# Toshiba America Information Systems, Inc.
## Telecommunication Systems Division

# Limited Warranty

Toshiba America Information Systems, Inc., ("TAIS") warrants that this telephone equipment (except for fuses, lamps, batteries, and other consumables) will, upon delivery by TAIS or an authorized TAIS dealer to a retail customer in new condition, be free from defects in material and workmanship for twelve (12) months after delivery. This warranty is void (a) if the equipment is used under other than normal use and maintenance conditions, (b) if the equipment is modified or altered, unless the modification or alteration is expressly authorized by TAIS, (c) if the equipment is subject to abuse, neglect, lightning, electrical fault, or accident, (d) if the equipment is repaired by someone other than TAIS or an authorized TAIS dealer, (e) if the equipment's serial number is defaced or missing, or (f) if the equipment is installed or used in combination or in assembly with products not supplied by TAIS and which are not compatible or are of inferior quality, design, or performance.

The sole obligation of TAIS or Toshiba Corporation under this warranty, or under any other legal obligation with respect to the equipment, is the repair or replacement by TAIS or its authorized dealer of such defective or missing parts as are causing the malfunction with new or refurbished parts (at their option). If TAIS or one of its authorized dealers does not replace or repair such parts, the retail customer's sole remedy will be a refund of the price charged by TAIS to its dealers for such parts as are proven to be defective, and which are returned to TAIS through one of its authorized dealers within the warranty period and no later than thirty (30) days after such malfunction, whichever first occurs.

Under no circumstances will the retail customer or any user or dealer or other person be entitled to any direct, special, indirect, consequential, or exemplary damages, for breach of contract, tort, or otherwise. Under no circumstances will any such person be entitled to any sum greater than the purchase price paid for the item of equipment that is malfunctioning.

To obtain service under this warranty, the retail customer must bring the malfunction of the machine to the attention of one of TAIS' authorized dealers within the twelve (12) month period and no later than thirty (30) days after such malfunction, whichever first occurs. Failure to bring the malfunction to the attention of an authorized TAIS dealer within the prescribed time results in the customer being not entitled to warranty service.

THERE ARE NO OTHER WARRANTIES FROM EITHER TOSHIBA AMERICA INFORMATION SYSTEMS, INC., OR TOSHIBA CORPORATION WHICH EXTEND BEYOND THE FACE OF THIS WARRANTY. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND FITNESS FOR USE, ARE EXCLUDED.

No TAIS dealer and no person other than an officer of TAIS may extend or modify this warranty. No such modification or extension is effective unless it is in writing and signed by the vice president and general manager, Telecommunication Systems Division.

# *Strata*® DK

**Digital Business Telephone Solutions**

# General Description

# DK14

**Software Release 3.1**

# DK40i

**Software Release 4.3**

# DK424i

**Software Release 4.3 and ACD**

# Strata DK
# General End User Information

The Strata DK Digital Business Telephone System is registered in accordance with the provisions of Part 68 of the Federal Communications Commission's Rules and Regulations.

## FCC Requirements

Means of Connection: The Federal Communications Commission (FCC) has established rules which permit the Strata DK system to be connected directly to the telephone network. Connection points are provided by the telephone company—connections for this type of customer-provided equipment will not be provided on coin lines. Connections to party lines are subject to state tariffs.

Incidence of Harm: If the system is malfunctioning, it may also be disrupting the telephone network. The system should be disconnected until the problem can be determined and repaired. If this is not done, the telephone company may temporarily disconnect service. If possible, they will notify you in advance, but, if advance notice is not practical, you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC.

Service or Repair: For service or repair, contact your local Toshiba telecommunications distributor. To obtain the nearest Toshiba telecommunications distributor in your area, call Toshiba America Information Systems, Inc., Telecommunication Systems Division in Irvine, CA (949) 583-3700.

Telephone Network Compatibility: The telephone company may make changes in its facilities, equipment, operations, and procedures. If such changes affect the compatibility or use of the Strata DK system, the telephone company will notify you in advance to give you an opportunity to maintain uninterrupted service.

Notification of Telephone Company: Before connecting a Strata DK system to the telephone network, the telephone company may request the following:

1. Your telephone number.

2. FCC registration number:

   ♦ Strata DK may be configured as a Key or Hybrid telephone system. The appropriate configuration for your system is dependent upon your operation of the system.

   ♦ If the operation of your system is only manual selection of outgoing lines, it may be registered as a Key telephone system.

   ♦ If your operation requires automatic selection of outgoing lines, such as dial access, Least Cost Routing, Pooled Line Buttons, etc., the system must be registered as a Hybrid telephone system. In addition to the above, certain features (tie Lines, Off-premises Stations, etc.) may also require Hybrid telephone system registration in some areas.

   ♦ If you are unsure of your type of operation and/or the appropriate FCC registration number, contact your local Toshiba telecommunications distributor for assistance.
   **DK14 and DK40i**
   Key system: **CJ6MLA-74479-KF-E**
   Hybrid: **CJ6MLA-74478-MF-E**
   **DK424i**
   Key system: **CJ69XA-10242-KF-E**
   Hybrid: **CJ69XA-10243-MF-E**
   PBX: **CJ6JPN-22758-PF-E**

3. Ringer equivalence number: 0.3B. The ringer equivalence number (REN) is useful to determine the quantity of devices which you may connect to your telephone line and still have all of those devices ring when your number is called. In most areas, but not all, the sum of the RENs of all devices connected to one line should not exceed five (5.0B). To be certain of the number of devices you may connect to your line, as determined by the REN, you should contact your local telephone company to ascertain the maximum REN for your calling area.

4. Network connection information USOC jack required: RJ1CX, RJ2EX, RJ2GX, RJ48C, RJ48X, RJ11, RJ14C, RJ21X (see Network Requirements in this document). Items 2, 3 and 4 are also indicated on the equipment label.

## Radio Frequency Interference

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the manufacturer's 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 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/her own expense, will be required to take whatever measures may be required to correct the interference.

This system is listed with Underwriters Laboratory.

UL Requirement: If wiring from any telephone exits the building or is subject to lightning or other electrical surges, then secondary protection is required. Secondary protection is also required on DID, OPS, and tie lines. (Additional information is provided in this manual.)

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## Important Notice — Music-On-Hold

In accordance with U.S. Copyright Law, a license may be required from the American Society of Composers, Authors and Publishers, or other similar organization, if radio or TV broadcasts are transmitted through the music-on-hold feature of this telecommunication system. Toshiba America Information Systems, Inc., hereby disclaims any liability arising out of the failure to obtain such a license.

CP01, Issue 8, Part I Section 14.1
Notice: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the Equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

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**CAUTION!** **Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.**

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CP01, Issue 8, Part I Section 14.2
Notice: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The terminal on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the Devices does not exceed 5.

# Contents

## Introduction

## Chapter 1 – Strata DK14

## Chapter 2 – Strata DK40i

## Chapter 3 – Strata DK424i

## Chapter 4 – Universal Slot PCBs

## Chapter 5 – Stations and Peripherals

## Chapter 6 – System Features

## Chapter 7 – Station Features

## Chapter 8 – PC Attendant Console Features

# Introduction

This General Description provides an overview of the Strata DK telephone systems, associated hardware, system and station features. These systems include:

♦ Strata DK14

♦ Strata DK40i

♦ Strata DK424i

## Organization

This document is divided into the following major topics:

♦ **Chapter 1 – Strata DK14** describes the Strata DK14 overall system and covers the basics of: capacities, system expansion and configuration, power requirements, technology, and maintenance.

♦ **Chapter 2 – Strata DK40i** describes the overall system and the basic capacities, system expansion and configuration, power requirements, technology, and maintenance.

♦ **Chapter 3 – Strata DK424i** describes this new system and covers basic capacities, system expansion and configuration, technology, power requirements, maintenance, and programming.

♦ **Chapter 4 – Universal Slot PCBs** provides information about Printed Circuit Boards (PCBs) that can be installed in the universal slots of the Strata DK systems.

♦ **Chapter 5 – Stations and Peripherals** describes the most recent Toshiba-proprietary stations and peripherals, customer-supplied peripherals, as well as cabling and connectors. Includes information on system tones and data interface specifications.

♦ **Chapter 6 – System Features** describes the features which are available system-wide.

♦ **Chapter 7 – Station Features** describes the features which are available as stations features and shows the types of stations on which they are available.

♦ **Chapter 8 – PC Attendant Console Features** describes the features available from a PC Attendant Console, digital telephones, and the older DK Attendant Console.

♦ **Appendix – Specifications** contains reference information for the DK14, DK40i, and DK424i systems and compatible stations.

# Conventions

| Conventions | Description |
|:---:|:---|
| **Note** | Elaborates specific items or references other information. Within some tables, general notes apply to the entire table and numbered notes apply to specific items. |
| **Important!** | *Calls attention to important instructions or information.* |
| [DN] | Represents any Directory Number button, also known as an extension or intercom number. |
| [PDN] | Represents any Primary Directory Number button (the extension number for the telephone). |
| [SDN] | Represents any Secondary appearance of a PDN. A PDN which appears on another telephone is considered an SDN. |
| [PhDN] | Represents any Phantom Directory Number button (an additional DN). |
| [ ] | Brackets indicate a variable button. Example: [DN] represents the actual Directory Number, such as [301]. |
| **Arial Bold** | Represents telephone buttons. |
| **Courier** | Shows a computer keyboard entry or screen display. |
| **+** | shows a multiple PC keyboard or phone button entry. Entries without spaces between them show a simultaneous entry. Example: **Delete**+**Enter**. Entries with spaces between them show a sequential entry. Example: **#** + **5**. |
| Tilde (~) | Means "through." Example: 350~640 Hz frequency range. |
| See Figure 10 | Grey words within the printed text denote cross-references. In the electronic version of this document (Strata DK Library CD-ROM or FYI Internet download), cross-references appear in blue hypertext. |

# Related Documents/Media

**Note** Some documents listed here may appear in different versions on the CD-ROM, FYI, or in print. To find the most current version, check the version/date in the Publication Information on the back of the document's title page.

## General Descriptions

♦ Strata DK Call Center Solutions General Description

♦ Hospitality Management Information System (HMIS) General Description

## Installation and Programming

♦ Strata DK Installation & Maintenance Manual

♦ Strata DK Programming Manual

♦ Strata AirLink Wireless Systems Installation Guide

♦ Hospitality Management Information System (HMIS) Installation Guide

♦ Insight DK Installation Guide

♦ Voice Over Internet Protocol Installation & Maintenance Manual

## Feature Description

♦ Strata DK Feature Description Manual

## User Guides for:

♦ Digital Telephone

♦ Digital Single Line Telephone

♦ Electronic Telephone

♦ Standard Telephone

♦ DKT2004-CT Cordless Telephone

♦ DKT2104-CT Cordless Telephone

♦ Strata AirLink External Wireless Handset

♦ Strata AirLink Integrated Wireless Handset

♦ PC/Data Interface

♦ System Administrator Guide

♦ PC Attendant Console

♦ Hospitality Management Information System (HMIS)

♦ Call Center Viewer

♦ Insight DK Supervisor Guide

♦ ACD Agent Guide

♦ ACD Supervisor Guide

♦ Software MIS (SMIS) Supervisor Manual

♦ Keyprint 2000

## Quick Reference Guides for:

♦ Digital Telephone

♦ Electronic Telephone

♦ Strata AirLink External Wireless

♦ Strata AirLink Integrated Wireless

♦ PC Attendant Console

♦ Insight DK inView

## CD-ROMs

♦ Strata DK Library

♦ Strata DK HMIS

♦ StrataControl

♦ DKi Quote

♦ DKi Admin/DKi Backup

♦ Strata DK424 Insight DK (Insight works with the DK424i also)

**Note** For authorized users, Internet site FYI (http://fyi.tsd.toshiba.com) contains all Strata DK documentation and enables you to view, print, and download current publications.

# Strata DK14 1

This chapter provides an overview of the Strata DK14 System and its capacities.

The Strata DK14 Base Key Service Unit (KSU) is a compact system that provides many of the features offered by much larger systems. The Strata DK14 KSU is designed for convenient wall-mounting and occupies very little space (see Figure 1 and Table 1).

At maximum configuration, the Strata DK14 provides up to 10 station ports, that can be used for up to eight digital telephones (including the cordless telephone), up to four Central Office (CO) lines can be accommodated, and two standard telephone devices.

The Strata DK14 can be upgraded with these optional peripherals:

♦ Music-on-hold (MOH) source

♦ Background Music (BGM) source

♦ Night bell

♦ Amplifier/speaker for external page



**Figure 1      Base Key Service Unit (KSU)**

Also, any two of the following optional RS-232 interfaces can be added as needed:

♦ Caller ID (CLID)

♦ Station Message Detail Reporting (SMDR)

♦ Simplified Message Desk Interface (SMDI) for Voice Mail

♦ DKi Admin (TTY) Interface

**Table 1      KSU Specifications**

| Unit | Weight | Height | Width | Depth |
|---|---|---|---|---|
| Key Service Base Unit | 5.7 lbs. (2.59 kg) | 16.4 inches (416 mm) | 10.0 inches (254 mm) | 3.0 inches (76 mm) |

# KSU Architecture

The Strata DK14 KSU contains the main processor, operating software, circuitry and the following components (see Figure 2).
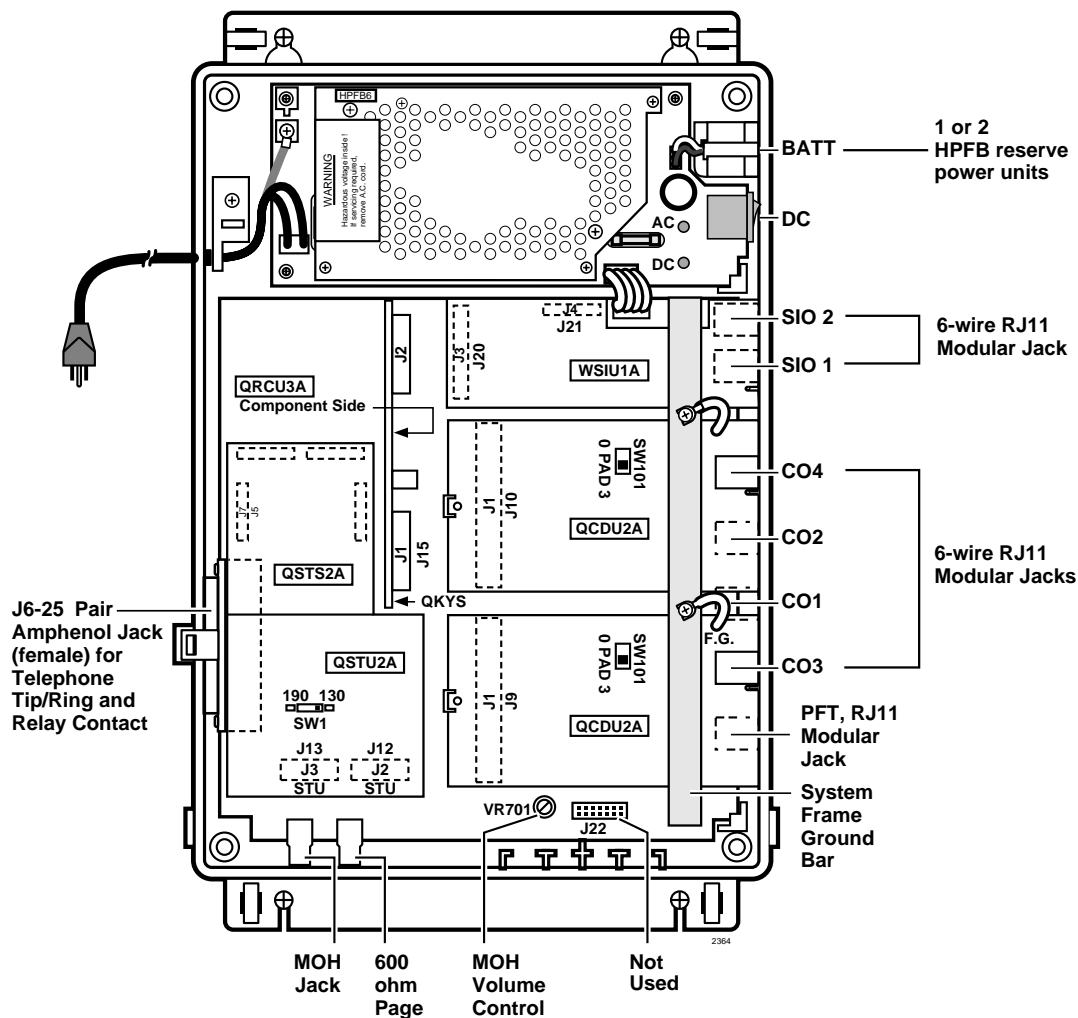


**Figure 2     KSU Interior**

## Digital Telephone/Central Office (CO) Line Circuits

The main PCB (WMAU) has four integrated circuits that can connect to digital corded and/or cordless telephones, stand-alone data interface units (PDIU-DSs), and digital door phone/lock control units (DDCB). Each of the digital telephones can support a PC Data Interface Unit (RPCI-DI) or up to two Add-on Modules (DADMs). It does not support a DDSS console.

Two circuits for loop start CO lines are built into the main PCB. Each line can be programmed for Dual-tone Multi-frequency (DTMF) or dial pulse signaling. It includes a switch to control potential excess volume from a nearby private branch exchange (PBX) or CO. Built-in gas tubes help protect each circuit from lightning. Each line supports Caller ID when optional equipment is added.

# Optional Printed Circuit Boards

## Central Office Line/Digital Telephone Interface Unit (QCDU2)

The QCDU2 provides one loop start CO line circuit and two digital telephone circuits. It interfaces with digital corded and/or cordless telephones, RPCI-DIs, ADMs connected to the corded telephones and PDIU-DSs, and door phones. The DK14 supports up to six door phones. It does not support a DDSS console. Up to two QCDU2 PCBs can be added to the DK14. Each line supports Caller ID when optional equipment is added.

## Standard Telephone Interface Unit (QSTU2)

The QSTU2 provides two standard telephone circuits for two-wire devices such as standard telephones, Auto Attendant devices, alternate BGM source connection, voice mail machines, and facsimile machines.

## DTMF Receiver/ABR Tone Detector Unit (QRCU3)

The QRCU3 enables the Strata DK14 to recognize Dual-Tone Multi-Frequency (DTMF) tones generated by a standard telephone or any other device connected to a QSTU3 standard telephone circuit. It is also required for Direct Inward System Access (DISA) calls and built-in Auto Attendant. The QRCU3 enables busy tone detection for Automatic Busy Redial.

## Auto Attendant Feature Key (QKYS1)

The QKYS1 plugs into the QRCU3 option PCB to support built-in Auto Attendant.

## Serial Interface Board (WSIU1)

The WSIU1 provides two serial interface ports for up to two of the following devices:

♦ Caller ID interface box

♦ SMDR Call Accounting device

♦ SMDI Voice Mail Interface

♦ PC with DKi Admin or external modem

# Power Considerations

The power supply generates +5VDC and +24VDC for the entire system (see Table 2).

**Table 2        DK14 Electrical Characteristics**

| DK14 Primary Power | |
|---|---|
| Input AC<br>AC frequency<br>Power<br>AC input current | 115VAC±10V<br>50/60 Hz<br>46 watts maximum<br><0.7 amps. max |
| **Power Supply** | |
| DC voltage output specification | +24VDC (+26.3~-27.8VDC)<br>+5VDC (+4.5~+5.5VDC) |

## Reserve Power

One or two optional Reserve Power Battery and Chargers (HPFBs) can be connected to the Strata DK14 power supply to maintain normal operation during a power failure. The estimated battery time for one or two HPFBs is shown below.

| DK14 (fully-loaded system) | Estimated Battery Time (hours) |
|---|---|
| One HPFB | 0.5~1.0 |
| Two HPFBs | 1.0~2.0 |

**Notes**

- Reserve power time varies with system call traffic.
- AC power must be available when HPFB is first installed.
- HPFB recharge time is 48 hours per HPFB.

## Power Failure Interface

The Strata DK14 KSU provides an interface for a dedicated backup standard telephone during an AC input power failure. If the system AC input power fails, the backup telephone will automatically connect to the CO1 line. This feature is independent of the HPFB.

## Music-on-Hold (MOH) Interface

Customers can connect their own MOH source to this interface. The source can also feed external page speakers and telephone speakers with Background Music (BGM).

## Paging Interface

This 600-ohm interface can support a Toshiba External Speaker (HESB) or a customer-supplied amplifier and speaker for Paging, Night Ringing over Page, and BGM applications.

## Flexible Relay Contacts

A relay contact can be programmed to either mute BGM during a page announcement over external speakers, to operate a device—such as an answering machine or ringing bell—during the Night Mode, or to provide on-off control for a MOH source.

# Maximum Line/Station Configurations

The maximum line and station configurations for DK14 are shown in Table 3.

**Table 3        CO Lines and Station Ports**

| DK14 System | CO Line Ports | Digital Ports | Standard Telephone Ports[1] |
|---|---|---|---|
| **Basic KSU** | 2 | 4 | 0 or 2 |
| **Expanded KSU** | 3 | 6 | 0 or 2 |
| **Expanded KSU** | 4 | 8 | 0 or 2 |

1.  Standard telephone ports do not support MW lamps on standard telephones.

# Network Requirements

Network requirements of station/line PCBs and interface cards are summarized in .

