20 seconds.*

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

**Table 2-1: MISU 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 Unit (MISU)**

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## DTMF4-A Unit

The DTMF4-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.

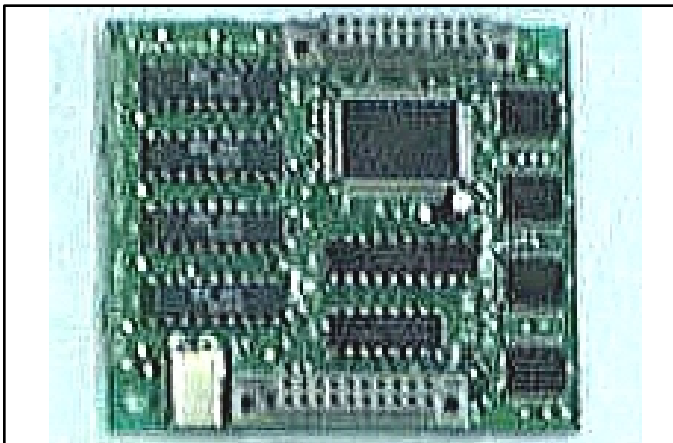


*Previous DTMF receivers in the main BKSU cabinet were not reliable when using voice mail. The effect was that message waiting notification was not consistent after the first notification from an analog voice mail. The DTMF4-A overcomes the reliability problem of the onboard DTMF receiver in the main KSU. Also, revision 1D provided a modification that improved the onboard DTMF reliability.*

### Installing the DTMF4-A

1. Using a grounding strap, unpack the DTMF4-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 DTMF4-A.
4. Position the DTMF4-A so CONN5 and CONN6 match CN13 and CN14 on the MPB.
5. Push the DTMF4-A onto its connector making sure it is properly seated.

This completes the DTMF4-A installation.



**Figure 2-8: DTMF4-A**

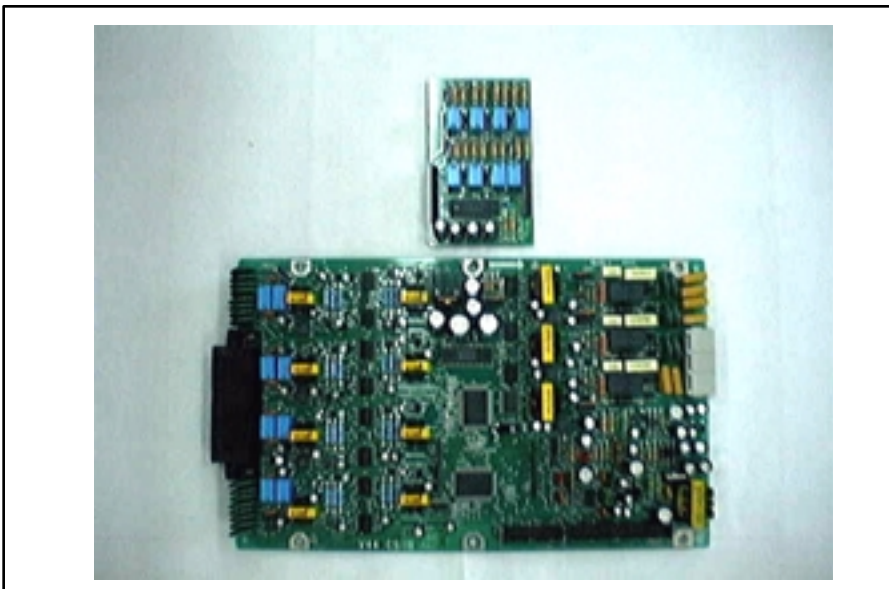
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## Message Wait Unit (MSGU)