# Functional Block Diagram

Figure 3 shows the Strata DK14 KSU PCBs and the available lines, stations and peripherals. Basic voltage and cabling information is also included.
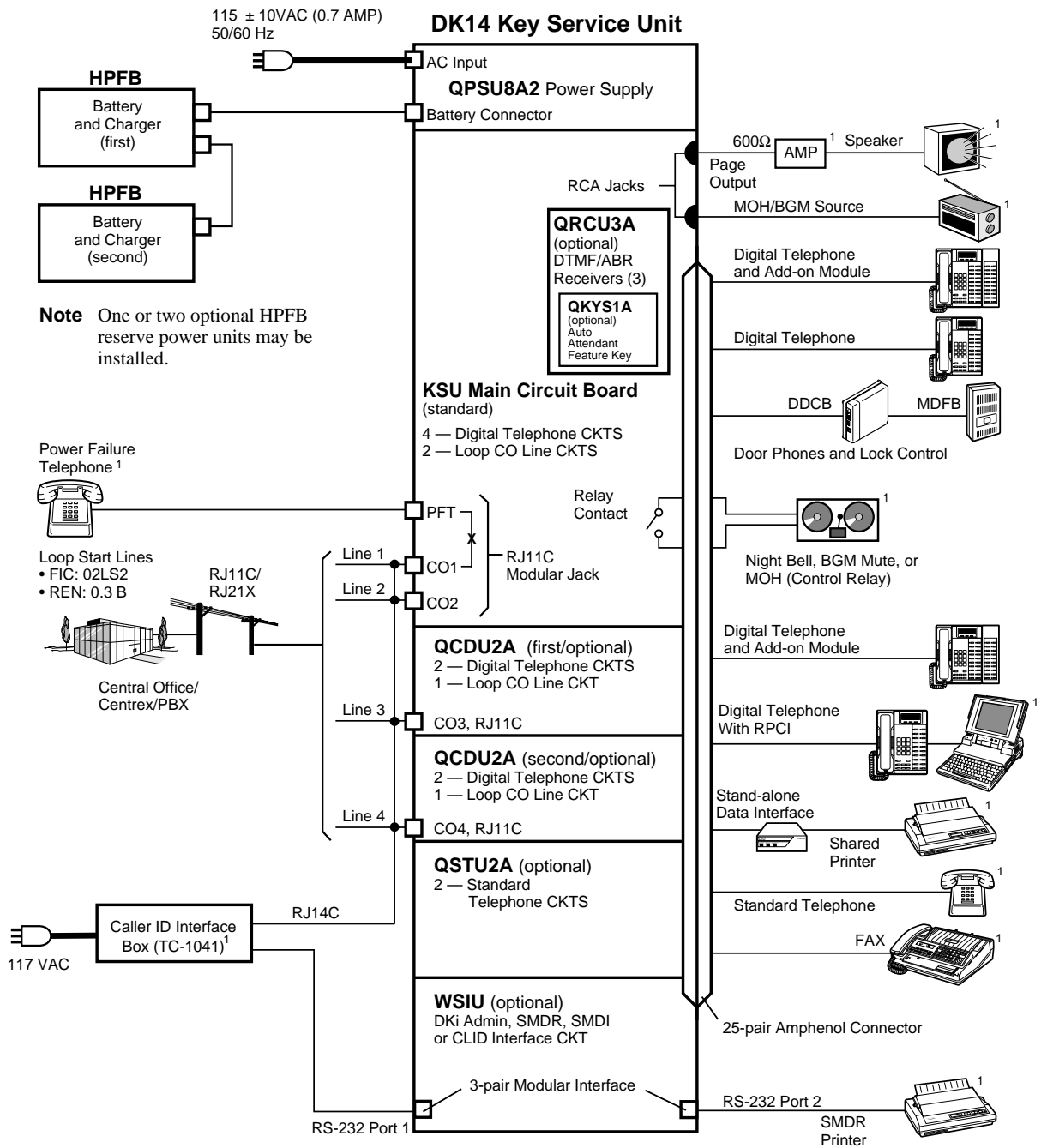


**Figure 3    Functional Block Diagram**

# System Technology

## Pulse Code Modulation

Digital switching talkpaths enable all CO and intercom lines to be accessed simultaneously. Analog-to-digital and digital-to-analog conversion is done by CODECs (coder plus decoder) on station and CO line PCBs.

## Custom Electronic Circuitry

Large Scale Integration (LSI) technology makes the Strata DK14 circuit designs simple and efficient. Gate arrays using very large scale integration save vast amounts of space by using the latest technology. More circuitry fits onto smaller PCBs for a more compact system. Widespread use of CMOS circuits minimizes system power requirements.

## Stored Program Control

The system uses a 16-bit microprocessor for stored program control. The Strata DK14 System operating software is stored on Read Only Memory (ROM), and individual configuration and custom programming is stored on Random Access Memory (RAM). A lithium battery with a life span of at least six years preserves RAM in the case of a power failure.

## Microprocessors

The system's main microprocessor is a 16-bit 68000-type that operates at a clock speed of 8 MHz. In addition, some PCBs use 8-bit, TMP90C840-type local microprocessors that run at 10 MHz. This distributed microprocessing architecture is used system wide.

# Maintenance and Programming

Hardware maintenance and repair procedures describe how to quickly locate, remove, and replace defective parts and PCBs. System programming can be performed without taking the system out-of-service.

On-site programming can be executed with any 20-button proprietary LCD telephone or with a DKi Admin PC connected to an optional maintenance port.

Off-site programming with DKi Admin, which can help cut costs and save time, is available through a customer-provided modem connected to the maintenance port.

## DKi Admin/DKi Backup

Toshiba DKi Admin Release 4.0 software enables customer data (configuration, station, and system options) to be downloaded to a PC and stored on a computer disk. The customer data can be added to, or changed, using the PC independent of the DK System.

The new customer data can then be uploaded to the DK System from the PC, changing customer program options on-site or remotely over telephone lines and/or modems.

The DKi Backup software program is also available. The program consists of a small subset of DKi Admin functions which can perform backup, restore and upgrade functions, but cannot edit customer databases.

# Strata DK40i 2

This chapter provides an overview of the Strata DK40i Release 4.3 system and its capacities. Release 4.3 enables the DK40i to provide Automatic Call Distribution (ACD), E911 CAMA, T1, ISDN PRI and BRI U and S/T interfaces.

The Strata DK40i Base Key Service Unit (KSU) is a compact system that provides many of the features offered by much larger systems. The KSU is designed for convenient wall-mounting and occupies very little space (see Figures 4, 5 and Table 4.)
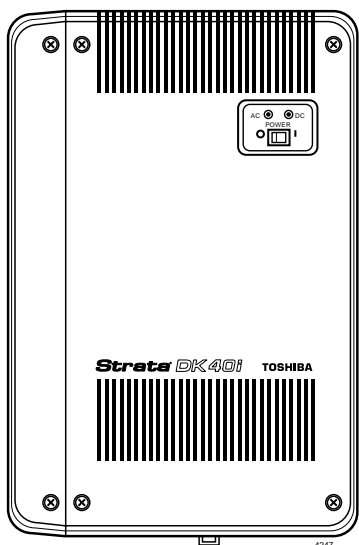


**Figure 4     Base Key Service Unit (KSU)**
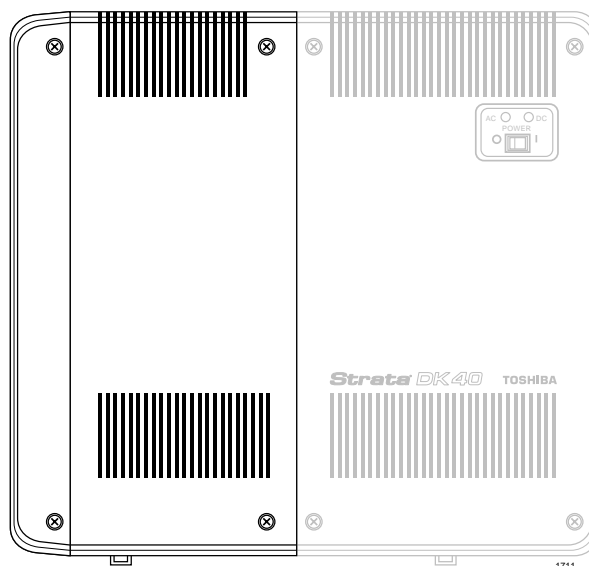
**Figure 5     KSU with Expansion Unit**

**Table 4     KSU and Expansion Unit Specifications**

| Unit | Weight | Height | Width | Depth |
|---|---|---|---|---|
| Key Service Base Unit | 8.4 lbs. (3.8 kg) | 18.0 inches (457 mm) | 12.2 inches (310 mm) | 3.4 inches (86 mm) |
| Expansion Unit | 1 lb. empty (0.45 kg)  4.3 lbs. full (2.4 kg) | 18.0 inches (457 mm) | 7.8 inches (198 mm) | 3.4 inches (86 mm) |

# Base KSU Architecture

The Strata DK40i Base KSU contains the main processor, operating software, circuitry and the following components (see Figure 6).



**-24 Volt Circuit Breakers**

**Connect Expansion Unit TB1 TO FG2**

**Important Notice**

**Expansion KSU Cable Receptacle**

**Battery Jumper**

**Reserve Power Battery Jack**

**Base Telephone Tip/Ring and Relay Contact**

**Music-on-Hold Input**

**600 Ω External Page Output**

**Music-on-Hold Sensitivity Adjustment**
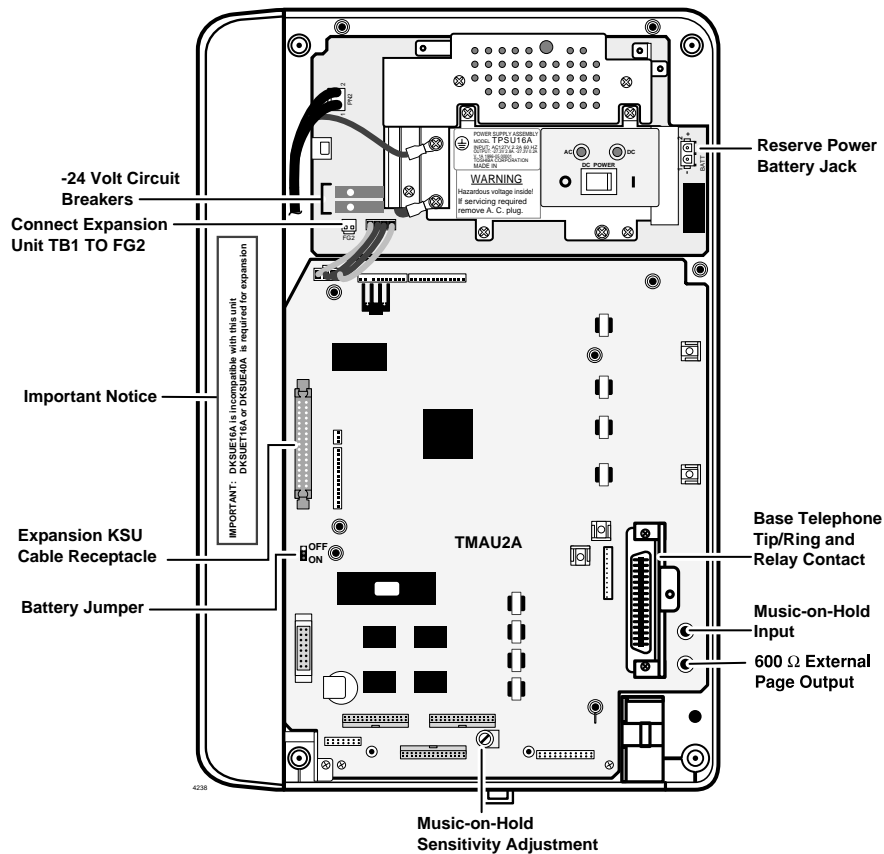
**Figure 6        Base KSU Interior**

## Digital Telephone Circuits

The main circuit board (TMAU2) in the Strata DK40i Base KSU has eight integrated circuits that can connect to Toshiba-proprietary digital telephones (including the cordless telephone), Stand-alone Data Interface Units (PDIU-DSs), Digital Door Phone/Lock Control Units (DDCB), and Digital Direct Station Selection Consoles (DDSS).

Furthermore, each of the digital telephones can support a PC Data Interface Unit (RPCI-DI) or up to two Add-on Modules (DADMs).

## Central Office (CO) Line Circuits (TCOU/TDDU/TBSU/TBUU)

The following PCBs can be installed in the DK40i Base KSU:

♦    TCOU provides four circuits for loop start CO lines.

♦    TDDU provides four circuits for Direct Inward Dialing (DID) lines

♦    TBSU provides two circuits for BRI lines or stations (see TBSU below)

♦    TBUU provides two BRI U interface circuits for lines or stations

The CO line interface and DID interface unit can be programmed for DTMF or dial pulse signaling and each line has a switch to control potential excess volume that could be created by a nearby PBX or CO. Built-in gas tubes help protect each TDDU and TCOU line from lightning. An optional RDDU (for DID lines) installed in the Expansion Unit requires an external secondary protector. DID lines require the optional K5RCU2 tone receiver.

### ISDN BRI S/T Circuits (TBSU)

The TBSU PCB provides two Basic Rate Interface (BRI) circuits for DK40i. The TBSU can only be installed in the DK40i Base KSU.

The TBSU circuits are four-wire S/T type circuits and connect to the PSTN BRI lines using a dealer-supplied UL-listed Network Terminator unit (NT1). In Canada, the NT-1 must be CSA certified. On the station side, they can connect to S-type ISDN Terminal Equipment (TE) or Terminal Adapters (TA).

### ISDN BRI U Circuits (TBUU)

DK BRI U interface circuits can be configured to connect to an ISDN line circuit (NT mode, line-side) or to ISDN U-type terminal equipment TE1 or terminal adapters TA (LT mode, station side). The TBUU provides two BRI-U circuits that can be configured independently for line or station circuits.

**Note**    The TBSU and TBUU contains two circuits, each of which reduces the system capacity by two station ports or two CO lines. If the BRI circuit is configured as a station circuit, the circuit assumes two station ports. If the BRI circuit is configured as a line circuit, the circuit assumes two CO lines. BRI lines can be used for voice and data calls.

### Caller ID (TCIU2)

An optional Caller ID PCB (TCIU2) can be added to the four-circuit loop start CO line PCB (TCOU) to provide four Caller ID circuits. Local telephone companies do not provide Caller ID on DID lines; so the TCIU2 PCB cannot be added to the four-circuit DID PCB (TDDU). Caller ID can also be added with the RCIU2 and KCDU2. See "Caller ID Interface Unit (RCIU2)" on Page 41 and "Caller ID" on Page 69 for more information.

## Standard Telephone Interface Unit (KSTU2)

The optional KSTU2 provides four circuits that can interface with DTMF for rotary dial standard telephones and other single-line devices, including: Strata AirLink Wireless Base Station Interface Adapters (BSIAs) and handsets, fax/modems (14.4 bps max.), Voice Mail and Auto Attendant devices, off-premises stations, alternate BGM source and dictation equipment. These devices may require that the optional tone receiver (K5RCU or K5RCU2) be installed in the DK40i Base KSU to interpret the DTMF signals the above devices may transmit.

The KSTU2 does not support message waiting lamps on standard telephones. The RSTU2 must be installed in the Expansion Unit to support message waiting lamps.

## DTMF/ABR Tone Detection Receiver (K5RCU and K5RCU2)

Station users in systems that have the optional K5RCU or K5RCU2 installed can access Automatic Busy Redial (ABR) and communicate with devices, such as standard telephones or voice mail machines that require DTMF signaling.

This unit is also required for Direct Inward System Access (DISA) and built-in or external Auto Attendant operation, as well as for DID and Tie lines. Each K5RCU or K5RCU2 PCB contains five shared receivers.

### Feature Key (KKYS)

The system can be upgraded with an optional feature key, the KKYS, which installs onto the K5RCU PCB in the Base KSU. The KKYS1 provides Automated Attendant (AA); KKYS2 provides AA and ACD; and KKYS3 provides AA and ACD/MIS.

### SMDR, SMDI, ACD/MIS and Maintenance DKi Admin/Modem (TTY) Interface (TSIU)

The TSIU PCB provides two RS-232 interface ports (modular jacks) that allow the DK40i system to connect to an SMDR Call Accounting device, a DKi Admin PC or external modem for system maintenance/administration, ACD/MIS reports using Toshiba's Insight DK software, or an SMDI interface for Voice Mail. It does not have a built-in modem capability.

Only one TSIU can be installed per DK40i system. When the TSIU PCB is installed, the PIOU can still be installed for zone paging, control relays, and an SMDR RS-232 interface, built-in (IMDU) maintenance modem, ACD/MIS processor or VM SMDI or maintenance interface.

## Expansion KSU Architecture

The optional Expansion KSU, which attaches easily to the side of the Base KSU, offers four universal slots that can host a variety of line and telephone PCBs (see Figure 7). See Chapter 4 – Universal Slot PCBs for descriptions of PCBs.
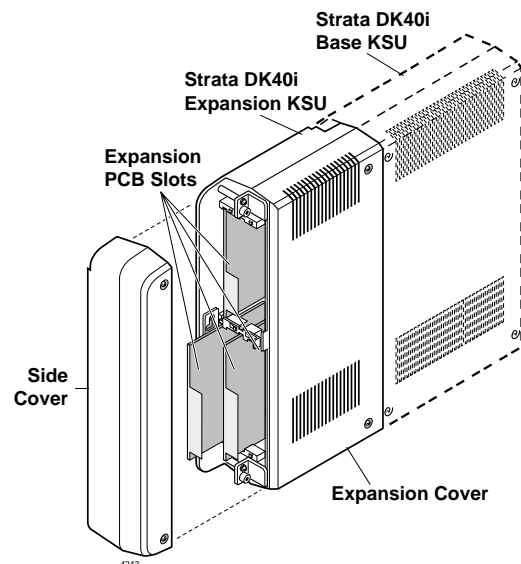


**Figure 7      Expansion KSU Interior**

## Station and Line Capacities

This section shows the maximum basic and CO configurations that are possible with the DK40i. There is a variety of configuration combinations of digital and standard telephones with CO lines, including loop start, ground start, Tie, and DID lines. Any loop or ground start CO line can be equipped with Caller ID.

The DK40i Base KSU comes equipped with eight digital telephone station circuits. One of four optional PCBs can be added to provide either four loop start or DID lines, or two ISDN BRI S/T or U circuits. Another optional TCIU2 PCB can be added to the Base KSU loop start line PCB to provide Caller ID interface. An optional KSTU2 PCB can be added to provide four standard telephone circuits (ports).

An optional Expansion KSU can be added to the DK40i to increase the system capacity to 28 station ports and 12 CO lines (see Figure 5). A maximum of 28 station ports and 12 CO line interfaces are allowed in the system (Base KSU plus Expansion KSU). Base capacity is 12 station ports and 4 CO line or 2 BRI circuit interfaces.

Table 5 shows maximum capacity for a DK40i system. DKi Quote, an auto quote program that runs on a PC with Microsoft® Windows®, is available from Toshiba to generate DK40i quotes and configurations. Also, refer to the *Strata DK Installation and Maintenance (I&M) Manual,* Chapter 2 – DK40i Configuration, for more information.

**Table 5    Maximum CO Lines/Ports and BRI Line and Station Circuits**

| Hardware | Maximum Allowed |
|---|---|
| CO Lines | 12 |
| Station Ports | 28 |
| BRI Line Circuits | 6 |
| BRI Station Circuits | 10 |

Attaining maximum system capacities depends on power consumption of a particular configuration (see Table 6). Power factor calculations in accordance with the *Strata DK I&M Manual* will determine if the maximum capacities in these tables can be reached.

**Table 6    DK40i Station and Line Capacities and Universal Printed Circuit Board Slots**

| Lines and PCB Slots | DK40i |
|---|---|
| Universal slots[1] | 4[1] |
| Stations[2] | 8~28[2] |
| CO lines – loop start | 0, 2, 4, 8 or 12[3] |
| CO lines – ground start | 0, 2, 4, 8 or 12[3] |
| DID lines (analog)[4] | 0, 2, 4, 8 or 12[3] |
| Tie lines (analog)[3] | 0, 2, 4, 8 or 12[3] |
| T1 lines | 8 or 12 channels/lines |
| ISDN BRI line circuits (S/T type and/or U type)[5] | 2, 4 or 6 circuits (12 B-channels/lines)[3] |
| ISDN PRI line circuits | 8 or 12 channels/lines |
| Squared System Maximum (ground/loop lines + stations) | 12 lines + 12 stations |
| Squared System Maximum (Tie/DID lines + stations) | 12 lines + 12 stations |

1. There are four universal slots in the DK40i expansion unit.

2. Line and station capacities cannot exceed 28 stations and/or 12 CO lines. Incremental capacities depend on the type of station/line PCBs installed. All increments are not available with all PCB types.

3. Increments vary and depend on the type of line PCBs installed.

4. In the D40i, DID and Tie, lines do not use up station ports as in DK40, R3.1 and the DK424 R3.2. Each BRI line circuit uses up to two CO lines of system capacity and no station ports.

5. Each S/T type circuit requires an NT-1 device when connected to a Central Office BRI line circuit.

The DK40i Base and Expansion cabinets provide an extensive number of features for a telephone system of its size. See Table 40 on Page 109 for a list of  DK40i, Release 4.3 features and capacities.

# ISDN BRI Lines

Stations can be a combination of ISDN TE-1 and TA S-type devices and digital, electronic or standard telephones. CO line combinations include ground or loop start, DID, Tie or ISDN BRI. Each BRI line circuit uses up two CO lines at system capacity. All other line circuits use up one CO line of system capacity.

Each BRI station circuit uses up to two station ports of system capacity. All other station circuits use up one station port of system capacity.

**Table 7**      **Typical Maximum Capacity Examples with ISDN BRI (S/T and/or U-type) Circuits**

| BRI Station Circuits[1] | Other Station Circuits[3] | BRI Line Circuits[4] | BRI Line B channels | Other Line Circuits[5] |
|:---:|:---:|:---:|:---:|:---:|
| 10[2] | 8 | 6 | 12 | 0 |
| 8 | 12 | 4 | 8 | 4 |
| 6 | 16 | 4 | 8 | 4 |
| 4 | 20 | 6 | 12 | 0 |
| 4 | 20 | 4 | 8 | 4 |
| 2 | 24 | 2 | 4 | 8 |
| 0 | 28 | 0 | 0 | 12 |

1. Each BRI circuit (S/T and/or U-type) provides two B channels plus one D channel. Each (S/T) BRI station circuit allows up to two TE-1 and TA devices to share the BRI B channels (two simultaneous calls maximum per BRI circuit.). Each BRI-U circuit supports one TE-1 or TA device.

2. Maximum BRI line capacity. BRI station circuits do not use up CO line channels and vice versa. Also, station circuits use 2B + 1D channel; lines use one B channel which enables one BRI circuit to provide two lines.

3. Other stations include Toshiba digital and electronic telephones, or attendant consoles, standard telephones and devices.

4. BRI S/T circuits are available with TBSU and RBSU/RBSS PCBs and BRI-U circuits are available with TBUU and RBUU/RBUS PCBs. Each BRI line circuit (S/T or U) provides two BRI CO lines (B channels) for incoming/outgoing calls.

5. Other lines include analog and digital (T1 or PRI) loop start, ground start, DID, and Tie lines.

# Peripherals

The DK40i Base KSU can support a number of peripherals, which are not considered as stations or lines and do not affect the maximum station and line capacities. The DK40i Base KSU comes standard with built-in interfaces for connecting the following dealer-supplied equipment: an amplifier and speaker for paging and night ringing, Music-on-Hold (MOH) source, reserve power batteries, and emergency standard telephone for system power failure occurrences when using loop start lines in the base cabinet.

A relay contact is also provided to control one of the following peripherals: MOH source, night bell, or page amplifier mute control.

An optional KSTU2 PCB provides an alternate background music source interface. The music plays through Toshiba telephone speakers, as opposed to the external page speakers.

The optional TSIU PCB provides two RS-232 interface ports to connect two of four options: a DKi Admin PC (or external modem for remote maintenance); or VM SMDI, ACD/MIS or an SMDR port to connect a call accounting device or printer. An Expansion Unit RS-232 interface PCB is required if all four features are needed.

# Power Considerations

The power supply generates +5VDC and -24VDC for the entire system, even in its expanded configuration (see Table 8.) See Table 45 on Page 124 for environmental characteristics.).

**Table 8        DK40i Electrical Characteristics**

| DK40i Primary Power | |
|---|---|
| Input AC<br>AC frequency<br>Power<br>AC input current | 115VAC±10V<br>50/60 Hz<br>75 watts maximum<br>1.8A maximum |
| **Power Supply** | |
| DC voltage output specification | -24VDC (-25.94~-28.66VDC)<br>+5VDC (+4.5~+5.5VDC)<br>-5VDC (-4.5~-5.5VDC) - Expansion KSU only |
| **Battery Charger Characteristics** | |
| Charger<br>Nominal float voltage<br>Charge current<br>Battery discharge cut-off voltage | current limiting<br>2.275 volts/cell<br>0.7 amps maximum<br>20.5VDC ±0.5 |

## Power Supply/Reserve Power

The power supply provides a built-in charger for the batteries (see Table 9). Two customer-supplied 12VDC batteries can be connected to the power supply to maintain fully functioning operation during a power failure.

**Table 9        Typical Reserve Power Duration Estimates**

| Description | DK40i Base KSU | | DK40i Expansion KSU | | | |
|---|---|---|---|---|---|---|
| | No KSTU2 | KSTU2 | 1 PCB | 2 PCBs | 3 PCBs | 4 PCBs |
| Approximate (-24V) current drain (DC amps.) | 1.0 | 1.2 | 1.6 | 2.0 | 2.4 | 2.8 |
| Estimated battery operation time (in hours) | 75.0 | 58.0 | 41.0 | 31.0 | 25.0 | 20.0 |

Reserve power time estimates assume the following:

- Batteries are fully charged at start of operation and two batteries are connected in a series (12 VDC, rated 80 amp/hours each).
- Batteries used for this test are gel-cell and maintenance free. Reserve duration will vary depending upon battery type, age, and manufacturer. These figures should be used as an estimate.
- AC power must be available when first installing reserve power batteries.

## Power Failure Interface

The Base KSU provides an interface for a dedicated backup standard telephone during an AC input power failure. If the system AC input power fails, the backup telephone automatically connects to the CO1 line. The backup telephone is disabled when the system operates during normal power conditions.

This feature is independent of Battery Backup and is available when loop start lines are installed in the Base KSU. A power failure telephone cannot be installed for DID lines.

## Music-on-Hold Interface

Customers can connect their own MOH source to this interface. The source can also feed external page speakers and telephone speakers with BGM.

♦ **Paging Interface** – This 600-ohm interface supports a Toshiba External Speaker (HESB) or a customer-supplied amplifier and speaker for Paging, Night Ringing over Page, and BGM.

♦ **Flexible Relay Contacts** – A relay contact can be programmed to either mute BGM during a page announcement over external speakers, to operate a device: i.e., an answering machine or ringing bell during the Night Mode, or to provide on-off control for a MOH source.

# Functional Block Diagram

Figure 8 shows the Strata DK40i Base and Expansion KSU PCBs and the available lines, stations and peripherals. Basic voltage and cabling information is also included.
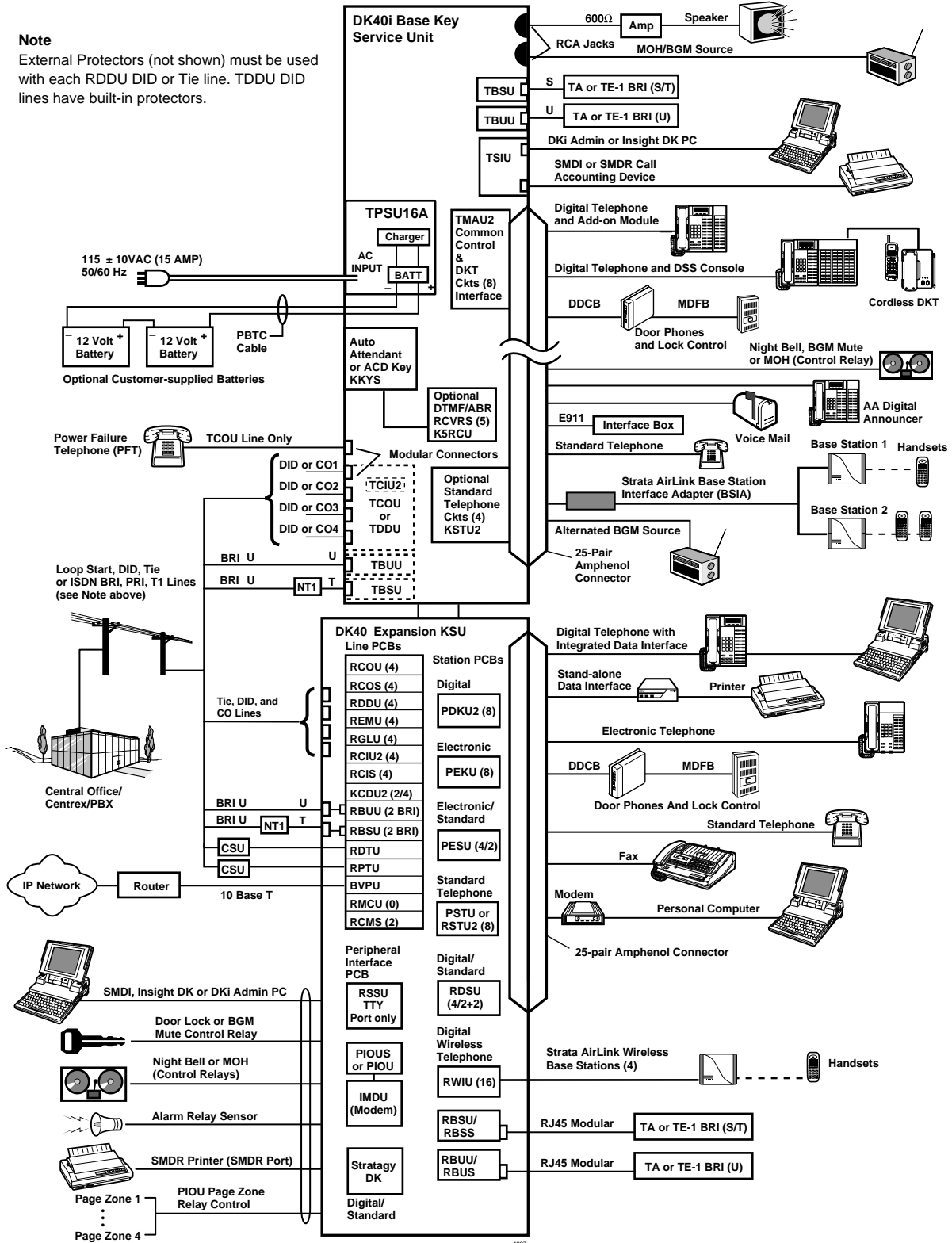
**Figure 8    Functional Block Diagram**

# Network Requirements

See for network requirements of station and line PCBs and interface cards.

# System Technology

## Pulse Code Modulation

Digital switching talkpaths enable all CO and intercom lines to be accessed simultaneously. Analog-to-digital and digital-to-analog conversion is done by CODECs (coder plus decoder) on station and CO line PCBs.

## Custom Electronic Circuitry

Large Scale Integration (LSI) technology enables the Strata DK40i circuit designs to be simple and efficient. Gate arrays using very large scale integration save vast amounts of space by using the latest technology. More circuitry fits onto smaller PCBs for a more compact system. Widespread use of CMOS circuits minimize system power requirements.

## Stored Program Control

The system uses a 16-bit microprocessor for stored program control. Strata DK40i system operating software is stored on Read Only Memory (ROM), and individual configuration and custom programming is stored on Random Access Memory (RAM). A lithium battery with a life span of at least six years preserves RAM in the case of a power failure.

## Microprocessors

The system's main microprocessor is a 16-bit 68000-type that operates at a clock speed of 8 MHz. In addition, some PCBs use 8-bit, TMP90C840-type local microprocessors that run at 10 MHz. This distributed microprocessing architecture is used system-wide.

# Maintenance and Programming

Hardware maintenance and repair procedures describe how to quickly locate, remove, and replace defective parts and PCBs. System programming can be performed without taking the system out-of-service.

On-site programming can be executed with any 20-button proprietary LCD telephone or with a DKi Admin PC connected to an optional maintenance port. Off-site programming with DKi Admin is available through a customer-provided modem connected to the maintenance port.

## DKi Admin/DKi Backup

Toshiba DKi Admin software Release 4.3.1 and higher, enables customer data (configuration, station, and system options) to be downloaded to a PC and stored on a computer disk. The new customer data can then be uploaded to the DK System from the PC, changing customer program options on-site or remotely over telephone lines and/or modems.

The DKi Backup software is also available. DKi Backup consists of a subset of DKi Admin functions such as backup, restore and upgrade functions, but it cannot edit customer databases.

## StrataControl

StrataControl™ is a Windows-based PC application enabling limited access to Strata DK40i and DK424i system programming functions. See for more information.

# Strata DK424i 3

This chapter covers the new Strata DK424i digital business telephone system.

Strata DK424i easily connects to outside public telephone lines (CO lines). All of the telephones (stations) tied to the system can have direct access to each other as well as to the public network.

A modular design and a choice of four processors, also called common control units, enables the system to fit a variety of customer needs and capacities.

The DK424i can be configured as a single cabinet system that provides capacity of up to 64 CO lines and stations combined, and can grow to a five cabinet system that provides capacity for up to 432 CO lines and stations combined. These capacities assume that one slot is reserved for an optional External Page/Maintenance interface PCB. (See Tables 13~15 for details.)

The system line and station capacity can be increased by adding additional cabinets (see Figure 9 and Table 10) which have universal slots capable of interfacing with most line, station, and option interface PCBs available with the system.
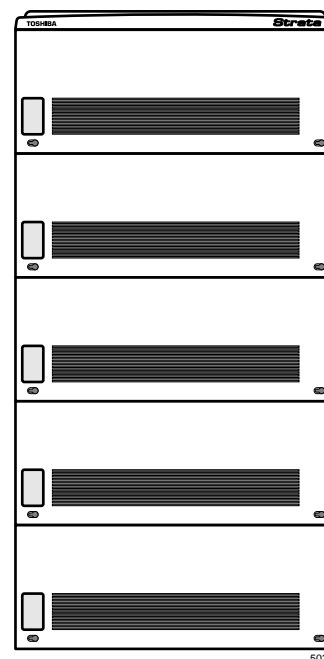


**Figure 9    Base/Expansion Cabinets**

## Architecture

The Base Cabinet and optional Expansion Cabinets are the building blocks of the system. Each system has a Base Cabinet, and can have from one to four Expansion Cabinets. All lines, stations, and options are tied together through the cabinets.

**Table 10    Cabinet Specifications**

| Cabinet | Weight | Height | Width | Depth |
|---------|--------|--------|-------|-------|
| Base Cabinet (CHSUB672) | 31 lbs. | 11.625 in. | 26.5 in. | 10.3 in. |
| Expansion Cabinet (CHSUE672) | 29 lbs. | 9.75 in. | 26.5 in. | 10.3 in. |

# Processor PCBs

The system operates with one of four processors (B1CU, B2CAU/B2CBU, B3CAU/B3CBU, or B5CAU/B5CBU). These processors can only be installed in dedicated slots in the Base Cabinet (slots B101 and B102).

♦ The B1CU unit consists of a single PCB. The B1CU processor supports only the DK424i Base Cabinet with up to eight universal slots.

♦ B2CAU/B2CBU consists of two PCBs that support up to two cabinets, with up to 14 universal slots. Expansion Cabinet slots S207~S210 are *not* available with the B2CAU/B2CBU processors.

♦ B3CAU/B3CBU consists of two PCBs that support up to three cabinets, with up to 28 universal slots.

♦ B5CAU/B5CBU consists of two PCBs that supports up to five cabinets, with up to 48 universal slots.

Each processor provides a MOH/BGM source interface, and connectors to mount optional DTMF receiver PCBs required for some CO line types and peripherals, as described below. Each processor provides an interface for connecting an optional feature key (RKYS) as described below.

B3CAU/B3CBU and B5CAU/B5CBU require a remote maintenance PCB, usually installed in slot S101; the remote maintenance PCB is optional for the B1CU and B2CAU/B2CBU. All configurations shown in this document assume this PCB is installed.

Table 11 lists the clock speed and available chips and memory for each processor.

**Table 11        Strata DK424i Processors and Memory**

| Cabinets | B1CU | B2CAU/B2CBU | B3CAU/B3CBU | B5CAU/B5CBU |
|---|---|---|---|---|
| **Main CPU** | 68000 (8.192 MHz) | 68000 (16.384 MHz) | 68000 (16.384 MHz) | 68EC020 (16.0 MHz) |
| **Sub-CPU** | TMP90C802-4011 x 1 (10MHz) | TMP90C802-4011 x 2 (10MHz) | TMP90C802-4011 x 3 (10MHz) | TMP90C802-4011 x 5 (10MHz) |
| **Program Memory** | 2MB (4MB x 2) EPROM | 2MB (4MB x 4) EPROM | 2MB (4MB x 4) EPROM | 2 MB (4MB x 4) Flash Memory |
| **RAM** | 1MB (4MB x 2) | 21MB (4MB x 4) | 2MB (4Mb x 4) | 2.5MB (4MB x 4 + 1MB x 4) |

## Processor PCB Subassemblies

Subassemblies required for some features can be added to the processor PCBs. Also see "Summary of PCBs and Subassemblies" on Page 45.

### DTMF Receiver Subassembly (BRCS)

The BRCS is required to translate DTMF tones needed for DISA, Tie/DID/Dialed Number Identification Service (DNIS)/Automatic Number Identification (ANI) lines, voice mail, AA announcement devices, DTMF standard telephones, and other devices to data signals for the system.

The BRCS can be attached to the processor and is available with either 4, 8, or 12 (BRCS-4, -8 or -12) shared receiver circuits. See Table 38 on Page 95 for more information.

### RKYS Feature Key Upgrades

The system can be upgraded for built-in AA, Automatic Call Distribution (ACD), Software Management Information System (SMIS), Call Center Viewer and Insight DK with the following feature keys that attach to the processor. See Table 12 for a list of features provided by RKYS feature keys.

**Table 12    RKYS Features**

| Features Provided to all DK424i Processors | RKYS1 | RKYS2 | RKYS3 |
|---|---|---|---|
| Built-in Auto Attendant | X | X | X |
| ACD | | X | X |
| ACD with MIS data information | | | X |

# Cabinet Slots

## Base Cabinet

The Base Cabinet has two slots reserved for the system processor PCBs and eight universal slots, labeled "S101~S108," that can accommodate station, line or option PCBs (see Figure 10). It also houses a power supply described later in this chapter.
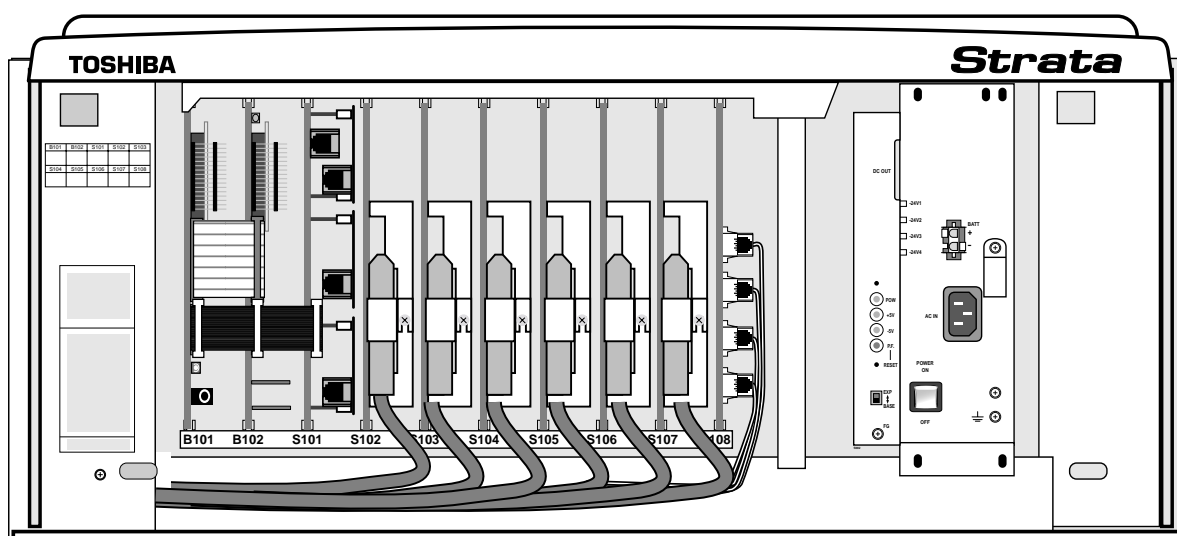


**Figure 10    DK424i Base Cabinet Interior**

## Expansion Cabinets

Expansion cabinets can be added to increase station and CO line capacity of systems that allow multiple cabinets. Figure 11 shows an example of the interior of an expansion cabinet.

Refer to the following section for station/line capacities. Table 13 shows the number of stations and lines allowed when additional cabinets and PCBs are used.
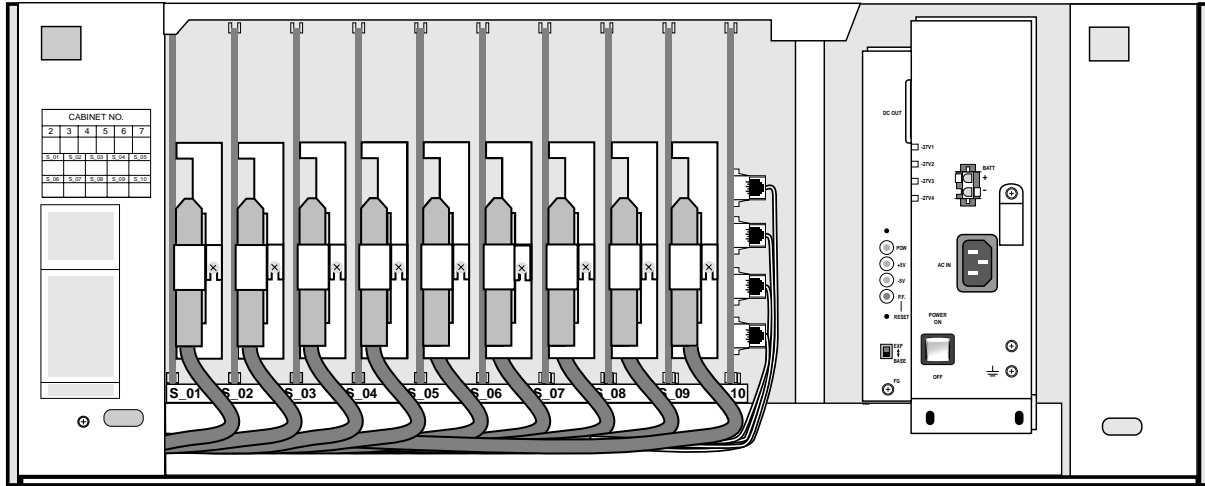


**Figure 11    DK424i Expansion Cabinet Interior**

## Printed Circuit Boards (PCBs)

PCBs are installed in the cabinets to provide interface for stations, lines, and peripherals. Each PCB measures 7.5 x 5.5 inches (190 x 140 mm) and mounts in the slot with a 44-pin backplane connector. PCB external connections to station equipment are made to the Main Distribution Frame (MDF) using industry-standard connectors. Also see Chapter 4 – Universal Slot PCBs.

# Maximum Station/Line Capacities

Attaining maximum system capacities depends on power consumption of a particular configuration. Configurations for a fully expanded system can range from 200 lines or 336 stations. All capacity configurations shown below assume one slot contains an eight circuit station PCB and one universal slot is reserved for an optional External Page/Maintenance PCB. A summary of the maximum number of lines and stations by processor is shown in Table 13.

**Table 13    Strata DK424i Maximum Capacities**

| Cabinets | B1CU | B2CAU/B2CBU | B3CAU/B3CBU | B5CAU/B5CBU |
|---|---|---|---|---|
| **Maximum CO Lines** | 32 | 104 | 120 | 200 |
| **Maximum Stations** | 56 | 112 | 192 | 336 |
| **Stations + Analog Lines** | 56 or 64* | 104 or 112* | 216 | 376 |
| **Stations + T1 &/or PRI Lines** | 64 | 128 | 248 | 432 |

\* Configuration numbers marked with a \* do not include a slot for the Remote Maintnenace PCB. All other configurations (without an \*) assume that a slot is provided for the Remote Maintenance PCB.

Configurations using analog line circuits are shown in Table 14. One universal slot is always required for a Remote Maintenance interface PCB with B3CAU/B3CBU and B5CAU/B5CBU; the Remote Maintenance PCB is optional for B1CU and B2CAU/B2CBU.