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)**

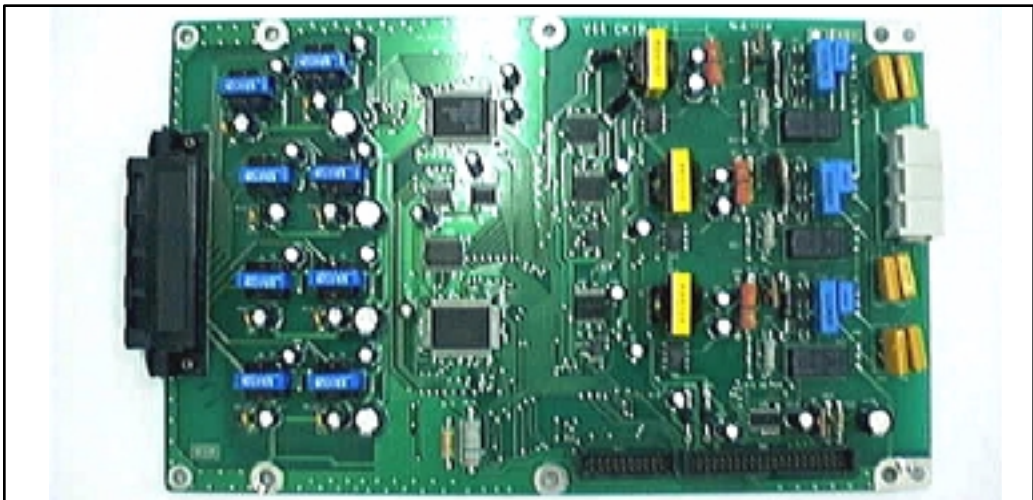
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## CKIB/CSIB Installation

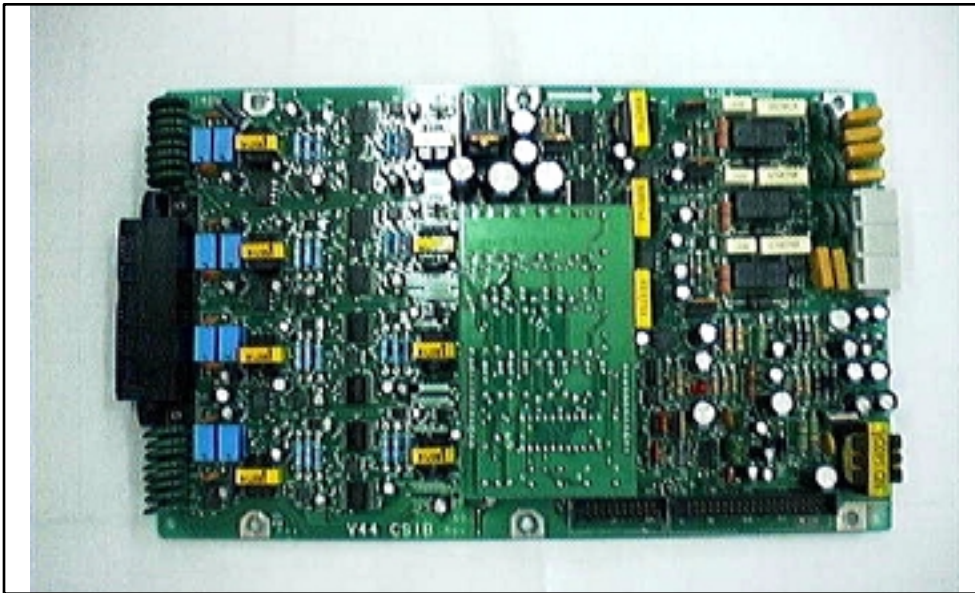
There are two types of expansion boards available: CKIB and CSIB. These boards include 3 loop start CO line interfaces and 8 digital key telephone interfaces (CKIB), or 3 loop start CO line interfaces and 8 single line telephone interfaces (CSIB).

### 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	EXPT EXPR			
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

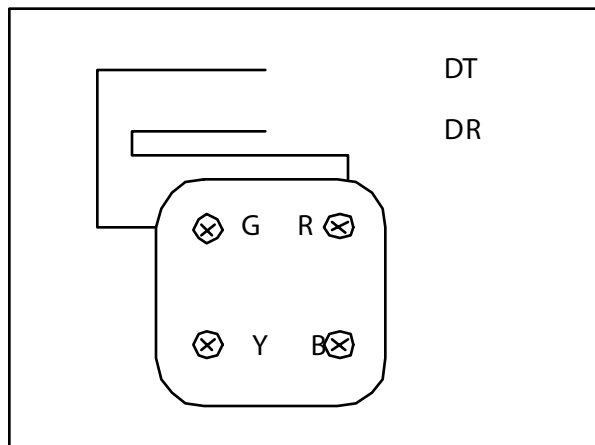
The following provides details on the interconnection of each type station interface board and station jack.



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

### *Digital Keypad*

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.



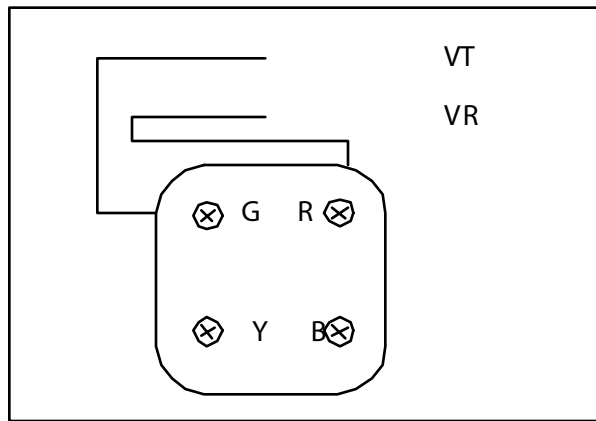
**Figure 2-12: Digital Station Jack Wiring**

---

---

### *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**

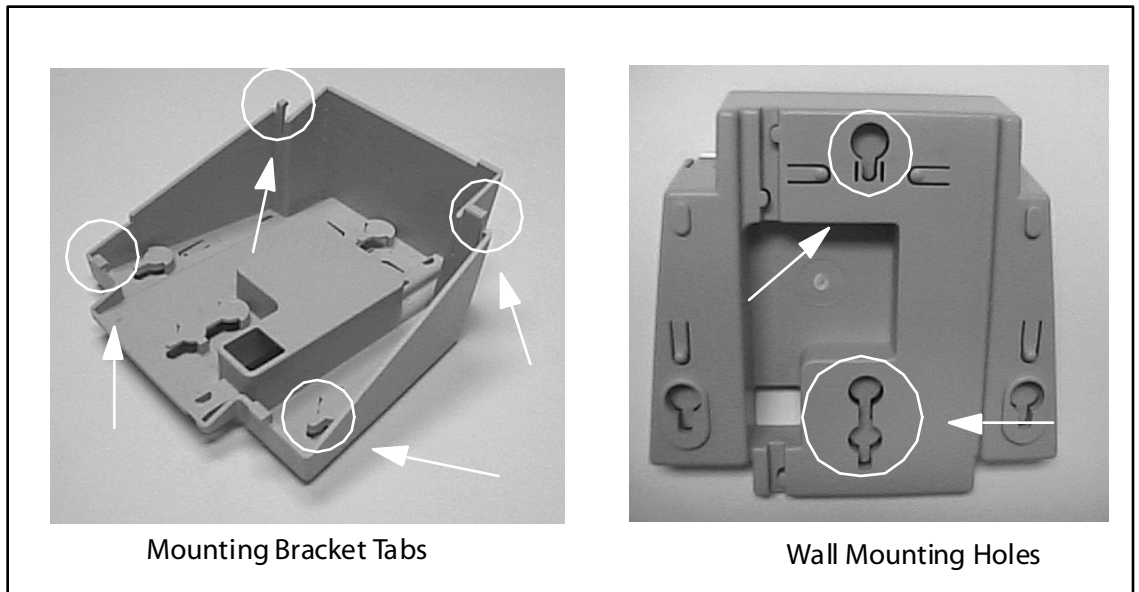
---

## 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.



**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.

---

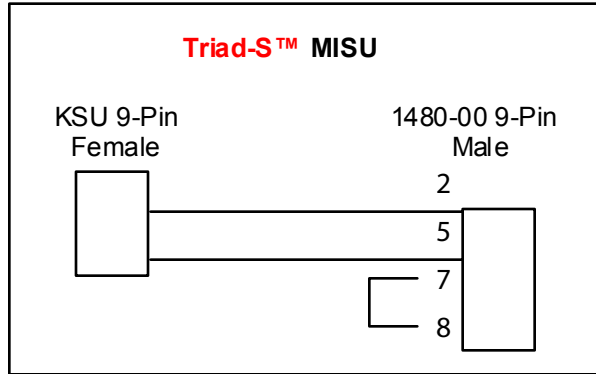
## Caller ID Interface Unit Installation

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.



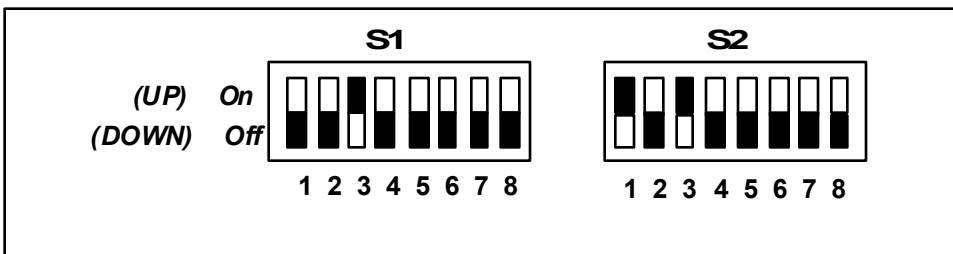
**Figure 2-15: Caller ID Cable Connections**