**Table 14    Maximum Configurations Using Analog CO Lines**

| B1CU | |
|---|---|
| 1 Cabinet | |
| 8 Universal Slots | |
| 56 Stations Max. | |
| 32 CO Lines Max. | |
| 64 Stations + Analog Lines | |
| **Stations** | **Lines** |
| 56 | 0 |
| 56 | 8* |
| 48 | 8 |
| 48 | 16* |
| 40 | 16 |
| 40 | 24* |
| 32 | 24 |
| 32 | 32* |

| B2CAU/B2CBU | |
|---|---|
| 2 Cabinets | |
| 14 Universal Slots | |
| 112 Stations Max. | |
| 104 CO Lines Max. | |
| 112 Stations + Analog Lines | |
| **Stations** | **Lines** |
| 112 | 0* |
| 104 | 0 |
| 104 | 8* |
| 96 | 8 |
| 96 | 16* |
| 88 | 16 |
| 88 | 24* |
| 80 | 24 |
| 80 | 32* |
| 72 | 32 |
| 72 | 40* |
| 64 | 40 |
| 64 | 48* |
| 56 | 48 |
| 56 | 56* |
| 48 | 56 |
| 48 | 64* |
| 40 | 64 |
| 40 | 72* |
| 32 | 72 |
| 32 | 80* |
| 24 | 80 |
| 24 | 88* |
| 16 | 88 |
| 16 | 96* |
| 8 | 96 |
| 8 | 104* |

| B3CAU/B3CBU | |
|---|---|
| 3 Cabinets | |
| 28 Universal Slots | |
| 192 Stations Max. | |
| 120 CO Lines Max. | |
| 216 Stations + Analog Lines | |
| **Stations** | **Lines** |
| 192 | 24 |
| 184 | 32 |
| 176 | 40 |
| 168 | 48 |
| 160 | 56 |
| 152 | 64 |
| 144 | 72 |
| 136 | 80 |
| 128 | 88 |
| 120 | 96 |
| 112 | 104 |
| 104 | 112 |
| 96 | 120 |

| B5CAU/B5CBU | |
|---|---|
| 5  Cabinets | |
| 48 Universal Slots | |
| 336 Stations Max. | |
| 200 CO Lines Max. | |
| 376 Stations + Analog Lines | |
| **Stations** | **Lines** |
| 336 | 40 |
| 328 | 48 |
| 320 | 56 |
| 312 | 64 |
| 304 | 72 |
| 296 | 80 |
| 288 | 88 |
| 280 | 96 |
| 272 | 104 |
| 264 | 112 |
| 256 | 120 |
| 248 | 128 |
| 240 | 136 |
| 232 | 144 |
| 224 | 152 |
| 216 | 160 |
| 208 | 168 |
| 200 | 176 |
| 192 | 184 |
| 184 | 192 |
| 176 | 200 |

\*  Configuration numbers marked with a * do not include a slot for the Remote Maintnenace PCB. All other configurations (without an *) assume that a slot is available for the Remote Maintenance PCB.

Configurations using T1 and/or ISDN PRI lines are shown in Table 15. One universal slot is always required for a Remote Maintenance interface PCB with B3CAU/B3CBU and B5CAU/ B5CBU; the Remote Maintenance PCB is optional for B1CU and B2CAU/B2CBU.

**Table 15    Maximum Configurations Using T1 and/or ISDN PRI Lines**

| B1CU | | B2CAU/B2CBU | | B3CAU/B3CBU | | B5CAU/B5CBU | |
|---|---|---|---|---|---|---|---|
| 1 Cabinet | | 2 Cabinets | | 3 Cabinets | | 5 Cabinets | |
| 8 Universal Slots | | 14 Universal Slots | | 28 Universal Slots | | 48 Universal Slots | |
| 56 Stations Max. | | 112 Stations Max. | | 192 Stations Max. | | 336 Stations Max. | |
| 32 CO Lines Max. | | 120 CO Lines Max. | | 120 CO Lines Max. | | 196 CO Lines Max. | |
| 64 Stations + Digital Lines | | 128 Stations + Digital Lines | | 248 Stations + Digital Lines | | 432 Stations + Digital Lines | |
| **Stations** | **T1/PRI Lines** | **Stations** | **T1/PRI Lines** | **Stations** | **T1/PRI Lines** | **Stations** | **T1/PRI Lines** |
| 56 | 0 | 112 | 0* | 192 | 0 | 336 | 0 |
| 56 | 8/8* | 104 | 0 | 192 | 16/16 | 336 | 16/16 |
| 48 | 16/16 | 104 | 16/16* | 192 | 24/23 | 336 | 24/23 |
| 40 | 24/23 | 96 | 16/16 | 192 | 40/40 | 336 | 40/40 |
| 32 | 32/32 | 96 | 24/23* | 184 | 48/46 | 336 | 48/46 |
| | | 88 | 24/23 | 176 | 64/64 | 336 | 64/64 |
| | | 88 | 40/40* | 168 | 72/69 | 328 | 72/69 |
| | | 80 | 40/40 | 160 | 88/88 | 320 | 88/88 |
| | | 80 | 48/46* | 152 | 96/92 | 312 | 96/92 |
| | | 72 | 48/46 | 136 | 112/112 | 304 | 112/112 |
| | | 64 | 64/64 | 128 | 120/115 | 296 | 120/115 |
| | | 56 | 72/69 | | | 288 | 136/136 |
| | | 40 | 88/88 | | | 280 | 144/138 |
| | | 32 | 96/92 | | | 272 | 160/160 |
| | | 16 | 112/112 | | | 264 | 168/161 |
| | | 8 | 120/115 | | | 248 | 184/184 |
| | | | | | | 240 | 192/188 |

\* Configuration numbers marked with a * do not include a slot for the Remote Maintnenace PCB. All other configurations (without an *) assume that a slot is available for the Remote Maintenance PCB.

**Note**    In some configurations, PRI lines are less because one channel is required for control of each 23 or 47 PRI lines.

# ISDN BRI Circuit Capacity Guidelines

The tables in this section show the maximum capacities for ISDN BRI circuits using RBUU/RBUS and/or RBSU/RBSS PCBs. Guidelines 1~7 below apply to Tables 16~19.

1. Each BRI circuit can be configured to support either one BRI (TE or TA) ISDN station; or two ISDN line channels.

2. A maximum of eight BRI circuits may be used as BRI line circuits to connect to the ISDN Central Office. Each circuit provides two CO line channels to the DK424i.

3. Each BRI circuit (S/T and/or U-type) provides two B channels plus one D channel and reduces the system capacity by two station ports and two CO lines, regardless of how it is configured (line or station). Each (S/T) BRI station circuit allows up to two TE-1 and TA devices to share the BRI B channels (two simultaneous calls maximum per BRI circuit.). Each BRI-U station circuit supports one TE-1 or TA device.

4. In Tables 16~19, other stations include Toshiba digital and electronic telephones, or attendant consoles, standard telephones and devices.

5. In Tables 16~19, other lines include analog and digital (T1 or PRI) loop start, ground start, DID, and Tie lines.

6. RBSS can only be used for BRI stations. All other BRI PCBs can be configured as line or station BRI circuits.

7. Some configurations require T1 or PRI lines to reach the maximum configuration.

**Table 16    B1CU Maximum ISDN BRI Configuration**

| B1CU | |
|---|---|
| 1 Cabinet<br>8 Universal Slots<br>56 Stations Max.<br>32 CO Lines Max.<br>64 Stations + Lines Max. | |
| **BRI Circuits (2B + 1D channel each)** | **Other Stations & Lines Combined (see Guidelines 4 & 5)** |
| 14 | 8 |
| 12 | 16 |
| 10 | 24 |
| 8 | 32 |
| 6 | 40 |
| 4 | 48 |
| 2 | 56 |
| 0 | 64 |

**Table 17    B2CAU/B2CBU Maximum ISDN BRI Configuration**

| B2CAU/B2CBU | |
|---|---|
| 2 Cabinets<br>14 Universal Slots<br>104 Stations Max.<br>120 CO Lines Max.<br>128 Stations + Lines Max. | |
| **BRI Circuits (2B + 1D channel each)** | **Other Stations & Lines Combined (see Guidelines 4 & 5)** |
| 30 | 8 |
| 26 | 24 |
| 22 | 40 |
| 18 | 56 |
| 14 | 72 |
| 10 | 88 |
| 6 | 104 |
| 2 | 120 |
| 0 | 128 |

**Table 18 B3CAU/B3CBU Maximum ISDN BRI Configuration**

| B3CAU/B3CBU | |
|---|---|
| 3 Cabinets<br>28 Universal Slots<br>192 Stations Max.<br>120 CO Lines Max.<br>248 Stations + Lines Max. | |
| **BRI Circuits<br>(2B + 1D channel each)** | **Other Stations & Lines Combined (see Guidelines 4 & 5 on Page 25)** |
| 48 | 56 |
| 44 | 72 |
| 40 | 88 |
| 36 | 104 |
| 32 | 120 |
| 28 | 136 |
| 24 | 152 |
| 20 | 168 |
| 16 | 184 |
| 12 | 200 |
| 8 | 216 |
| 4 | 232 |
| 0 | 248 |

**Table 19 B5CAU/B5CBU Maximum ISDN BRI Configuration**

| B5CAU/B5CBU | |
|---|---|
| 5 Cabinets<br>48 Universal Slots<br>336 Stations max.<br>200 CO Lines max.<br>432 Stations + Lines Max. | |
| **BRI Circuits<br>(2B + 1D channel each)** | **Other Stations & Lines Combined (see Guidelines 4 & 5 on Page 25)** |
| 72 | 144 |
| 68 | 160 |
| 64 | 176 |
| 60 | 192 |
| 56 | 208 |
| 52 | 224 |
| 48 | 240 |
| 44 | 256 |
| 40 | 272 |
| 36 | 288 |
| 32 | 304 |
| 28 | 320 |
| 24 | 336 |
| 20 | 352 |
| 16 | 368 |
| 12 | 384 |
| 8 | 400 |
| 4 | 416 |
| 0 | 432 |

Configurations using analog line circuits are shown in Table 14. Configurations using T1 and/or ISDN PRI lines are shown in Table 15. All capacity configurations Tables 14~23 assume one universal slot is used for an External Page/Maintenance interface PCB.

# ISDN BRI CIrcuit Capacity Guidelines

The tables in this section show the maximum capacities for ISDN BRI circuits using RBUU/RBUS and/or RBSU/RBSS PCBs. Guidelines 1~7 below apply to Tables 20~23.

1. Each BRI circuit can be configured to support either one BRI (TE or TA) ISDN station; or two ISDN line channels.

2. A maximum of eight BRI circuits may be used as BRI line circuits to connect to the ISDN Central Office. Each circuit provides two CO line channels to the DK424i.

3. Each BRI circuit (S/T and/or U-type) provides two B channels plus one D channel and reduces the system capacity by two station ports and two CO lines, regardless of how it is configured (line or station). Each (S/T) BRI station circuit allows up to two TE-1 and TA devices to share the BRI B channels (two simultaneous calls maximum per BRI circuit.). Each BRI-U station circuit supports one TE-1 or TA device.

4. In Tables 20~23, other stations include Toshiba digital and electronic telephones, or attendant consoles, standard telephones and devices.

5. In Tables 20~23, other lines include analog and digital (T1 or PRI) loop start, ground start, DID, and Tie lines.

6. RBSS can only be used for BRI stations. All other BRI PCBs can be configured as line or station BRI circuits.

7. Some configurations require T1 or PRI lines to reach the maximum configuration.

**Table 20     B1CU Maximum ISDN BRI Configuration**

| B1CU | |
|---|---|
| 1-Cabinet<br>8-Universal Slots<br>56-Stations Max.<br>32-CO Lines Max.<br>64-Stations + Lines Max. | |
| BRI Circuits<br>(2B + 1D channel each) | Other Stations &<br>Lines Combined<br>(see Guidelines 4 & 5) |
| 14 | 8 |
| 12 | 16 |
| 10 | 24 |
| 8 | 32 |
| 6 | 40 |
| 4 | 48 |
| 2 | 56 |
| 0 | 64 |

**Table 21    B2CAU/B2CBU Maximum ISDN BRI Configuration**

| B2CAU/B2CBU | |
|---|---|
| 2-Cabinets<br>14-Universal Slots<br>104-Stations Max.<br>120-CO Lines Max.<br>128-Stations + Lines Max. | |
| BRI Circuits<br>(2B + 1D channel each) | Other Stations & Lines<br>Combined (see Guidelines<br>4 & 5 on Page 27) |
| 30 | 8 |
| 26 | 24 |
| 22 | 40 |
| 18 | 56 |
| 14 | 72 |
| 10 | 88 |
| 6 | 104 |
| 2 | 120 |
| 0 | 128 |

**Table 22    B3CAU/B3CBU Maximum ISDN BRI Configuration**

| B3CAU/B3CBU | |
|---|---|
| 3-Cabinets<br>28-Universal Slots<br>192-Stations Max.<br>120-CO Lines Max.<br>248-Stations + Lines Max. | |
| BRI Circuits<br>(2B + 1D channel each) | Other Stations & Lines<br>Combined (see Guidelines<br>4 & 5 on Page 27) |
| 48 | 56 |
| 44 | 72 |
| 40 | 88 |
| 36 | 104 |
| 32 | 120 |
| 28 | 136 |
| 24 | 152 |
| 20 | 168 |
| 16 | 184 |
| 12 | 200 |
| 8 | 216 |
| 4 | 232 |
| 0 | 248 |

**Table 23    B5CAU/B5CBU Maximum ISDN BRI Configuration**

| B5CAU/B5CBU | |
|---|---|
| 5-Cabinets<br>48-Universal Slots<br>336-Stations max.<br>200-CO Lines max.<br>432-Stations + Lines Max. | |
| BRI Circuits<br>(2B + 1D channel each) | Other Stations & Lines<br>Combined (see Guidelines<br>4 & 5 on Page 27) |
| 72 | 144 |
| 68 | 160 |
| 64 | 176 |
| 60 | 192 |
| 56 | 208 |
| 52 | 224 |
| 48 | 240 |
| 44 | 256 |
| 40 | 272 |
| 36 | 288 |
| 32 | 304 |
| 28 | 320 |
| 24 | 336 |
| 20 | 352 |
| 16 | 368 |
| 12 | 384 |
| 8 | 400 |
| 4 | 416 |
| 0 | 432 |

# Remote Expansion Cabinet Unit

The RRCU PCB enables a DK424i Expansion Cabinet to be located up to three kilometers from its Base Cabinet. One RRCU connects to up to two ribbon-type Data Cables and applies the inter-cabinet signal to a fiber-optic pair. One fiber pair can support one or two expansion cabinets in one remote location using one RRCU in the Base Cabinet and another in the Remote Expansion Cabinet.

A DK424i Base Cabinet will support up to four RRCU PCBs. A DK424i will support up to four Remote Expansion Cabinets.

Remote cabinets support all line and trunk interfaces. Network clock signals can only be derived from digital trunks installed in the Base Cabinet (Master) location.

One BDCL cable set is required for each RRCU (master and slave) except for the daisy chain configuration where only one BDCL cable set is required at the intermediate site.

# Power Considerations

Each DK424i Base and Expansion Cabinet houses a power supply that furnishes power to all of the stations and some of the peripherals that interface with the cabinet (see Table 24).

**Table 24    DK424i Electrical Characteristics**

| DK424i Primary AC Power Voltage | | | |
|---|---|---|---|
| Input Voltage | 115VAC±10V or 208VAC±20V or 240VAC±20V | | |
| AC Frequency | 50/60 Hz, Single-phase | | |
| Watts per cabinet (continuous) | 180 | | |
| Watts for five cabinet system | 900 | | |
| **DK424i Primary Power Current  Consumption  (Rating in Amperes)** | | | |
| | 120VAC | 208VAC | 240VAC |
| 1 cabinet | 3.2 amps. | 2.2 amps. | 2.0 amps. |
| 2 cabinets | 6.4 amps. | 4.4 amps. | 4.0 amps. |
| 3 cabinets | 9.6 amps. | 6.6 amps. | 6.0 amps. |
| 4 cabinets | 12.8 amps. | 8.8 amps. | 8.0 amps. |
| 5 cabinets | 16.0 amps. | 11.0 amps. | 10.0 amps. |
| **Power Supply Unit (BPSU672)** | | | |
| DC voltage output specification | -24VDC (-26.3~-27.8VDC, 6.0 DC amps. ) +5VDC (+4.5~5.5VDC, 4.0 DC amps.) -5VDC (-4.5~-5.5VDC, 0.8 DC amps.) | | |

## Reserve Power

Two or four customer-supplied 12VDC reserve batteries can be connected to the system to maintain normal operation during a power failure (see Tables 26 and 27). The batteries are kept in a highly-charged state by the standard power supply and must be connected when the system is operating normally. Fully charged batteries must be connected when normal AC power is available, batteries cannot be connected after/during an actual power failure.

**Table 25    Reserve Power Characteristics**

| Battery Charger Characteristics | |
|---|---|
| Charger: current limiting<br>Nominal float voltage: 2.275 volts/cell<br>Charge current: 0.7 amps. maximum<br>Battery discharge cut-off voltage: 20.5 ±0.5VDC | Maximum Battery Consumption:<br>-24VDC<br>1 cabinet — 6.0 amps.<br>2 cabinets — 12.0 amps.<br>3 cabinets — 18.0 amps.<br>4 cabinets — 24.0 amps.<br>5 cabinets — 30.0 amps. |

**Table 26    Typical Reserve Power Duration Estimates (in hours)**

| Number of Cabinets | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Estimated operation time<br>Two-battery configuration | 12.0 hr. | 6.0 hr. | 4.0 hr. | 3.0 hr. | 2.5 hr. |
| Estimated operation time<br>Four-battery configuration | 24.0 hr. | 12.0 hr. | 8.0 hr. | 6.0 hr. | 5.0 hr. |
| DC Current Drain (-24VDC) | 4.6 amps. | 8.7 amps. | 12.8 amps. | 16.9 amps. | 21.0 amps. |

# Primary/Reserve Power Cabinet Hardware

The lightweight and compact design enables easy wall or floor mounting. The BFIF hardware kit is needed for floor mounting (see Table 27). If floor mounting three or more cabinets, AC and reserve power must be connected to the BCCB conduit connection box option by a licensed electrician. If more than two cabinets require reserve power batteries, the BBDB must be installed. Wall mounting the system does not require special hardware.

Underwriters' Laboratory (UL) and local electrical codes require certain standards for connecting commercial AC and reserve power to the Strata DK424i system. Table 27 describes which assemblies may be required to meet UL and local electrical code standards.

**Table 27        Power Cabinet Hardware**

| Option | Description |
|---|---|
| **BPSU672** | DK424i cabinet power supply. This power supply can operate with 120VAC, 208VAC, or 240VAC connected as the system's primary AC power source.  It automatically detects and adjusts to the type of primary AC power that is connected. The power supply is included with each cabinet ordered but must be installed in the field.<br><br>Standard 9 ft. AC power cords for AC120VAC/15A are provided with DK424i Base or Expansion cabinets.  When AC208V or AC240V power is used, a special AC cord, BACL240, is required for each cabinet power supply and must be ordered separately. |
| **RPSB2** | Cabinet power strip for 120VAC primary power – provides three standard 120VAC/15A outlets (NEMA 1-15R) and nine ft. AC power cord with standard 120VAC/15A plug (NEMA1-15P). This unit is field installed inside system cabinet side panels.<br><br>One RPSB2 is required for two or three cabinet systems if the local electric code allows only one AC power cord to be connected to the system.<br><br>**Note**    If the local electric code allows only one AC power cord to be connected to the system, 208VAC or 240VAC must be used as primary AC power for systems with four or more cabinets.<br><br>One RPSB2 is required for a three or four cabinet system if the local electric code allows two AC power cords connected to the system.<br><br>Two RPSB2s are required for a five cabinet system if the local electric code allows two AC power cords connected to the system. |
| **BPSB240** | Cabinet power strip for 208VAC or 240VAC primary power. Provides three 240VAC/20A outlets (NEMA 6-20R) and 9ft. AC power cord with a standard 240VAC/20A plug (NEMA 6-20P). This unit is field installed inside system cabinet side panels.<br><br>One BPSB240 is required for two or three cabinet systems.<br><br>Two BPSB240s are required for four or five cabinet systems.<br><br>**Notes**<br><br>♦    Local electric codes allow only one AC power cord to be connected to the system when using 208VAC or 240VAC as the primary AC power.<br><br>♦    If using 208VAC as primary power, the plug on the BPSB240 AC power cord (NEMA 6-20P) may have to be changed by a certified electrician depending on local electric codes. |
| **BACL240A** | AC208V or AC240VAC nine ft. power supply cord. This cord must be used when the system is powered by 208VAC or 240VAC. One cord is required for each cabinet power supply and must be ordered separately only if using 208VAC or 240VAC as the system primary AC power.<br><br>**Note**    The cord is equipped with a 250VAC/20A plug (NEMA 6-20P) which is standard for 240VAC. If using 208VAC as the system primary power this cord may not exit the cabinet, a BPSB240 power strip is required and the power strip plug may have to be changed by a certified electrician depending on local electric codes. |
| **PBTC-3M** | A three-meter battery cable used to connect reserve power batteries to the system power supply when the system has less than three cabinets. One reserve power cable is required for each cabinet in a one or two cabinet system (wall or floor mount). The cable connects the DK424i cabinet power supply directly to the battery terminals (a BBDB is not required). |
| **BBDB** | DK424i reserve power battery distribution box is required when connecting reserve power batteries to three or more cabinets (wall or floor mount). The box is field installed into one of the DK424i cabinet side panels.<br><br>The BBDB provides 7 BBTC2A-2.0M, battery distribution cables to connect reserve power from the BDDB box to each individual cabinet power supply.<br><br>One or two BBTC1A-2.0M must be ordered separately when using the BBDB battery distribution box. |

**Table 27    Power Cabinet Hardware** *(continued)*

| Option | Description |
|---|---|
| **BBTC1A-2.0M** | A two-meter battery cable used to connect reserve power batteries to the BBDB battery distribution box. One reserve power cable is required in a three or four cabinet system and two cables are required for five cabinet systems (wall or floor mount). The cable connects DK424i BBDB box directly to the battery terminals. |
| **BCCB120 or BCCB240** | DK424i conduit connection box is installed in the bottom cabinet, side panel. It is used to hardwire Primary AC power and reserve battery power connections through conduit. These boxes are required by UL for three or more floor mounted cabinets. Conduit boxes are not required for wall mounted systems with any number of cabinets or floor mounted system with one or two cabinets. They can be used as an option on any system. |
| | The BCCB120 is required when connecting AC120VAC as the primary power source and the BCCB240 is required when connecting AC208VAC or AC240VAC as the primary power source. |
| | BCCB conduit boxes must be field installed by a certified electrician. |
| **BFIF** | Floor mount fixture kit is required when floor mounting DK424i cabinets. |
| | Provides two metal stands for mounting any number of DK424i cabinets on the floor. Three pairs or wall brackets (RWBF) are supplied with BFIF to use when mounting three or more DK424i cabinets on floor. The wall brackets are needed to secure floor-mounted systems to the wall for safety purposes. |

# DK424 and DK424i Hardware Compatibility

The following tables shows the PCB compatibility for the DK424 and D424i systems.

| Category | Unit Name | DK424 | DK424i |
|---|---|:---:|:---:|
| **Processor Card** | RCTU cards for DK424 | X | NC |
| | B_C_U cards for DK424i | NC | X |
| **DTMF Receiver Unit** | RRCS-4/8/12 | X | NC |
| | BRCS-4/8/12 | NC | X |
| **Optional Interface Unit** | RSIU | X | X |
| | PIOU | X | X |
| | RSSU | X | X |
| | PIOUS | X | X |
| **Terminal** | EKT2000 | X | X |
| | EKT6000 | X | X |
| | EKT6500 | X | X |
| | HDSS | X | X |
| | Existing Proprietary Attendant Console | X | X |
| | DK424 PC Attendant | X | X |
| | RPCI (RS-232C) - Data | X | X |
| | RPCI (RS-232C) - TAPI | X | X |
| | DKT1000 | X | X |
| | DKT2000 | X | X |
| **Base Cabinet** | DKSUB424A | X | NC |
| | CHSUB672A | NC | X |
| **Expansion Cabinet** | DKSUE 424A | X | NC |
| | CHSUE672A | NC | X |
| | Data Cable for Expansion Cabinet DK424 | X | NC |
| | Data Cable for Expansion Cabinet DK424i | NC | X |
| **Power Supply Unit** | RPSU424A1 | X | NC |
| | BPSU672A (120VAC/208VAC/240VAC power supply) | NC | X |
| **Conduit Connection Box** | RCCB2A1 | X | NC |
| | BCCB120A (120V box) | NC | X |
| | BCCB240A (240V box) | NC | X |
| **Battery Distribution Box** | RBDB2A | X | NC |
| | BBDB1A (new Battery Distribution Box, seven BBTC2A-2.0M) | NC | X |
| **Power Strip** | RPSB1A1 | X | NC |
| | RPSB2A (current 120VAC power strip) | X | X |
| | BPSB240A (new 240VAC power strip) | NC | X |
| **Battery Cable** | PBTC-3M | X | X |
| | BBTC1A-2.0M | NC | X |

*X = Compatible*
*NC = Not Compatible*

# Functional Block Diagrams

The Functional Block Diagrams show the PCBs and interface connectors used for connecting the stations and peripherals (see Figures 12~14).



**Figure 12    KSU Processor and Optional Interface PCBs**

**Figure 13    CO Line Side Functional Block Diagram**

**PDKU2**
8 Digital Telephone Circuits

**RWIU**
32 Digital Wireless Telephone Circuits

**RDSU**
4 Digital Telephone Circuits
2 Standard Telephone Circuits

| **RSTS** (Option PCB) 2 Standard Telephone Circuits | **R48S** (Option PCB, RDSU/RSTU2 Only) -48 Volt Loop Supply |

**RSTU2**
8 Standard Telephone Circuits

**R48S** (Option PCB, RDSU/RSTU2 Only) -48 Volt Loop Supply

**PEKU**
8 Electronic Telephone Circuits

**EOCU** (Option PCB to Receive Speaker OCA)

**PESU**
4 Electronic Telephone Circuits
2 Standard Telephone Circuits

**EOCU** (Option PCB to Receive Speaker OCA)

**RATU**
4 Attendant Console Circuits

25-pair Amphenol Connectors and Cables (except RBSU/RBSS)

**RBSU**[3]
2B+1D/Circuit (2-NT Circuits)

**RBSS**
2B+1D/Circuit (2-NT Circuits)

**RBUU**[3]
2B+1D/Circuit (2-LT Circuits)

**RBUS**
2B+1D/Circuit (2-LT Circuits)

Data and Speech Highway

Digital Telephone (DKT) and Add-on Module

Digital Cordless Telephone

Digital Single Line Telephone (DKT)

Digital Telephone with RPCI-DI
1 Pair Modular Cord

TAPI PC[1]

RS-232 Cable

DDCB    MDFB

Door Phones and Lock Controls

Strata AirLink Wireless Base Stations (4)

Digital Telephone with DSS Console

DIU-DS

Mainframe Computer[1]

Handsets

Modem (Pool)

RS-232 Cables

DIU-DS

Printer (Sharing)[1]

Voice Mail

PC[1]

DIU-DS

RS-232 Cables

Base Station 1    Handsets

Modem

Strata AirLink Base Station Interface Adapter (BSIA)

Base Station 2

1-pair Modular Cords    FAX[1]

**DPFT**

Power Failure Transfer Unit

Power Failure Standard Telephone (8 max.)[1]

Digital Announcer for ACD and Auto Attendant

Secondary Protector

Standard Telephone [2]

Off-premises Station[1]

HESB Loud Ringing Bell

Electronic Telephone (EKT)

EKT with HDSS Console (PEKU Only)

Alternate BGM[1] source to stations and Page Output

Door Phones and Lock Controls

HDCB    MDFB

PC Attendant Console

PC

S[4]    R[4]    COM Port

**TA**

S[4]

U[4]

ISDN Telephone (TE-1, S-Type)

PC with Video Card (TE-1, U-Type)

U[4]

ISDN Telephone (TE-1, U-Type)

4250

Modular Jacks

Main Distribution Frame (MDF)

1. Customer-supplied equipment
2. RSTU2 is required for standard telephone message waiting lamp.
3. RBUU/RBUS (Release 4.3).
4. U, S, T, R are ISDN reference model termination points.

**Figure 14    Station Side Functional Block Diagram**

# Maintenance and Programming

Hardware maintenance and repair procedures describe how to quickly locate, remove, and replace defective parts and PCBs. System programming can be performed without taking the system out-of-service.

On-site programming can be executed with any 20-button proprietary LCD telephone or with a DKi Admin PC connected to an optional maintenance port. Off-site programming with DKi Admin is available through a customer-provided modem connected to the maintenance port.

## DKi Admin/DKi Backup

Toshiba DKi Admin software Release 4.3.1 and higher, enables customer data (configuration, station, and system options) to be downloaded to a PC and stored on a computer disk. The new customer data can then be uploaded to the DK System from the PC, changing customer program options on-site or remotely over telephone lines and/or modems.

The DKi Backup software is also available. DKi Backup consists of a subset of DKi Admin functions such as backup, restore and upgrade functions, but it cannot edit customer databases.

## StrataControl

StrataControl is a Windows-based PC application enables limited access to Strata DK40i and DK424i system programming functions. See "StrataControl" on Page 89 for more information.

# Universal Slot PCBs

# 4

This chapter describes each of the PCBs that install into the universal slots of the Strata DK40i Expansion KSU, the DK424i Base/Expansion Cabinets. The following paragraphs categorize the cards according to their function.

Descriptions here apply to both DK40i, DK424i unless noted otherwise. The DK14 does not support any universal slot PCBs.

Feature subassemblies that plug onto a universal slot PCB, such as the Standard Telephone Interface Subassembly (RSTS), are listed below the associated PCB. For a list of available subassemblies, see .

## Station PCBs

### Digital Telephone Interface Unit (PDKU2)

The PDKU2 has eight digital telephone circuits that can support digital telephones (cordless as well as corded), integrated PC interface data units for data calling and/or TAPI application, off-hook call announce, DDSS consoles or DADMs for attendant stations that must handle a heavy load of calls, and a DDCB for a variety of applications.

Each of these devices only requires one circuit except for the integrated PC interface unit or DADM, which shares a circuit with the telephone to which they are connected.

### Digital/Standard Telephone Interface Unit (RDSU)

The RDSU in its basic configuration has two standard telephone circuits and four digital telephone circuits (cordless as well as corded). The standard telephone circuits can support the same devices that the RSTU2 can, with the exception of standard telephone message waiting lamps.

The digital circuits can support the same devices as the PDKU, except for the DDSS console. The RDSU can be equipped with an RSTS subassembly to provide two more standard telephone circuits, and an R48S subassembly to increase the standard telephone maximum loop length.

♦ **DK40i** – a K5RCU or K5RCU2 must be installed in the Base KSU to interpret DTMF tones transmitted by devices connected to the standard telephone circuits.

♦ **DK424i** – a BRCS must be installed on the main processor PCB to interpret the DTMF signals for devices connected to the standard telephone circuits.

### Standard Telephone Interface Subassembly (RSTS)

The RSTS attaches to the RDSU and adds two standard telephone circuits to the PCB. With the RSTS installed, the RDSU provides four standard telephone circuits and four digital telephone circuits. (RSTS does not support standard telephone message waiting.)

## Strata AirLink Wireless Interface Unit (RWIU)

The RWIU interfaces the DK40i, DK424i with the Strata AirLink Telephone wireless system. The card functions as a protocol converter between the Base Stations and the PBX. It has four digital circuits that connect to four Base Stations using industry standard RJ11 jacks. Roaming and handoff functionality are present between all four Base Stations.

## CO Line/Digital Telephone Interface Unit (KCDU) (DK40i only)

The KCDU provides two analog loop start CO line circuits and four digital telephone circuits. The CO line circuits offer all of the features that the Base TCOU and the RCOU line circuits provide. The digital telephone circuits can support every peripheral (except for the DDSS console) that the PDKU2 and a Base KSU digital circuit can support. Up to four KDCU PCBs can be installed in the DK40i Expansion Unit.

**Note**    The RCIU2 Caller ID Interface Unit is required to add Caller ID with the KCDU PCB.

## Electronic Telephone Interface Unit (PEKU)

The PEKU provides eight electronic telephone circuits that can interface with electronic telephones, an alternate BGM source, a Direct Station Selection Console (HDSS), an external amplifier for DISA or two-CO line Conferencing.

## Standard/Electronic Telephone Interface Unit (PESU)

The PESU offers two standard and four electronic telephone circuits. Its standard circuits support the same devices as the KSTU2. Its electronic circuits interface with the same peripherals as the PEKU, except for the HDSS console.

♦    **DK40i** – a K5RCU or K5RCU2 must be installed in the Base KSU to interpret DTMF tones transmitted by devices connected to the standard telephone circuits.

♦    **DK424i** – a BRCS must be installed on the common control unit to interpret the DTMF signals for devices connected to the standard telephone circuits.

### Off-hook Call Announce Upgrade Unit (EOCU)

Electronic telephones connected to PEKU and PESU PCBs can receive speaker Off-hook Call Announce (OCA)—internal [DN] calls over their speaker while they are on another call—if the PCBs are equipped with an EOCU. Digital telephones also support this function, but do not require an EOCU in the KSU. Unlike digital telephones, electronic telephones cannot receive handset OCA.

## Standard Telephone Interface Unit (RSTU2)

The RSTU2 has eight circuits that can support single-line devices (one device per RSTU2 port). Besides rotary and DTMF standard telephones, the RSTU2 can support the Strata AirLink Wireless analog system, fax machines, dictation equipment, modems, a separate BGM source, off-premises stations, Toshiba Stratagy and VP voice mail systems, and digital announcement devices for optional built-in AA or ACD.

This PCB also supports the Message Waiting feature on standard telephones that are equipped with a 90VDC neon message waiting lamp.

The RSTU2 also provides an 80V RMS sine wave ring generator and has interface connectors for an optional R48S subassembly that increases the maximum possible station loop length from 600 to 1200 ohms.

♦ **DK40i** – a K5RCU or K5RCU2 must be installed in the Base KSU to interpret DTMF tones transmitted by devices connected to the standard telephone circuits.

♦ **DK424i** – a BRCS must be installed on the main processor PCB to interpret the DTMF signals for devices connected to the standard telephone circuits.

### 48V Loop Voltage (R48S)

The optional R48S unit can be connected to the RSTU2 or RDSU and, by creating 48V loop voltage instead of 24V, can extend the maximum possible loop length of standard telephone circuits (including the resistance of the phone) from 600 ohms to 1200 ohms, allowing standard telephones to be connected farther from the system. By using this unit, a less expensive type of off-premises lines can be used (see ).

# Console PCBs

## Attendant Console Interface Unit (RATU, DK424i only)

The RATU can support four attendant consoles. Multiple consoles enable automatic load-sharing on a rotation basis from a central call queue, increasing call handling efficiency. The RATU PCB in the Strata DK424i system cabinets connects to the PC Attendant Console Interface (RATI) via two pair of wires.

One RATU is available per system to support a maximum of four Attendant Consoles per system with B5CAU/B5CBU, two with B2CAU/B2CBU or B3CAU/B3CBU (any combination of PC or conventional consoles).

# CO Line PCBs

A summary of Strata DK station, CO line PCBs and feature subassemblies are listed in .

## Caller ID Interface Unit (RCIU2)

The RCIU2 is required, along with an analog ground/loop start CO line PCB, to provide the Caller ID feature. Caller ID is also known as CLID and is available at extra cost per line from the local Telco. It is sometimes known as a CLASS feature.

Each RCIU2 circuit receives and decodes telephone number and name information sent from the calling CO. Caller ID is available on analog loop start lines and analog ground start lines only. An RCIU2 circuit must be available with each RGLU2, RCOU/RCOS, PCOU or KCDU2 circuit that is to receive Caller ID. Built-in gas tubes help protect each RCIU2 circuit from lightning surges.

An RCIS subassembly PCB can be installed onto the RCIU2 to provide four additional Caller ID circuits.

### Caller ID Interface Subassembly (RCIS)

The RCIU2 comes equipped with four Caller ID circuits; an RCIS subassembly PCB can be installed onto the RCIU2 to provide four additional Caller ID circuits. Hence, an installed RCIU2/

RCIS can provide a maximum of eight Caller ID circuits per cabinet slot. Built-in gas tubes help protect each RCIU2/RCIS circuit from lightning surges.

## Loop Start CO Line Interface Unit (RCOU)

The RCOU in its basic configuration has four analog loop start CO line circuits, connecting to the public telephone network.

Each RCOU line can be programmed for DTMF or Dial Pulse signaling and has a switch to control potential excess volume that can be created by a nearby PBX or CO.

An optional RCOS subassembly can be attached to the RCOU for four more loop start lines. Each line can be programmed for DTMF or Dial Pulse signaling. Built-in gas tubes help protect each circuit from lightning.

### Loop Start CO Line Interface Subassembly (RCOS)

The RCOS can be attached to the RCOU to provide four additional analog loop start CO line circuits. Each RCOS line has all of the features that are available with the RCOU lines.

## Ground/Loop Start Interface CO Line Interface Unit (RGLU2)

The RGLU2 provides four analog CO line circuits which can be configured individually for ground start or loop start. Ground start should be used for applications requiring disconnect supervision, such as AA/Voice Mail, or ACD.

The RGLU2 also provides ring detection, dial outpulsing, Hold, and CO line flash signal. Each RGLU2 line can be programmed for DTMF or Dial Pulse signaling and has a switch to control potential excess volume that can be created by a nearby PBX or CO. Built-in gas tubes help protect each circuit from lightning.

## Direct Inward Dialing Interface Unit (RDDU)

The RDDU provides four analog DID lines, each of which is assigned a single office code along with a block of extension numbers. Each extension number is programmed to ring a [DN] selected in system programming. This enables calls over the same line to be routed to different stations.

Each DID line can be set for either Wink Start or Immediate Start. DID lines can also support DNIS and/or ANI. An optional K5RCU or K5RCU2 (DK40i) or BRCS (DK424i) tone receiver PCB is required for DTMF DID operation. Rotary DID signaling ability at 20 pps is a standard feature. An external protector is required for each line.

## Tie Line Unit (REMU)

The REMU has four analog circuits for E & M Type I or Type II signaling, Immediate Start or Wink Start Tie lines. A choice between 2- or 4-wire transmission is available as a jumper-plug option.

Tie lines can also support DNIS and/or ANI. An optional K5RCU or K5RCU2 (DK40i) or RRCS (DK424i) tone receiver PCB is required for DTMF Tie operation. An external protector is required for each line. REMU Tie lines are two-way and can be used for incoming and outgoing calls.

## Voice Over IP Gateway (BVPU)

The BVPU combines the functions of a four-circuit REMU E&M Tie line card and a Voice Over Internet Protocol (IP) gateway on a single PCB. The BVPU is an H.323 Version 2 compliant gateway and can interoperate with other H.323 devices as well as other BVPUs. The BVPU allows multiple Strata DKs to establish virtual Tie line connections across an IP network. The BVPU connects to the LAN through an RJ45, 10BaseT connection. An RJ21 jack provides a serial maintenance connection. This connection must be used to initiate the card. Once an IP address has been established, maintenance may be performed through the LAN connection.

## T1/DS-1 Interface Unit (RDTU2)

The RDTU provides either 8, 16 or 24 digital voice channels that can be individually configured for ground start CO line operation, loop start CO line operation, DID/DOD line operation (with hookflash) or Tie line operation (8 or 12 on DK40i). The number and type of channels for each RDTU installed is assigned in system programming. All RDTU line types are two-way and can be used for incoming and outgoing calls.

Any RDTU, DID/DOD, or Tie channel can be configured in system programming to receive DNIS and/or ANI information from long distance carriers.

The RDTU normally requires the installation of a Channel Service Unit, which is not supplied by Toshiba. RDTU T1/DS-1 digital voice channels can be configured for SF or ESF format and either AMI or B8ZS line coding (see Table 28).

The RDTU2 supports the hook flash capability. "SuperTrunk" requires hook flash operation on T1 two-way DID/DOD lines. The RDTU1 can be upgraded to support hook flash.

In most locations within the U.S., network connection using RDTU2 requires a dealer-supplied, UL-listed external CSU or in Canada, a CSA-certified CSU.

## ISDN Primary Rate Interface Unit (RPTU)

The Primary Rate Interface Unit is a 24-channel PRI card, which provides 1 data (control) channel and 23 bearer channels. All B channels appear and program as CO lines in the DK424i systems and can be individually configured for local service, FX, WATS, DID, Tie, etc., service operation. Network connection using the RPTU requires a dealer-supplied, UL-listed, external CSU in most locations in the U.S. In Canada, the CSU/DSU must be CSA certified.

See "ISDN Primary Rate Interface (PRI)" on Page 79 for more information.

## ISDN S/T-type Basic Rate Interface Unit (RBSU)

The Basic Rate Interface (BRI) Unit provides two BRI S/T circuits. Each circuit provides two simultaneous voice and/or data connections with a single interface. BRI uses the 2B+D transmission format which is defined as two 64-kbps bearer channels and one 16-kbps data (control) channel. The D channel carries call setup control data.

The RBSU BRI circuits can be connected to ISDN BRI network lines and/or ISDN S-type Terminal Equipment (TE-1) or Terminal Adapters (TA) on the station side.

The RBSU/RBSS BRI circuits that are configured for the station side provide a passive bus that enables up to two TE1 and TA devices to be connected to one BRI circuit. When multiple TE1 and TA devices are installed on a singled RBSU/RBSS BRI circuit, the devices must share or contend for that circuit's two B channels.

A maximum of two simultaneous voice and/or data calls are allowed between all devices connected to the same BRI circuit. The contention rule for the two BRI B channels is first come, first serve. Network connections using BRI S/T type interface also require a dealer-supplied, UL-listed, external Network Terminal (NT-1) device. In Canada, the NT-1 must be CSA certified.

### Basic Rate Interface Subassembly (RBSS)

The RBSS attaches to the RBSU to provide two additional BRI S/T type circuits that can be used for station-side connections only. An RBSU with the RBSS subassembly provides four BRI circuits in one card slot.

RBSU/RBSS stations can be voice and/or data devices, such as ISDN telephones and Terminal Adapters, that support the standard S-type interface. Each RBSU/RBSS circuit provides two B channels, plus one D channel and reduces the system's basic capacity by two station ports and two CO lines. See "ISDN Basic Rate Interface (BRI)" on Page 79 for more information.

## ISDN U-type Basic Rate Interface Unit (RBUU)

The Basic Rate Interface Unit provides two Basic Rate Interface (BRI) "U" circuits. Each circuit provides two simultaneous voice and/or data connections with a single interface. BRI uses the 2B+D transmission format which is defined as two 64-kbps bearer channels and one 16-kbps data (control) channel.

### Basic Rate Interface Subassembly (RBUS)

The RBUS attaches to the RBUU to provide two additional BRI "U" circuits that can be used to connect to Network BRI lines and/or station-side connections only. An RBUU with the RBUS subassembly provides four BRI "U" circuits in one card slot.

RBUU/RBUS stations can be voice and/or data devices, such as ISDN telephones and Terminal Adapters, that support the standard U-type interface. Each RBUU/RBUS circuit provides two B channels plus one D channel and reduces the basic system capacity by two CO lines and two station ports. See "ISDN Basic Rate Interface (BRI)" on Page 79 for more information.

## Enhanced 911 CAMA Trunk Interface Unit (RMCU/RCMS)

The RMCU/RCMS PCBs provide up to four CAMA trunk circuits. The RMCU/RCMS eliminates the need for connection of adjunct terminal adapter equipment to E911 CAMA trunks. Also, see note below RCMS.

### CAMA Trunk Subassembly (RCMS)

One RCMS subassembly attaches to the RMCU to provide two CAMA trunk circuits. A second RCMS can be added to provide four CAMA trunk circuits.

**Note** The RCMS is ordered separately from the RMCU, but it must be installed on the RMCU to provide CAMA trunk interface.

# Summary of PCBs and Subassemblies

Table 28 provides a summary of the universal slot PCBs and available subassemblies.