### 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:



## *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 programming 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:

**Table 2-3: SMDR Printout**

<b>30 character format selected:</b>							
1	2	3					
12345678901	2345678901	234567890					
AAAA	BBB	HH:MM:SS	HH:MM	MM/DD/YY	(CR)	(LF)	
HCC	CCCC	CCCC	CCCC	CCCC	CC	CC	CC
STA	CO	TOTAL	START	DATE			
1116	008	00:02:00	14:13	08/28/00	(CR)	(LF)	
0123456789012345678901234							
123456789012							
<b>80 character format selected:</b>							
1	2	3	4	5	6	7	8
12345678901	2345678901	2345678901	2345678901	2345678901	2345678901	2345678901	234567890
AAAA	BBB	HH:MM:SS	HH:MM	MM/DD/YY	HCCCC	CCCC	CCCC
STA	CO	TOTAL	START	DATE	DIALED	ACCOUNT	CODE
1116	008	00:02:00	14:13	08/28/00	0123456789012345678901234	123456789012	(CR)
<b>80 character format with Call Cost Display feature enabled:</b>							
1	2	3	4	5	6	7	8
12345678901	2345678901	2345678901	2345678901	2345678901	2345678901	2345678901	234567890
AAAA	BBB	HH:MM:SS	HH:MM	MM/DD/YY	HCCCC	CCCC	CCCC
STA	CO	TOTAL	START	DATE	DIALED	ACCOUNT	CODE
1116	008	00:02:00	14:13	08/28/00	0123456789012345678901234	123456789012	(CR)
<b>80 character format for DISA Calls:</b>							
1	2	3	4	5	6	7	8
12345678901	2345678901	2345678901	2345678901	2345678901	2345678901	2345678901	234567890
AAAA	BBB	HH:MM:SS	HH:MM	MM/DD/YY	HCCCC	CCCC	CCCC
STA	CO	TOTAL	START	DATE	DIALED	ACCOUNT	CODE
1116	001	00:02:00	14:13	08/28/00	I	123456789012	(CR)
001	004	00:04:54	14:15	08/28/00	I0123456789012345678901234		
<b>ICLID 30 character format selected:</b>							
1	2	3					
12345678901	2345678901	234567890					
STA	CO	TOTAL	START	DATE			
1000	001	00:00:19	09:32	08/28/00	(CR)	(LF)	
0	480	443	6000	(CR)	(LF)		
123456789012		**	(CR)	(LF)			



**Table 2-3: SMDR Printout**

ICLID 80 character format selected:							
1	2	3	4	5	6	7	8
1234567890123456789012345678901234567890123456789012345678901234567890	STA	CO	TOTAL	START	DATE	DIALED	ACCOUNT CODE<_><_>COST
1000	001	00:00:36	04:37	08/28/00	I1-480-443-6000		** (CR) (LF)
**VODAVI				(CR) (LF)			
	01	00:00:00	04:38	08/28/00	U1-480-443-6000		**
**VODAVI				(CR) (LF)			
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							

---

---

# 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



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---

# 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.



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## 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 data base 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).

---

### Keypad 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 keypad and DSS LED, LCD, and keyboard button operations.

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

### *Keypad 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.

### *Keypad Button Test*

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

```

PRESS KEYPAD BUTTONS
DIGIT 1 <-----
```

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

**Table 4-1: Flash Rates**

<b>Button</b>	<b>IPM</b>	<b>Type</b>
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 keypad are placed in the test mode.

PRESS DSS BUTTONS <span style="float: right;">&lt;-----</span>
---

If no DSS unit is associated with the keypad, the keypad 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 keypad identifying the DSS button number (01 to 48). This button also turns off the previously selected flex LED.