**Table 28    PCB Circuits, Interface Options and Connectors**

| PCB | Subassembly | Circuits | Interface Options | Connector |
|---|---|---|---|---|
| **RPTU** | | (DK40i and DK424i) 1 circuit/ISDN PRI DK424i: 23 B channels/ 1 D channel DK40i: 8 or 12 B channels/1 D channel | POTS FX Tie (senderized) Tie (cut through) OUTWATS (intra-LATA) OUTWATS (inter-LATA) InWATS | RJ48C or RJ48X ISDN TIA-568A |
| **RBSU** | | 2 ISDN BRI S/T point circuits (NT or TE). Each circuit is 2B+1D. (Host for the RBSS) | Network and/or station side | RJ45, ISDN TIA-568A |
| attaches to RBSU | **RBSS** | 2 ISDN BRI, S point circuits (2B+D each) | Station side only 1 RBSS subassembly per RBSU | RJ45, ISDN TIA-568A |
| **RBUU** | | 2 ISDN BRI, U point circuits (2B+D each). Host for the RBUS. | Network and/or station side | RJ45, ISDN TIA-568A |
| attaches to RBUU | **RBUS** | 2 ISDN BRI, U point circuits (2B+D each) subassembly for the RBUU. | Network and/or station side 1 RBUS subassembly per RBUU. | RJ45, ISDN TIA-568A |
| **RDTU2** | | 1~8, 1~12, 1~16, or 1~24 channels (lines), depends on system programming | Loop start lines Ground start lines Tie lines (wink or immediate) DID/DOD lines (wink or immediate) | 2-pair amphenol RJ48M (All PCB amphenol connectors are female) |
| **RMCU** | | 2 E911 CAMA circuits with the 1 RCMS or 4 with 2 RCMSs. (DK40i and DK424i only) | E911 CAMA lines | RJ11C modular |
| attaches to RMCU | **RCMS** | 2 E911 CAMA circuits | Up to 2 RCMSs per RMCU for 4 CAMA lines max. | |
| **REMU** | | 4 Tie line circuits | E&M Tie lines 2- or 4-wire transmission Type I signaling Type II signaling Immediate start Wink start | REMU (8-wire modular jack) 2- or 4-wire/type I or II |
| **KCDU** | | (DK40i only) 2 CO line circuits/ 4 digital telephone circuits | CO loop start lines Digital circuits same as PDKU, except no DDSS | RJ14C modular (CO Line circuits) 25-pair amphenol (digital phone circuits) |
| **RCOU** | | 4 CO line circuits (lines) With RCOS: 8 CO line circuits (lines) | CO loop start lines | RJ14C modular |
| attaches to RCOU | **RCOS** | Provides four additional Loop Start CO lines. | 1 RCOS subassembly per RCOU | |

**Table 28    PCB Circuits, Interface Options and Connectors** *(continued)*

| PCB | Subassembly | Circuits | Interface Options | Connector |
|---|---|---|---|---|
| **RCIU2** | | 4 circuits<br><br>With RCIS: 8 circuits | Loop or Ground Start Lines with Caller ID. Requires: RCOU, RGLU2 or PCOU | RJ14C modular |
| attaches to RCIU2 | **RCIS** | Used with RCOU/RCOS, PCOU, and RGLU2 CO line PCBs to provide 4 Caller ID circuits. | 1 RCIS subassembly per RCIU2 | |
| **RDDU** | | 4 DID circuits | DID Lines | RJ14C modular |
| **RGLU2** | | 4 line circuits | Loop or ground start lines | RJ14C modular |
| **PIOU, PIOUS, PEPU, RSSU** | | A PIOU or PIOUS can use an IMDU | ACD/SMIS (DK40i and DK424i)<br><br>SMDI for Voice Mail<br><br>SMDR printer or call accounting machine<br><br>PC or maintenance terminal (local or remote) | 25-pair amphenol (PIOU or PEPU)<br><br>Spring clip terminal (PIOUS)<br><br>Two 3-pair modular (TTY/SMDR/SMDI/SMIS)<br><br>(All PCB amphenol connectors are female) |
| attaches to PIOU and PIOUS | **IMDU** | | Provides remote maintenance 300 bps or 1200 bps full-duplex modem for DKi Admin or DKi Backup. 1 per PIOU/PIOUS. | None |
| **RSTU2** | | 8 standard telephone circuits | Standard telephones<br><br>Voice mail ports<br><br>Off-premises stations<br><br>Other similar devices<br><br>Alternate BGM source<br><br>Auto Attendant digital announcer<br><br>Message Waiting lamp (RSTU2 only)<br><br>Fax machines<br><br>ACD Announcer<br><br>Strata Airlink wireless telephones | 25-pair amphenol<br><br>(All PCB amphenol connectors are female) |
| attaches to RSTU2 and RDSU | **R48S** | 48VDC circuit for up to 8 standard telephone circuits | Optionally interfaces to the RSTU2 and RDSU to extend loop length of standard telephones from 600 ohms to 1200 ohms. | None |
| **RDSU** | | Without RSTS:<br>2 standard telephone/<br>4 digital telephone circuits<br><br>With RSTS:<br>4 standard telephone/<br>4 digital telephone circuits | Digital: same as PDKU, except no DDSS console<br><br>Standard: same as RSTU (standard Message Waiting not available) | 25-pair amphenol |
| attaches to RSTU2 and RDSU | **RSTS** | Provides two additional standard telephone circuits | 1 maximum per RDSU | None |
| **PESU** | | 2 standard telephone circuits/<br>4 electronic telephone circuits (standard/electronic telephone ports) | Standard: same as KSTU2<br><br>Electronic: same as PEKU, except PESU does not support HDSS console | 25-pair amphenol |
| **RATU** | | (DK424i only)<br>4 PC Attendant PC Console circuits | PC Attendant Console<br><br>Conventional Attendant Console | 25-pair amphenol |

**Table 28     PCB Circuits, Interface Options and Connectors** *(continued)*

| PCB | Subassembly | Circuits | Interface Options | Connector |
|---|---|---|---|---|
| **PDKU2** | | 8 digital telephone circuits | Digital telephones (with or without RPCI-DI, DVSU, DADMs, or digital cordless telephone) <br><br> Stand-alone digital cordless telephone <br><br> DDSS console <br><br> PDIU-DS <br><br> DDCB | 25-pair amphenol |
| **Stratagy DK** | | 2, 4, 6, or 8 VM ports <br><br> All of the above Stratagy DK systems use 8 station ports in the DK40i, DK424i software | None | None |
| **PEKU** | | 8 electronic telephone circuits | Electronic telephones <br> HDSS console <br> Alternate BGM source <br> EOCU PCB for OCA <br> External conference amplifier <br> HDCB | 25-pair amphenol <br><br> (All PCB amphenol connectors are Female) |
| attaches to PEKU or PESU | **EOCU** | Provides Speaker OCA path for 8 circuits on PEKU or 4 circuits on PESU. (Handset OCA is not available on EKTs.) | 1 for PEKU or PESU that supports Speaker OCA | |
| **RSIU** <br><br> (DK424i only) | | Up to 4 interface ports when installed with the optional RSIS or RMDS piggy-back PCBs. | ACD/SMIS <br><br> SMDI for voice mail <br><br> SMDR printer or call accounting machine <br><br> PC or maintenance terminal (local or remote) | One 3-pair modular (TTY/SMDR/SMDI/SMIS) |
| attaches to RSIU | **RSIS,** RS-232 interface <br><br> **RMDS** (Modem/RS-232) (DK424i only) | Up to 3 RSISs <br> ...or <br><br> 1 RMDS and 2 RSISs per RSIU | Provides up to four interface ports (RS-232 and modem) for system interface with: <br><br> RMDS (1200 or 2400 bps) <br> Voice Mail SMDI <br> ACD/SMIS <br> SMDR <br> Local or Remote Maintenance for DKi Admin or DKi Backup PC. | One 3-pair modular per RSIS (RS-232), RMDS (Modem/RS-232) |
| **RWIU** | | 4 RJ11 jacks to support 4 Strata AirLink Integrated Base Stations | Digital Wireless Handsets: same as PDKU, except no DDSS console, Stand-alone cordless telephone, PDIU-DS, or DDCB | None |
| **BVPU** | | 4 Virtual Tie line circuits, <br> 1 10baseT port, <br> 1 RS-232 maintenance port | H.323 standard for Voice over Internet Protocol (VoIP) | One 3-pair modular plug for serial port. <br><br> One 10baseT RJ45 for LAN connection. |
| **RRCU** | | Supports 2 remote cabinets. | 62.5 mμ, multi-mode fiber. | SC connector |

# Option Interface PCBs

This section describes the option interface PCBs.

## Option Interface Unit (PIOU)

The PIOU provides interfaces for Paging (Amplified, Unamplified, and Zone), SMDR, SMDI for Voice Mail integration, SMIS for ACD, DKi Admin Interface for on or off-site maintenance, an Alarm sensor, and a Remote Maintenance Modem subassembly (IMDU) that allows the system to be programmed from an off-site DKi Admin PC.

♦ **DK40i** – the PIOU PCBs three-watt or non-amplified 600 ohm paging output is not used since paging is supported by the Base KSU paging interface.

♦ **DK424i** – the PIOU provides two-relay contact pairs. One of the contact pairs can be set for control of a customer-provided door lock or control of a MOH source. The other relay pair can be configured to mute BGM while the page feature is being activated or for the Night Relay function.

## Simplified Option Interface Unit (PIOUS)

The PIOUS has most of the PIOU's features, including SMDR output and the TTY output port interface and IMDU. It also provides flexible relay contacts and an Unamplified Page output. It does not provide Amplified or Zone Paging.

### Remote Maintenance Subassembly (IMDU)

The IMDU is an optional modem that connects to a PIOU or PIOUS to link the system to off-site programming and maintenance equipment, such as a DKi Admin PC. The IMDU has an internal maintenance channel and does not require a dedicated CO line or station port. Data transmission speed can be set at 300 or 1200 bps full duplex.

## External Page Interface Unit (PEPU)

The PEPU is a reduced version of the PIOU and PIOUS, providing most of the Paging and Relay Contact options offered by these other optional PCBs.

## Single Serial Interface Unit (RSSU)

The RSSU contains one RS-232 serial port for connecting an SMDI, SMIS processor, DKi Admin/DKi Backup PC or external modem.

The RSSU provides a cost-effective alternative to the PIOU or PIOUS when only one other serial I/O port is needed, or when the other features of the PIOU or PIOUS are not required. The RSSU has a fixed speed of 1200 bps. It does not support SMDR, or the IMDU or RMDS modems.

♦ **DK40i** – one optional RSSU maintenance interface PCB can be used for connecting a maintenance PC or external modem (local or remote) to the DK40i.

♦ **DK424i** – a maximum of three RSSU cards can be supported per system.

## Serial Interface Unit (RSIU, DK424i only)

The RSIU provides up to four interface ports that allow the Strata DK424i systems to connect to the following:

♦ Voice Mail system with RS-232 SMDI

♦ ACD/SMIS system or Call Center Viewer

♦ SMDR printer, call accounting machine or HMIS

♦ DKi Admin/DKi Backup running on a PC as a maintenance terminal (locally or remotely) or HMIS

♦ StrataControl PC maintenance terminal

The RSIU, which comes standard with one port, can be equipped with up to three more optional RS-232 ports (total of four RS-232 ports). The Single Interface Subassembly (RSIS) piggy-backs onto the RSIU PCB to provide the optional ports. One of the serial ports can be an internal modem. An optional 2400 bps built-in Modem Subassembly (RMDS) can be added onto the RSIU.

The maximum allowed combined speed of all four channels is 9600 bps. All four channels of the RSIU connect directly to the system processor via a short ribbon cable. The RSIU must be positioned in the first universal slot of the Base Cabinet.

### RMDS (DK424i only)

The optional RMDS modem mounts on an RSIU and can function either as a remote maintenance modem to provide the same functions as the IMDU or as a direct RS-232 link to a DKi Admin/ DKi Backup PC COM port.

The function of the RMDS is set in system programming. Data transmission speed for the built-in modem function can be set at 1200 bps or 2400 bps via system programming.

## Option Interface PCB Compatibility

Option interface cards for the DK40i and DK424i are shown in Tables 29 and 30.

**Table 29     DK40i Interface PCB Options**

| Interface Options[1] | RSSU | PIOU | PIOUS | PEPU | TSIU | DK40i Base [2] |
|---|:---:|:---:|:---:|:---:|:---:|:---:|
| Zone page interface (unamplified, 4 zones) | | X | | | | |
| Unamplified page output (single zone, 600 $\Omega$, duplex) | | | | | | X |
| Night transfer or Music-on-hold control relay | | X | X | X | | X |
| Door lock or external amplifier control relay | | X | X | X | | X |
| IMDU disables TTY output when piggy-backed onto PIOU or PIOUS cards | | X | X | | | |
| Remote Maintenance using customer-provided external modem, StrataControl and/or DKi Admin PC (requires TTY output port) | X | X | X | | X | |
| SMDR output (RS-232/6-wire modular connector) | | X | X | | X | |
| Alarm sensor | | X | X | | | |
| Voice Mail SMDI (requires TTY output port) | X | X | X | | X | |

1. Amplified page output (single zone, 3 watts, 8 ohms) on the PIOU and PEPU is not available on the DK40i.

2. These functions are standard (built-in) to the DK40i Base KSU.

**Table 30     DK424i Interface PCB Options**

| Interface Options | RSSU[1] | PIOU[1] | PIOUS[1] | PEPU | RSIU/ RSIS[1] |
|---|:---:|:---:|:---:|:---:|:---:|
| Zone page interface (unamplified, 4 zones) | | X | | | |
| Unamplified page output (single zone, 600 ohms, duplex) | | X | X | X | |
| Amplified page output (single zone, 3 watts, 8 ohms) | | X | | X | |
| Night transfer or Music-on-hold control relay | | X | X | X | |
| Door lock or external amplifier control relay | | X | X | X | |
| Alarm Sensor | | X | X | | |
| Remote maintenance modem subassembly (IMDU or RMDS) (disables TTY output when they are piggy-backed onto the PIOU/PIOUS or RSIU/RSIS cards)[2] | | X (IMDU) | X (IMDU) | | X (RMDS) |
| Remote Maintenance using customer-provided external modem (requires TTY output port)[2] | X | X | X | | X |
| SMDR output (RS-232/6-wire modular connector) | | X[3] | X[3] | | X |
| MIS for ACD (requires TTY output port)[2, 4] | X | X | X | | X |
| Voice Mail SMDI (requires TTY output port)[2] | X | X | X | | X |
| StrataControl and/or DKi Admin PC (requires TTY output port)[2] | X | X | X | | X |
| Hospitality Management Information System (HMIS)[5] | | X | X | | X |

1. PIOU, PIOUS, and RSSU each provide one TTY port which can be flexibly programmed for the features marked with X. RSIU/RSIS can provide up to four flexible TTY/SMDR ports.

2. Maintenance modem, ACD/SMIS, Insight DK, Voice Mail, SMDI and DKi Admin PC Interface each require a separate TTY output. PIOU, PIOUS, and RSSU provide one TTY output each. RSIU with RSIS PCBs provides up to four TTY outputs.

3. SMDR output will function simultaneously on the same PIOU or PIOUS with one of the following: DKi Admin, remote modem, SMIS for ACD, Insight DK, or SMDI features.

4. Insight DK, Call Center Viewer and SMIS for ACD requires that the system processor must be equipped with an RKYS3 or higher feature key.

5. HMIS requires the system SMDR and maintenance ports. If HMIS is in use, local/remote system programming with a PC is not available.

# Stations and Peripherals 5

This chapter discusses the current line of Strata DK telephones and peripherals that are compatible with DK14, DK40i and DK424i.

The Strata DK40i and DK424i systems can also support all older Strata digital telephones and most Strata electronic telephones.

A large number of widely used and sophisticated features are available to Strata DK station users. Everyday features such as Call Transfer, Call Forwarding, Call Holding, and Call Pickup are executed with just the push of a button or a brief access code. LCD telephones offer more sophisticated features.

In addition to various operational features, the Strata DK also supports multiple [DNs], providing easy access to specific lines at the convenience of station users.

Toshiba Telecommunication Systems Division (TSD) does not provide ISDN station equipment, such as ISDN telephones, fax machines, and computer interface devices for high speed internet access or video conferencing. Toshiba does provide the interface circuit boards that support all of the above ISDN station equipment.

# Digital Telephones

The Strata DK supports the latest line of Strata DKT2000-series digital telephones, which offer station users a number of useful features that are easy to access (see Figure 15).
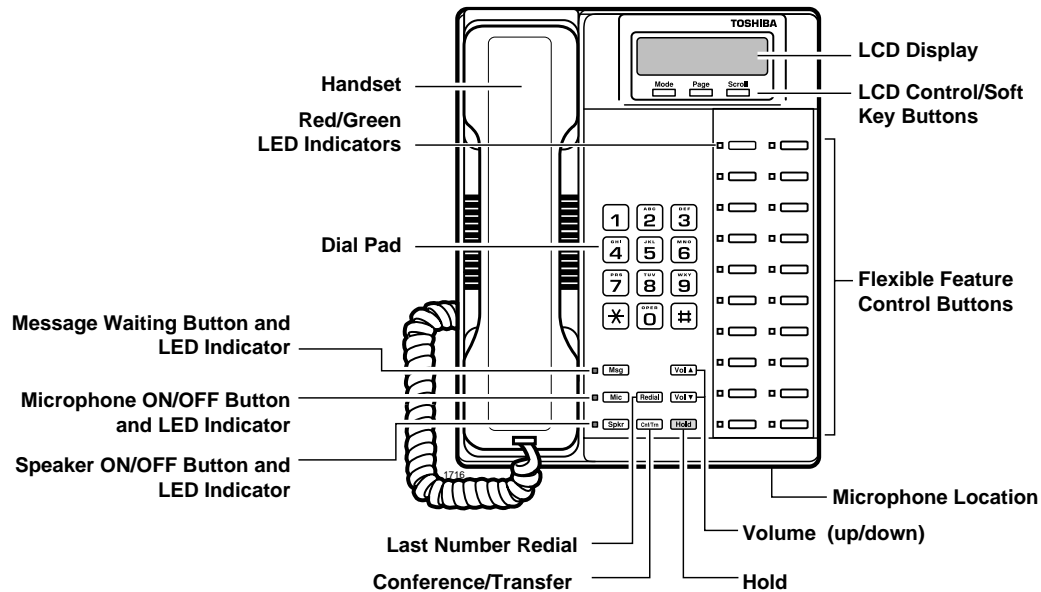


**Figure 15      2000-Series Digital Telephone Buttons and Features**

These telephones share a similar design and fit with a variety of office environments. The DKT2000-series are available in charcoal gray or ash white color in the following models:

## DKT2010-S

The DKT2010-S is a 10-Button Digital Speakerphone.

## DKT2020-S

The DKT2020-S is a 20-button Digital Speakerphone.

## DKT2010-SD

The DKT2010-SD is a 10-Button Digital Speakerphone with Liquid Crystal Display (LCD).

## DKT2020-SD

The DKT2020-SD is a 20-Button Digital Speakerphone with LCD.

## DKT2020-FDSP

DKT2020-FDSD Full-duplex Speakerphone with optional External Microphone (RFDM)

## DKT2001

The DKT2001 is a Digital Single Line Telephone. It looks similar to the existing 2000-series telephones, but it has a smaller footprint. It is narrower because there are no programmable buttons and no LCD.

The DKT2001 connects to same digital station port as other 2000-series digital telephones. This makes it compatible with all Strata DK and Perception systems that support digital station ports.

### Features

The digital single line telephone supports many features of the other 2000-series digital telephones, including:

♦ Line button with a red LED. The Line button for the DKT2001 is the [PDN] on this telephone.

♦ Hold button

♦ Conference/Transfer button

♦ Message Waiting button with red LED

♦ Volume Up and Volume Down buttons

♦ One-way voice announce and handset OCA

♦ Supports most DKT features through the use of feature codes

There are some features of the other 2000-series digital telephones that the DKT2001 *does not* support:

♦ On-hook dialing

♦ Handsfree answerback.

♦ Speaker OCA

♦ Add-on module (DADM2020)

♦ Personal Computer Interface Unit (RPCI)

♦ Headset/loud ringing bell connection (HHEU)

♦ Redial button

♦ Programmable buttons or LCD

The digital single line telephone has many feature advantages over analog single-line telephones:

♦ Automatic Busy Redial

♦ Automatic Line Selection

♦ Background Music with station control

♦ Busy Override over Handset

♦ Exclusive Hold

♦ One-way voice announce and handset OCA

# Liquid Crystal Display (LCD) Telephones

LCD telephones (DKT2010-SD and DKT2020-SD) provide a variety of calling and messaging information on an alphanumeric screen that displays up to two-lines of information, up to 16 characters per line. LCD telephones provide the features shown in Table 31.

**Table 31     LCD Features**

| Feature | Description |
|---------|-------------|
| Alphanumeric Messaging | Station users can create alphanumeric messages that display on other station users' LCDs, including busy, called station, calling station, and group station messaging. |
| Automatic Number Identification (ANI) | Displays the telephone numbers of the calling party for incoming, transferred, and Call Forward calls. |
| Busy Lamp Field (BLF) Indication | Indicates the busy or idle status of all of the telephones in the system. |
| Call Duration | The time elapsed during an outside call displays. |
| Caller ID | The telephone number or name of the calling party displays on the ringing or busy telephone for incoming, transferred, and Call Forward calls. |
| Call Park Orbits | When a call is parked, the orbit number displays. When multiple calls are parked, LCD station users can scroll through a list of parked calls. |
| CO Line Identification | Each line can be assigned a name which displays when station users answer or access lines. Names can be up to 16 characters long. |
| Date/Time of Day | The date and time displays when stations are idle. |
| Dialed Number Identification Service (DNIS) | Displays names of called parties which have been previously correlated with the system database of assigned DNIS numbers. |
| [DN] User Name/ Number | Station users can enter a name that displays on the station's LCD when idle or busy, and appears on the LCDs of other calling stations when the station calls them. The called station's name also appears on the calling station's LCD. Names can be up to 16 characters long.<br><br>If a name is not created for a station, the station's Primary Directory Number [PDN] displays in place of the name. |
| Feature Prompting Soft Keys | Soft keys are used as an alternative to access codes or feature buttons. Station users can access features by responding to LCD prompts. |
| Timed Reminders with Messaging | Selected station users can define up to five separate messages and have each message appear on their LCD at pre-scheduled times. |
| Speed Dial Memo Directory Dialing | Selected station users can enter 12-character names for each of their Station (Personal) Speed Dial numbers. They can call any of these numbers by scrolling through the directory on the LCD, selecting the desired name, and pressing a line access button. LCD users can also scroll the system common speed dial directory. |

# Speakerphones

The DKT2010-S, DKT2010-SD, DKT2020-S and DKT2020-SD models enable users to make both internal and outside calls without lifting the handset (see Table 32).

The DK2020-FDSP enables handsfree speakerphone use with the option to switch between "full-duplex" (concurrent speech) and "voice switch" (alternating conversation between telephones). It has also been designed to work with an optional, external, super-directional microphone (RFDM) for enhanced full duplex performance.