PRESS DSS BUTTONS BTN01 <span style="float: right;">&lt;-----</span>
--

### *Conditions*

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

## *Key Telephones/Terminals*

The following actions apply to multi-line key telephones:

**Table 4-2: Key Telephones/Terminals**

<b>Symptom</b>	<b>Action</b>
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**

<b>Symptom</b>	<b>Action</b>
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**

<b>Symptom</b>	<b>Action</b>
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 keypad	DSS must be assigned to keypad 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)**

<b>Symptom</b>	<b>Action</b>
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**

<b>Symptom</b>	<b>Action</b>
<b>Basic KSU and MBU</b>	
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 1 00.
<b>Modem Unit (MODU)</b>	
Cannot access system database programming remotely	Verify modem installation and programming. Check modem baud rate.
<b>Miscellaneous Interface Board (MISU)</b>	
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.
<b>DTMF Receiver Unit (DTMF-A)</b>	
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 MISU 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
maint>x

```

**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          BRD TYPE          SERV STAT          BRD OPTS          FW VER.
  -----          -
    00          DT24              INS                0                00-0
    01          SLIB              OOS                0                -0
    02          LCOB              OOS                0                -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 firm ware 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          BRD TYPE      SERV STAT      BRD OPTS      FW VER.
  -----
    01          SLIB          OOS            0             -0

  STA
  FLEX-FIX      TYPE          STATUS         LCD   STATE
  -----
  124-124      SP 24BTN        OOS           N     KEY_ID_UN
  125-125      SP 24BTN        OOS           N     KEY_ID_UN
  126-126      SP 24BTN        OOS           N     KEY_ID_UN
  127-127      SP 24BTN        OOS           N     KEY_ID_UN
  128-128      SP 24BTN        OOS           N     KEY_ID_UN
  129-129      SP 24BTN        OOS           N     KEY_ID_UN

maint>

```

**Figure 4-3: Station Configuration**

<u>Column</u>	<u>Indicates:</u>
1	Station Number
2	Station Type (keyset, DSS, SLT)  Keyset - ID 0 = Key station  DXX 1 = DSS Map 1 DXX 2 = DSS Map 2 DXX 3 = DSS Map 3 DXX 4 = DSS Map 4 DXX 5 = DSS Map 5 SLT - ID 6 = SLT SLT w/Lamp - ID 7 = SLT w/Message Waiting
3	Status: <input type="checkbox"/> <b>OOS</b> status can indicate the entire card is out of service; a specific station is not installed; or installed but not operational. <input type="checkbox"/> <b>INS</b> 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          BRD TYPE      SERV STAT      BRD OPTS      FW VER.
-----
   02          LCOB          OOS            0             -0

  CO           STATUS          PULSE/DTMF     CO/PBX        STATE
-----
  1 OOS, Bothway Enabled          DTMF          CO        WAIT_IDLE
  2 OOS, Bothway Enabled          DTMF          CO        WAIT_IDLE
  3 OOS, Bothway Enabled          DTMF          CO        WAIT_IDLE
  4 OOS, Bothway Enabled          DTMF          CO        WAIT_IDLE
  5 OOS, Bothway Enabled          DTMF          CO        WAIT_IDLE
  6 OOS, Bothway Enabled          DTMF          CO        WAIT_IDLE

maint>x

```

**Figure 4-4: CO Line Configuration**

Column      Indicates:

- 1      CO Line Number
- 2      Status:
  - OOS** status can indicate the entire card is out of service.
  - INS** status can indicate a board station is in-service 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      Whether CO Line is Pulse or DTMF (programmable option)
- 4      Whether CO Line is a CO Line or a PBX Line (programmable option)
- 5      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 MISU.
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 MISU. 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:

```

Digital Hybrid Key-System
Eng. Ver. 3.0I-FFFF DATE: 03/05/01  TIME: 16:14:35
ENTER PASSWORD:
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
mon>x

```

**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:

```

    Digital Hybrid Key-System
Eng. Ver. 3.0I-FFFF DATE: 03/07/01  TIME: 08:17:05
ENTER PASSWORD:
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 -> 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 4-6: 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

```
Sta 100: State= DIAL_TONE, Evt= Dial Pad (25), Data=7
Sta 100: State= DIALING, Evt= Dial Pad (25), Data=5
Sta 100: State= DIALING, Evt= Int Page (69), Data=8
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=3
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=9
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=5
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=8
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=7
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=4
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=3
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=9
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=9
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=9
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=7
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=11
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=3
Sta 100: State= PAGING, Evt= Dial Pad (25), Data=2
Sta 100: State= PAGING, Evt= Page T/O (150), Data=0
Sta 100: State= MISC_TONE, Evt= Dial Pad (25), Data=4
Sta 100: State= MISC_TONE, Evt= Dial Pad (25), Data=9
Sta 100: State= MISC_TONE, Evt= Key Data (26), Data=32
Sta 100: State= MISC_TONE, Evt= Mon Key (145), Data=-1
Sta 100: State= MISC_TONE, Evt= On Hook (17), Data=0
```

**Figure 4-8: Event Trace**

---

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