**Table 32       Speakerphone Features**

| Feature | Description |
|---|---|
| Handsfree Answerback | All DKT2000-series telephones enable users to answer internal calls without lifting the handset. |
| Handset OCA | Enables you to speak through the handset of an off-hook, busy digital phone. |
| Flexible Buttons | All DKT2000-series telephones have flexible buttons which can be assigned to access features or CO lines. |
|  | The DKT2010-S and the DKT2010-SD both have 10 flexible buttons, and the DKT2020-S, DKT2020-SD and the DKT2020-FDSP have 20. LEDs can be red or green depending on conditions. |
| Fixed Buttons | All DKT2000-series digital telephones have fixed buttons with red LEDs which are permanently dedicated to the features noted below: |
| **Msg** | The Message button is used to turn on the Message LED of a called station that is busy or that does not answer. Users can press **Msg** to call back the station or voice mail device that left the message. |
| **Mic** | The Microphone button cuts off the microphone during speakerphone operation to enable private office conversations. Also used to enable handset OCA talkback mode. |
| **Spkr** | The Speaker button is used to turn the speaker on and mutes handset microphone for group listening. It also disconnects on-hook dialing calls. |
| **Redial** | The Redial button is used to redial the number last dialed from the station. |
| **Cnf/Trn** | The Conference/Transfer button is used to set up the Conference and Transfer features. |
| **Vol** | The Volume up/down button provides independent control of the handset, speaker, and ring volumes. |
| **Hold** | The Hold button places internal [DN] and outside calls on hold. Can also be used to place calls on Exclusive Hold. |

# Peripherals

The Strata DK supports several types of stations and customer-supplied peripheral devices, such as attendant consoles, Direct Station Selection (DSS) consoles, door phones for visitor screening, a music source for MOH, a speaker for BGM and Paging, Toshiba Stratagy systems and Voice Processing (VP) for voice mail/auto attendant applications, and more (see Figure 16).

For information on the supporting PCB or data interface unit, refer to "Customer-supplied Peripherals and Interfaces" on Page 124.
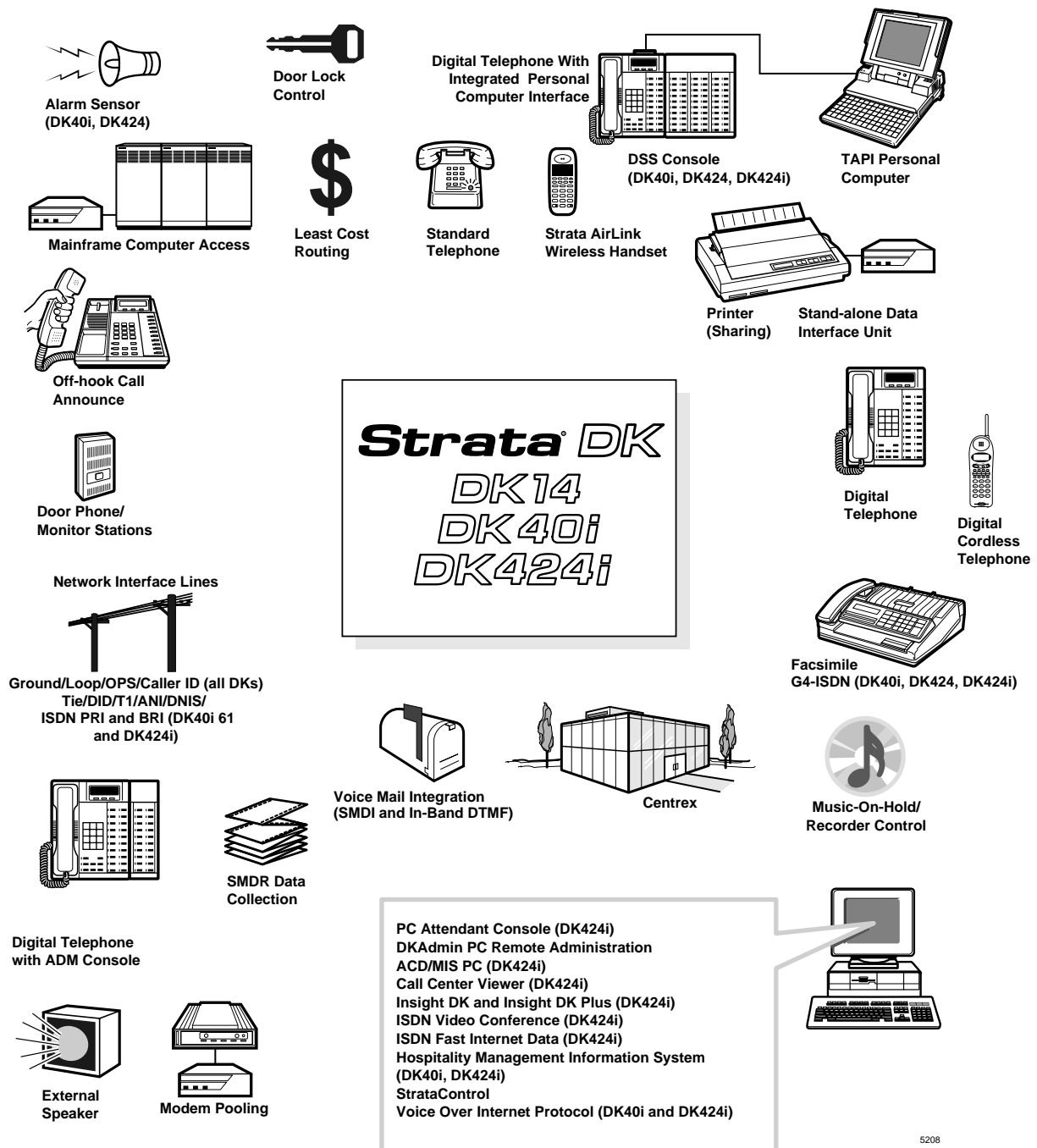


**Figure 16    Strata DK Peripherals**

# Digital Telephone Upgrade Options

Digital telephones can be upgraded with the following options.

## Digital Add-on Module (DADM)

The DADM adds 20 feature buttons to DKT2000-series telephones. These feature buttons can be assigned for CO line access, DSS, and Station or System Speed Dial. Directory Numbers or other functions, however, cannot be assigned to DADMs. Up to two DADMs can be attached to a telephone to provide 40 buttons to supplement the telephone's 10 or 20 buttons.

♦ **DK14** supports up to eight DADMs

♦ **DK40i** supports up to 12 DADMs

♦ **DK424i** supports up to 200 DADMs (see Table 40 on Page 109 for the capacities of different common control units)

## Integrated PC Interface (RPCI-DI)

An optional RS-232 PC interface unit that replaces the normal telephone base and provides the telephone with simultaneous computer-telephone interface and voice/data features, without the need of a modem or an extra outgoing line.

RPCI-DI-equipped digital telephones can also be connected to a PC with Microsoft® Windows®
TAPI applications. TAPI, or Telephony Application Programming Interface, applications enable the DK to provide "pop-up" screens on a PC that show information on the Calling or Called party.

Information such as ANI, DNIS, and Caller ID data is sent from the digital telephone/RPCI-DI to provide information for "pop-up" screens to the computer. The Telephone Service Provider Interface (TSPI) PC software is included with each RPCI-DI. For details on data interface specifications, see Table 51 on Page 129.

Digital phones shared with the Cordless DKT-2004-CT telephone cannot use the RPCI.

## Headset/Loud Ringing Bell Interface (HHEU)

The HHEU provides interfaces for both a headset and a loud ringing bell speaker. The headset must use a carbon microphone. (With the loud ringing bell feature, the speaker amplifies the ringing or voice announcement of an incoming call.) For details on data interface specifications, see Table 49 on Page 128.

## Microphone Unit (RFDM)

The RFDM1A is an external microphone that connects to the DKT2020-FDSP. This enables users to select a setting that provides the clearest transmission for a particular environment. In addition, the DKT2020-FDSP has three operational modes for enhanced microphone operation. See "Microphone (External Unit)" on Page 105 for more information.

## Speaker Off-hook Call Announce (DVSU)

DVSU-equipped digital telephones can receive Speaker OCA. This enables stations to receive internal calls over their speaker while on another call. DVSU is not required in a telephone to originate OCA calls or in a digital telephone that receives OCA calls via the handset or headset.

# Stand-alone Data Interface Unit (PDIU-DS)

The PDIU-DS enables users to make switched data connections for modem pooling, printer sharing, and host/mainframe computer accessing. LEDs on the front panel of the PDIU-DS indicate the status of each call.

# Cordless Digital Telephones

Toshiba offers two cordless digital telephone models, the DKT2104-CT and the DKT2004-CT. These cordless digital telephones bring mobility and productivity to office telephones. Greater call access cuts down on leaving messages and playing "telephone tag." The compact designs of both the DKT2104-CT and the DKT2004-CT offer easy portability and mobility within the office complex.

Both the DKT2104-CT and DKT2004-CT feature digital 900 MHz technology and represent state-of-the-art design and engineering.

The DKT2104-CT and DKT2004-CT telephones operate from the same digital station port on the PDKU2 as the DKT2000-series digital telephone which may or may not be attached. They cannot receive Group Pages or All Call Pages. They can be attached to a Toshiba DKT2000-series corded digital telephone or used as a stand-alone.

## DKT2104-CT

The DKT2104-CT works with Strata DK telephone systems (except Strata DK24/56/96, Release 3) and provides you with reliability, long life, and outstanding performance. Some of its features are:

♦ 900 MHz Digital Narrow Band technology

♦ 30 Simultaneous channels

♦ Liquid Crystal Display (LCD) that wraps using 2 lines, total of 32 characters

♦ Four displayed operation modes, including Message Waiting (MW)

♦ **Hold**, **MSG** (LCD icon), **Cnf/Trn**, and **Mute** buttons

♦ Headset jack (headset optional)

♦ Five handset ring modes, including a vibration mode

♦ Simultaneous charging of handset and spare batteries

♦ Wall-mount or desktop unit with wall-mount plate, and belt clip included.

♦ Advanced Speed Dial capabilities

♦ Five hours of talk time, and 40 hours of standby at full charge

See for a comparison of simultaneous calls available for each system.

## DKT2004-CT

The DKT2004-CT features spread-spectrum technology, providing clarity and unsurpassed range, several times greater than conventional analog cordless telephones. Spread-spectrum technology offers extremely secure communications between cordless digital telephones and their corresponding base stations in most environments.

♦ 900 MHz Digital Spread Spectrum technology

♦ Nine Simultaneous Channels

♦ LCD provides information such as User Name, DNIS and Caller ID

♦ Four programmable buttons for feature or multiple line access

♦ **Hold**, **MSG** (with MSG LED), **Cnf/Trn**, **Mute**, Memory Dial buttons

♦ Headset jack (headset optional)

♦ Three handset ring modes including a vibration mode

♦ Optional Wall-mount kit available

♦ 20 Speed Dial number memory (in addition to 40 station speed dials)

♦ Three hours of talk time, and 40 hours of standby at full charge

See for a comparison of simultaneous calls available for each system.

# Strata AirLink Wireless Handset

The Strata AirLink Wireless handset, like the cordless telephone, is designed for mobility, reliability, and outstanding performance. Operating in the 1.9 GHz Unlicensed Personal Communication Service (UPCS) range, it represents state-of-the-art design and engineering.

The handset can access up to eight separate Strata AirLink wireless systems enabling movement from building to building, system to system.

It provides unsurpassed range, clarity, and fully-secured communications using a voice scrambling algorithm.

The handset uses one Nickel Metal Hydride (NiMH) battery. When fully charged, the battery provides up to four hours of talk and 40 hours of standby time.

## Features

The handset is equipped with 12 handset volume adjustments (plus a silent mode), eight ring levels, and a lockable dial pad. Seventy internal alphanumeric Speed Dial memory locations enable Speed Dialing by name or number.

The handset has an LCD that shows an idle message, date, call duration, and icons. The icons represent these conditions:

♦ Off-hook or ringing

♦ Battery strength

♦ Alpha mode

♦ Signal lock and strength

It also has standard built-in buttons that perform these specific functions:

**PWR** – turns the power ON and OFF

**FLSH** – performs hookflash functions

**FCN** – enables features with the use of other buttons; for example, Call Forward, Transfer, Speed Dial, and Conference

**▲/▼** – adjusts volume and scrolls through menu options

**ABC** – toggles handset between alpha and numeric modes

**RCL** – recalls numbers stored in memory

**STO** – stores Speed Dial numbers/names and the idle message

**CALL** – places the handset off-hook to enable calling

**END** – places the handset on-hook and exits from RCL, FCN, STO, and ABC modes

**CLR** – erases one or more digits in the display

**∗▲** – scrolls backwards through the Speed Dial list

**#▼** – scrolls forward through the Speed Dial list and locks/unlocks the dial pad

## Strata AirLink Wireless Systems

The Strata AirLink™ Wireless Telephone system is available as either an External or Integrated product.

### External Wireless System (BSIA)

The Strata AirLink™ External Wireless Telephone system that is configured to standard ports of the Strata DK and many non-Toshiba telephone systems has software that enables a System Administrator or technician to quickly diagnose error messages, alarms, and traffic conditions by viewing a PC monitor before troubleshooting the hardware.

The Status Window, displayed by the Strata AirLink Manager software, is an active window in which viewing reports, querying the software, and rebooting the Base Station Interface Adapter (BSIA) is possible. Some of the available reports are:

♦ Base Station channels status

♦ Line status

♦ Call status

♦ Critical alarms

The software also creates log files and sends error messages to the PC monitor to assist the technician in making corrections. The log files are easily opened in any text editor for viewing and have information about the BSIA boot software, Base Station upgrades, software queries, errors, and alarms.

### Integrated Wireless System (RWIU)

The Strata AirLink Wireless Telephone system that is configured to Strata DK telephone systems using its own proprietary RWIU PCB also has software that enables a System Administrator or technician to:

♦ Set system IDs and enter handset IDs

♦ Set the time and date, and change passwords

♦ Enable UTAM

♦ Change communication ports

♦ Check the software version of the RWIU and Base Stations

♦ View log messages

♦ Reset and upgrade Base Stations and the RWIU

♦ Change Base Station numbers

### LEDs and BER Testing

There are several LEDs on each Base Station, BSIA, and the RWIU that indicate normal, boot up, and alarm conditions. Signal fading and attenuation can be checked using the resident Bit Error Rate (BER) test in each handset for additional troubleshooting and maintenance routines.

# PC Attendant Console (DK-PCATT)

Operators can process a heavy load of incoming calls quickly and efficiently using the Strata DK PC Attendant Console for Microsoft Windows. The console is *not* available for the RCTUA processor, DK40i or DK14. The console consists of the following items:

♦ Custom keyboard (DK-PCATT-KB)

♦ Handset and cradle (RATHC)

♦ Attendant Console Interface Unit (RATI) connected to an RATU PCB

♦ Special Toshiba-proprietary software

The following customer-supplied items are needed:

♦ An IBM-compatible personal computer (PC) with a 1.44 floppy disk drive and an additional COM port to attach to Toshiba RATI PCB

♦ Windows 95 or Windows 3.1

♦ Color VGA monitor

♦ Windows graphics acceleration

♦ Mouse

**Note** Minimum requirements for the PC are a 100MHz Pentium® computer with 16MB of RAM (for Microsoft Windows 3.1) or 32MB of RAM for (Windows 95), and 200MB hard drive. The application uses up to 20MB on the hard drive. A tower PC, placed on the floor, is

recommended over a desktop type for visibility. An internal or external modem is recommended with a third COM port.

The system supports up to four attendant consoles. Multiple consoles automatically sharing incoming call load on a call-by-call rotation basis. Features such as Overflow, Position Busy Mode, and Interposition Call Transfer add to the efficiency of multiple console applications.

Although designed to be a dedicated console, the PC can also be used for other Windows applications and serve as a multi-purpose work station.

The main screen, shown below, changes according to the status of the console.

Various telephone and system parameters can be changed from the console, without a separate maintenance port. These include Telephone User Names and System Speed Dial numbers.

The PCATT provides a Name/Number search that works with automatic or manual call handling. Other powerful features for the PCATT include Call Answer Priority and Queuing, Direct Station Selection, dial pad DTMF signaling, Emergency Call ID, Flexible Programmable Keys, Loop Keys with Status Indication, keyboard or mouse operation, and headset or handset operation with volume control. See "PC Attendant Console Features" on Page 113 for feature descriptions and Table 42 on Page 120 for a list of features.

# Direct Station Selection (DSS) Console

The DSS consoles are for system operators.

They operate alongside a digital or electronic telephone and have 60 buttons which can be programmed for DSS, CO line access, All Call Page, Night Transfer, and Station or System Speed Dial. DSS consoles do not have their own [DNs], since they are connected to a telephone.

 Multiple consoles can operate with one DKT:

♦ **DK14** does not support DSS consoles

♦ **DK40i** supports up to three consoles

♦ **DK424i** supports up to eight consoles (Table 40 on Page 109 for DSS console capacities for various common control units)

The DSS console uses LEDs to indicate call and feature status; the DDSS has dual red and green LEDs to help further define status. The DDSS console connects to the PDKU2. For details on data interface specifications (Table 51 on Page 129). The older electronic HDSS console is also supported.

# Door Phone (MDFB)

MDFBs are often used with a door lock to screen building visitors. Door phones also can operate as a "hot line." For example, a door phone can be used for calls between an office and a warehouse (requires DDCB).

♦   **DK14** can have up to six door phones

♦   **DK40i** can have up to nine door phones

♦   **DK424i** can have up to 12 door phones (see Table 40 on Page 109 for MDFB capacities for various common control units)

# Door Phone and Lock Control Unit (DDCB)

The DDCB can support as many as three door phones (MDFBs) or two door phones (MDFBs) and one door lock and connects to designated telephone circuits.

# External Speaker (HESB)

The HESB is a multi-functional, external, six-inch speaker unit with a built-in three-watt amplifier. It can be used as a paging speaker, an amplified talkback speaker, or a telephone's Loud Ringing Bell.

# Toshiba Stratagy and Stratagy DK Voice Processing

The Strata DK can operate with Toshiba Stratagy and Stratagy DK voice processing systems, which provide a number of helpful features.

The DK14, DK40i and DK424i also support SMDI voice mail integration (see "Simplified Message Desk Interface (SMDI)" on Page 86). Refer to the appropriate Stratagy literature for details. For Stratagy voice mail processors, a standard telephone PCB is also required (QSTU2, KSTU2, RDSU, RSTU2).

The Strata DK supports in-band DTMF voice mail integration for all of the above voice mail systems and requires DTMF receivers:

♦   **DK14** requires the QRCU3 for DTMF voice mail integration.

♦   **DK40i** requires the DK40i Expansion KSU for Stratagy DK voice mail. The K5RCU3 is required for DTMF voice mail integration. The Stratagy DK does not require a KSTU2, RDSU or RSTU2; it acts as an RSTU2 in the Strata DK KSU slot.

♦   **DK424i** requires the BRCS for DTMF voice mail integration.

# Cabling and Connectors

Strata DK uses industry standard cabling and connectors to interface with lines, stations, and peripherals (Table 46 on Page 125).

Stations use standard twisted-pair cabling to connect to the system via the MDF. Digital and standard telephones require just one pair-cabling, or two pair, if equipped with DADM, RPCI or DVSU. Electronic telephones need two-pair cabling or three-pair for Speaker OCA.

Station PCBs connect to stations and peripherals with a 25-pair Amphenol connector via the MDF. CO, DID, and Tie line circuits interface with the public telephone network via modular connectors.

Peripheral devices such as SMDR, DKAdmin maintenance PC, etc., are connected to the interface PCBs (TSIU, RSIU, PIOU, etc.) with three-pair (six wires) modular cords and the Toshiba PPTC9 or PPTC RS-232-to-modular adapters.

The Strata AirLink Wireless Telephone system configured to standard ports (RSTU2) connects to all Strata DK systems using the Base Station Interface Adapters (BSIAs) and one or two Base Stations.

The Strata AirLink Wireless Telephone system configured to digital ports interfaces to the DK40i, DK424i (standard cabling and connectors) using the proprietary RWIU PCB. The RWIU uses industry standard RJ11 jacks to support up to four Base Stations. Multiple RWIUs can be installed to increase the capacity of the wireless system.

# Station and Peripheral Specifications

For more information on Station and Peripheral Specifications, refer to these tables in the Appendix.

♦ "Station Loop Requirements" on Page 125

♦ "Station Dimensions" on Page 126

♦ "System Tones" on Page 127

♦ "Subassemblies for Toshiba Telephones" on Page 128

♦ "Data Interface Specifications" on Page 129

# System Features 6

This chapter describes system features for the DK14, DK40i and DK424i, in alphabetical order. These features are available on a system-wide basis and apply to all of these systems, except where noted. See for a list of system features.

## Abandoned Call Numbers

Automatic Number Identification (ANI) and Caller ID calls that ring but are abandoned before they are answered can be stored in system memory. LCD telephone and attendant console users can display and Auto Dial the "abandoned call" ANI and Caller ID numbers. Stations can be programmed to store from 0 to 100 abandoned call numbers in increments of 10.

♦ **DK14** and **DK40i** can store up to 200 ANI and Caller ID abandoned call numbers

♦ **DK424i** can store up to 2,000 ANI and Caller ID abandoned call numbers

## Account Codes (Forced/Voluntary/Verified)

Account Codes provide a method of tracing and categorizing CO line calls on the SMDR report. They may even be used to temporarily change a restricted station's class of service to allow long distance calling after an Account Code is entered.

Account Codes may be required before dialing calls (Forced) or optionally entered during calls (Voluntary). Codes can be as long as 15 digits and can be verified or nonverified. If a printer is connected to the system, a record of each Account Code prints out on the SMDR report.

**Note**     The 911 emergency number and two other optional customer-designated numbers (up to four digits long) can be assigned to bypass Forced Verified Account Code requirements.

## Alarm Sensor (DK40i, DK424i only)

Both the PIOU and PIOUS option interface PCBs have a sensor that can be connected to a customer-supplied alarm system. If the alarm is activated, the sensor triggers a loud alert tone to all digital and electronic telephones. Any station programmed with an **Alarm** button can turn off the alert tone.

# Alternate Answer Point

Users can answer a transferred outside line call from any station that has the **Line** button or a Secondary [DN] for the destination station.

# Amplified Conference Interface (DK40i, DK424i only)

Provides interface for a customer-supplied amplifier to improve low volume levels due to losses on some CO lines. The amplifier is not dedicated to certain CO lines (it is shared by all CO lines) and automatically connects to calls that include two CO lines: for example, DISA, conferencing and external call forward.

This amplifier provides a louder sound level on these types of calls and requires two circuits on a PEKU or PESU PCB installed in the Strata DK per amplifier. A maximum of two (DK40i) or four (DK424i) amplifiers per system can automatically connect to any two CO line conference. This feature is available for the Strata DK40i and DK424i.

# Auto Attendant (Built-in)

The built-in AA feature acts as an operator that automatically directs incoming calls to stations. Strata DK provides a built-in AA feature via optional feature upgrade keys: QKYS (DK14), KKYS1~3 (DK40i), RKYS1~3 (DK424i).

Callers who dial in to assigned Strata DK AA lines can receive a dialing prompt menu, such as, "Dial 5 for Sales, dial 6 for Tech Support." When the caller dials the digit, the call routes to a [DN], ACD group, or Distributed Hunt group (assigned in system programming).

AA can be programmed to answer CO line calls immediately or with a delayed ring option. AA can pick up unanswered calls that ring for either 12 or 24 seconds at selected stations. An unlimited number of CO lines can be assigned for built-in AA. Built-in AA applies to loop and ground start CO lines only; it does not answer Tie or DID line calls.

Built-in AA enables access to outgoing lines via DISA, which should be security protected with account codes and/or a DISA security code.

The AA feature requires customer-provided digital announcement device(s) and optional QRCU3 (DK14), K5RCU (DK40i) or BRCS (DK424i) tone receiver PCBs. Callers can be connected to one digital announcer simultaneously. One DTMF receiver is needed per caller.

♦  **DK14** enables up to three caller connections

♦  **DK40i** enables up to five caller connections

♦  **DK424i** each enable up to 24 caller connections

Auto Attendant is licensed by Dytel, Inc. under United States Patent No. 4,975,941.

# Automatic Call Distribution (ACD)

An optional feature upgrade key (KKYS2 or KKYS3 on the DK40i, Release 4.3, or RKYS2 or RKYS3 on the DK424i) connected to the processor enables ACD group features. Thus, incoming calls over a CO line to be distributed among a group of ACD Agents. This is ideal where a number of staff members receive the same type of calls, since calls can be automatically distributed.

Incoming calls that are not directly connected to Agents wait in queue for the first available Agent in the called group. While waiting, callers hear programmed announcements and music at designated intervals to encourage them to remain on hold. This feature requires a customer-provided, digital announcement device(s) and music source.

When the number of ACD calls waiting in queue reaches a programmable threshold, calls can overflow to another ACD group or destination such as a Distributed Hunt (DH) group.

The ACD feature also enables supervisor stations to provide ACD Agents with call assistance and call monitoring. ACD Supervisor LCD telephones can display ACD group status, individual Agent status (available/unavailable, on an ACD call, etc.) and Call Status (the number of calls in queue, longest call in queue, etc.).

Additionally, the KKYS3 and RKYS3 feature key enables the use of a Call Center Viewer, SMIS, or Insight DK application. SMIS provides detailed supervisory monitoring of Agent calls (on a PC screen) and printed reports regarding an Agent's performance. Call Center Viewer presents real-time ACD Agent and Queue Status to multiple PC screens.

## Insight DK

The Insight DK and Insight DK Plus systems are full-featured ACD MIS tools for call center supervisors, providing user-defined supervisor displays, user-defined historical reports, electronic wall board connections, and inView LAN-based status display messaging.

Insight DK and DK Plus are Windows-based MIS software programs that work with PCs running Windows 2000, 98, 95 (Vers. 4.00.950A, B, or C), or Windows NT® with a minimum Service Pack 3 installed.

They both support external wallboard displays and scheduled reporting. The data collected can be exported for further processing using other report generator programs or spread sheets. They also support inView, which provides LAN-based status displays in a wallboard format on Agent's or Supervisor's PC screens. See the *Strata DK Call Center Solutions General Description* for more information.

ACD Feature capacities are listed in Table 33.

**Table 33      ACD Capacities**

| ACD | DK40i | DK424i | | |
|---|---|---|---|---|
| | | B1CU | B2CAU/B2CBU, B3CAU/B3CBU | B5CAU/ B5CBU |
| ACD/Insight DK and Insight DK Plus/SMIS/Call Center Viewer | 8 | Yes | Yes | Yes |
| ACD Groups | 8 | 8 | 16 | 16 |
| ACD Agent IDs[1] | 200 | 200 | 256 | 256 |
| ACD Music Interface Ports (1 per Group) | 8 | 8 | 16 | 16 |
| ACD Announce Interface Ports (3 per Group) | 12 | 24 | 48 | 48 |

1. There are system limits for the number of simultaneous Agents depending on traffic. See the *Strata DK Call Center Solutions General Description* for details.

# Automatic Number Identification (ANI)

LCD telephones can display the telephone number of the calling party for direct, incoming, transferred, and Call Forwarded calls. The telephone number can also be sent to an application computer or to voice mail.

The system supports ANI on analog or digital lines (T1 or ISDN PRI/BRI), DID and Tie lines, and provides the calling telephone number to answering parties. An optional tone receiver PCB (K5RCU for DK40i; BRCS for DK424i) is required for ANI line operation. DK14 does not support ANI.

ANI is also known as Calling Number Identification Service (CNIS) on ISDN lines. CNIS operates the same as ANI on the DK424i. ANI digits can be received independently or simultaneously with DNIS called number digits.

Calls received with DNIS digits can be routed to unique destinations for each DNIS number (see "Dialed Number Identification Service (DNIS) (DK40i, DK424i only)" on Page 72 and Table 34).

If ANI is received without DNIS, all ANI calls ring the same selected destination. ANI calls are calls can be routed to a unique destination for each system ringing mode (Day, Day 2, Night). All routing destinations except Intercept can be assigned by system programming to change according to the time of day (see "Day/Night Modes" on Page 72).

Refer to the sections on ANI, Caller ID, DNIS or DID and Table 34 for more specific routing information.

**Table 34     ANI, Caller ID, and DNIS Routing Destinations**

| Routing Destination | ANI Line [1,2] Calls | Caller ID Line Calls | DNIS Line [1,2] Calls | Tie & DID [1,2] Line Calls | Ground [2] Loop Start Line Calls |
|---|:---:|:---:|:---:|:---:|:---:|
| Individual Primary/Secondary/Phantom DNs | X | X | X | X | X |
| CO line or pooled line buttons | | X | | | X |
| Individual Distributed Hunt (DH) Groups[2] | X | X | X | X | X |
| Individual ACD Groups | X | X | X | X | X |
| Remote Maintenance/Administration modem | X | X | X | X | X |
| System External Page (Tie lines, private network lines only) | | | | X | |
| System night bell or night ringing over external Page | X | X | X | X | X |
| Intercept destination (station console announcement) applies to DID line types only | X | | X | X | |
| External telephone network numbers | X | X | X | X | X |
| Voice mail box/Auto Attendant device | X | X | X | X | X |

1. DNIS calls can be received independently or simultaneously with ANI "calling number" digits. ANI-only calls (without DNIS) can also be routed to one destination shown in this table.

2. Not supported by DK14.

# Automatic Release from Hold

If an outside caller on hold hangs up, the system will automatically disconnect the call and free the line for other calls. This feature applies to DISA, DNIS and/or ANI external routed calls, AA, voice mail calls, and regular voice calls.

Automatic Release is available on a line-by-line basis and operates only with COs that provide a disconnect (Calling Party Control) signal.

# Background Music (BGM)

BGM can be sent to telephone and external speakers. The customer-supplied BGM source(s) can be applied in a flexible manner.

One music source can feed both types of speakers, or both types can have their own separate source. The source used for MOH can also be piped to telephone speakers for BGM or an alternate BGM source can be connected so callers on-hold have a separate music/announcement source. The BGM source connects to the RCA jack in the system's Base Cabinet processor to a designated standard or electronic telephone circuit port.

# Caller ID

This feature enables the telephone number or name of the calling party to display on the ringing telephone's LCD. It can also be sent to an application computer or to voice mail. Up to 10 digits or 16 characters can be displayed or sent to a computer.

Caller ID (CLID) information displays on direct, incoming, transferred, and Call Forwarded calls. For PCs, CLID allows both the caller's name and number to be sent. If the Strata DK system is programmed to receive both ANI and DNIS information on incoming calls, the station user can press **Page** while the call is ringing to alternate between DNIS and ANI/Caller ID LCD displays. See "Computer Telephony Integration (CTI)" on Page 70 for more information.

Caller ID is similar to ANI except that Caller ID is offered by local carriers on ground or loop start lines. Most local carriers charge an extra fee for this service.

A Caller ID Interface PCB is required, in conjunction with the normal ground or loop start CO line PCBs, to provide the Caller ID feature.

Caller ID can be provided only on analog loop start lines (with QCDU2, KCDU2, TCOU, RCOU or RCOU/RCOS) and analog ground start lines (RGLU2). It is not available on any other type of analog lines (TDDU, RDDU and/or REMU) or any type of T1 or ISDN digital lines (see Table 34).

♦ **DK14** – the WSIU PCB is required to provide an RS-232 interface to a customer-provided Caller ID interface device (TC-1041). CO lines that receive Caller ID must be cross-connected to the TC-1041 (MLX-41) Caller ID interface box. The TC-1041 (MLX-41) is available from TEL-CONTROL, Inc., P.O. Box 4087, Huntsville, AL 35815-4087. Phone (205) 881-4000.

♦ **DK40i** –the TCIU2, RCIU2 and RCIS PCBs come with four Caller ID circuits each. The TCIU2 is used for Base Cabinet lines and the RCIU2/RCIS is used for Expansion Cabinet lines to provide up to eight Caller ID interface circuits. A KCDU2 can also support Caller ID with an RCIU2. A TCIU2/RCIU2/RCIS circuit must be available for each line that is to receive Caller ID.

♦ **DK424i** – when ordered from the factory, the RCIU2 PCB comes with four Caller ID circuits; however, an RCIS piggy-back PCB can be installed on the RCIU2 to provide four more Caller ID circuits, for a maximum of eight Caller ID circuits per cabinet slot. An RCIU2/RCIS circuit must be available for each line that is to receive Caller ID.

ANI is delivered by long distance providers on DID or Tie lines.

# Centrex/PBX Compatible

All system features are compatible with Centrex/PBX operation, including repeat of Centrex/PBX ringing cadence, one-button access to Centrex/PBX features, a two- to four-digit station numbering plan, and Delayed Ringing to selected stations.

# Centrex Ringing Repeat

The system can mimic CO/Centrex/PBX ringing cadences received from outside lines when it rings a called station.

# Computer Telephony Integration (CTI)

CTI combines the capabilities of the Strata DK digital business telephone system with custom functionality provided by computer applications. This can be provided through the Digital Telephone Integrated PC Interface.

## Digital Telephone Integrated PC Interface

A Toshiba 2000-series digital telephone can be connected to a PC. This can be used for both routine data switching simultaneous voice and data applications, and for more robust CTI applications.

The connection is made with an RS-232 cable from a communication port on a PC to an RS-232 port on the digital telephone. The RS-232 port is provided by equipping the digital telephone with an integrated PC Interface Unit (RPCI-DI). This optional unit replaces the normal telephone base and equips the telephone for simultaneous computer-telephone interface and voice/data features.

Data switching applications enable users to make data calls to printers, PCs, and other data devices. Users can also make voice calls using PC directory dialing software, without the need for a modem or an additional outgoing line.

The system can be programmed with one to four security groups, and can restrict calls between groups. It can also support modem pooling and printer sharing.

For CTI applications, digital telephones interface to a PC that runs the application software using the Microsoft Telephone Application Programming Interface (TAPI), to provide customized functionality. The PC must run Microsoft Windows software.

Any TAPI-enabled PC software is compatible with Strata DK systems. The most common types of application are database look-up and pop-up screens that provide information on the calling party. From a Strata DK system, Caller ID, ANI, DNIS and call processing information can be passed from the digital telephone to the application computer.

## StrataLink

The Strata DK can interface with computer applications that conform to Microsoft Windows TAPI format. The Toshiba StrataLink Telephony Service Provider Interface (TSPI) software enables the Strata DK to communicate with TAPI applications. StrataLink TSPI software is bundled with the RPCI-DI in the form of a 3-1/2" IBM-compatible disk, and is compatible with Windows 2000, 98, 95, and Windows NT.

StrataLink software greatly enhances the use of the basic TAPI interface, enabling you to customize the call-control functions of your PC application, including:

♦ **Select how the PC application responds to the next call event** – StrataLink can accept call events from the telephone, apply call handling rules and conditions, and invoke actions in a PC application.

♦ **Handle multiple telephone calls** – Most TAPI compatible applications can only handle one call at a time because they only respond to a ringing line for Caller ID database lookup and screen display. StrataLink enables the application to respond to multiple calls and events that capture Caller ID and generate screen displays. It also displays transferred calls and reconnections to held calls. The display can be delayed until after the current call or for a programmed amount of time.

♦ **Handle multiple PC applications from the same telephone** – Incoming calls can activate actions in different applications, depending upon the type of call.

For example, you can generate "customer database" application screens of callers on your regular directory numbers, use "help desk" application software generated from ACD calls, and have your pager beep with Caller ID when you are away from your desk. Different applications can be assigned to work on specific buttons on your telephone, or on all buttons.

♦ **Enhance outbound calling** – StrataLink provides for outbound telephone calling and call control from the PC application.

♦ **Easy setup, testing, and monitoring** – StrataLink provides tools for testing the interface, debugging or monitoring the call events, and makes application setup easier. When you select from pre-defined tested applications, the proper interface is automatically assigned.

# Conferencing

A variety of Conferencing combinations are available to all station users, as listed below. Stations and lines can be added in any order. (See "Amplified Conference Interface (DK40i, DK424i only)" on Page 66)

♦ One or two stations and two outside lines

♦ Two or three stations and one outside line

♦ Four stations on one internal [DN] line

# Credit Card Calling

Callers can make credit card calls (0 + telephone number + credit card number) that bypass Toll Restriction. The calls are billed to the credit card, not to the Strata DK line. The system requires that a specific quantity of digits be dialed; otherwise, the call will be dropped within 20 seconds to prevent operator-placed calls that would be billed to the Strata DK line.

# Data Switching

Strata DK offers a sophisticated optional data switching capability using PDIU-DS and RPCI-DI that can interconnect a wide range of customer-supplied data equipment, including PCs, printers, and modems. Asynchronous data can be transmitted between devices connected to PDIU-DS/RPCI-DI at speeds up to 19.2 kbps (see Table 40 on Page 109).

The system provides four data security groups to restrict data calls between groups. Dialing by PC (both data and voice calls) as well as modem pooling and printer sharing is supported.

# Day/Night Modes

The system has three available ringing modes for routing incoming line calls. The routing destinations are [DNs], ACD groups, Distributed Hunt groups, Auto Attendant, DISA, and a night bell. The ringing modes are Day, Day2, and Night.

Each mode can be assigned a distinct ringing destination. The system can be programmed with either two modes (Day, Night) or three modes (Day, Day 2, Night), which can be changed by any station programmed with a **Night Transfer** button. A supervisor's **Night Lock** button can be provided to prevent false changes in modes. Day/Night call routing applies to all incoming line types: ANI, DNIS, Caller ID, DISA, Tie, and DID lines.

# Delayed Ringing

If an incoming CO, DID or Tie line or internal [DN] call rings a station [DN] and is unanswered, alternate stations can be programmed to ring 12 or 24 seconds later. The stations that were ringing initially will continue to ring after the Delayed Ringing begins. This feature is assigned on a line-by-line and [DN] basis.

It is also possible to direct loop or ground start CO line calls to the Strata DK built-in AA on a delayed ring basis. In this case, the telephone(s) that initially ring will stop ringing when the AA answers.

# Dialed Number Identification Service (DNIS) (DK40i, DK424i only)

This feature enables incoming DNIS (called party) telephone numbers to display on the LCDs of ringing telephones. DNIS is provided on analog, and/or digital (T1, ISDN PRI/BRI), DID and Tie lines. An optional DTMF tone receiver PCB is required for DNIS.

Normally, DNIS is associated with "1-800" type calls offered by various long distance carriers; however, the Strata DK can provide DNIS information over DID and Tie line circuits.

Traditionally, each 800-number is assigned to its own line group, often resulting in a large number of under-used lines. DNIS allows multiple numbers to ring into the same line or line group, which provides a more efficient use of 800-numbers. Each DNIS line is used on an as-needed basis for different 800-number calls.

♦   **DK40i** supports up to 200 DNIS numbers and a maximum of 100 telephone network numbers. The K5RCU (DK40i) optional tone receiver PCB is required for DNIS. Each DNIS, DID or Tie line reduces the station capacity by one.

♦   **DK424i** each support up to 500 DNIS numbers and a maximum of 300 telephone network numbers. BRCS optional tone receiver PCB is required for DNIS. See "Station Features by Station Type" on Page 110.

The DNIS numbers are correlated in the system database with assigned DNIS names. DNIS names (up to 16 alphanumeric characters) display on direct incoming, transferred, and Call Forward calls. This allows incoming calls to be identified and answered appropriately.

DNIS numbers can be assigned to ring unique destinations in the Day, Day2, and Night Ring modes (Table 34). The DNIS (called number) digits can be received independently or simultaneously with ANI "calling number" digits (see "Automatic Number Identification (ANI)" on Page 68).

Priority of ANI or DNIS is set for each line in system programming. DNIS digits can also be sent to a PC. See "Computer Telephony Integration (CTI)" on Page 70.

### External Telephone Network Numbers

All DNIS/DID/Tie numbers that ring into the Strata DK can be routed externally to any outside telephone number. Depending on the application, the caller DNIS name may be passed to the destination Strata DK when routed over the telephone network.

### Voice Mail

If assigned in the system database, incoming calls for each unique DNIS/DID/Tie number can be directly routed or Call Forwarded to a designated voice mailbox. This allows callers of each DNIS/DID/Tie number to receive immediate personal custom greetings.

**Note** This feature is available on in-band integration only. It is not available using SMDI.

# Direct Inward Dialing (DID) Lines (DK40i, DK424i only)

Based on the final digits of a dialed telephone number, DID enables incoming calls over a single line to directly ring one or a number of stations which share a common [DN]. DID numbers can be assigned to ring a number of destinations (see Table 34). DK14 does not support DID.

DID is provided by analog or digital (T1, ISDN PRI/BRI) lines. The TDDU and RDDU analog PCBs support DID. For the DK424i only, the digital T1/DS-1 (RDTU2) or ISDN PRI (RPTU) PCBs support DID.

Each DID number can be assigned a Name to display on an LCD telephone that rings when the DID number is called. Each DID line has a single office code and a block of extension numbers (the final digits) that can be individually assigned in system programming to ring stations.

DID lines can directly access the remote maintenance modem and can optionally provide automatic Camp-on-busy when callers dial a busy [DN] on incoming DID calls. This feature provides a camp-on tone and distinctive LED flash at the busy station.

♦ **DK40i and DK424i** – DID lines do not affect station port capacity.

An optional tone receiver PCB (K5RCU or BRCS) is required for DID line DTMF operation.

# Direct Inward System Access (DISA)

Outside callers using a DTMF-capable telephone can dial internal stations or outgoing lines directly, without going through a receptionist or operator. DISA security codes and/or a verified account codes, each up to 15 digits, can be assigned to prevent undesired access to lines.

DISA is available to any quantity of ground or loop start lines (not Tie or DID), either directly or through the Strata DK built-in AA. It enables privileged users to take advantage of the benefits of the Strata DK even when they are not on the premises. An optional tone receiver PCB (QRCU3, K5RCU or BRCS) is required for DISA.

DISA can be accessed by calling into the DK built-in AA. To prevent users from calling into the Auto Attendant and accessing an outgoing line with DISA to make unauthorized external calls, be sure to use the DISA security code.

# Distinctive CO Line/Directory Number Ringing

The incoming line ringing tone to digital telephones is distinct from the internal ringing tone indicating the type of the call. This feature is optional for standard telephones by using a different ring pattern.

# Door Lock Control

Digital and electronic telephone station users can unlock a customer-supplied electronic door lock at the touch of an optional button on their telephone.

♦ **DK14** supports up to two locks

♦ **DK40i** supports up to three locks

♦ **DK424i** supports up to five locks

# Door Phones (MDFB)

Door phones are frequently mounted near building entrances and associated with a customer-provided door lock to help screen visitors. Door phones can be assigned to ring [PDNs] and/or [PhDNs]. Each door phone must be connected to a DDCB or HDCB.

They also monitor sound—station users can call the door phone and listen to sounds from the surrounding area. In a warehouse-type environment, a door phone can work as a "hot link," for example, the door phone can have a preassigned button that accesses a certain telephone [DN] in an office, and any common [DNs].

♦ **DK14** supports up to six door phones

♦ **DK40i** supports up to nine door phones

♦ **DK424i** each support up to 12 door phones

# DTMF Back Tone

The system can be programmed to allow or prevent DTMF tones from being returned to digital telephones when a user dials on outside lines or sends DTMF digits to a voice mail device.

# DTMF and Dial Pulse CO Line Compatible

The Strata DK System works with either DTMF or rotary dial pulse CO lines on a line-by-line basis.

# DTMF Signal Time (80/160 ms)

DTMF tones that are sent via Speed Dial to lines and via automatic dialing to voice mail devices can be set to 80 or 160 milliseconds. The time can be set independently for line out-dialing and for voice mail automatic dialing. See "Continuous Dual-tone Multi-frequency (DTMF) Tone" on Page 102.

# Emergency Ringdown

Standard telephones can be programmed to automatically ring a designated extension when they are taken off hook, after a predetermined time without dialing. The receiving digital or electronic LCD station or attendant console displays the station name/number of the off-hook calling station. This feature does not work with digital and electronic telephones.

In healthcare applications, this feature is known as Emergency Ringdown operation. It is used to assist callers who may not be able to complete a call by dialing. If a station is left off-hook, continuous ringing will occur at a designated extension. This feature is also known as "Hotline Service" for hotel/motel applications. See for more information.

# Enhanced 911 (E911) Service (DK40i, DK424i only)

E911 delivers a 911 call to the Public Safety Answering Position (PSAP) with an information element that identifies the source of the call. Called CESID (Caller Emergency Services Identifier), it can be used to determine the location of the caller. In many locations, E911 also includes the ability to connect to emergency services by dialing "9-1-1" without any access codes.

The Strata DK offers three E911 solutions. Only one solution may operate on a system at one time. Detailed installation instructions for each solution may be found in the Strata DK Installation & Maintenance Manual. The solutions are:

♦ **Adjunct Equipment** – The Strata DK uses standard, single-line telephone ports to connect to external E911 equipment which is connected to the public network by CAMA trunks.

♦ **CAMA Trunks** – The DK424i can connect directly to CAMA trunks using an RMCU PCB and its RMCS subassembly. Internal notification includes alerting of attendant consoles, optional conferencing of the emergency call and a Start-of-Call SMDR message. The system may be programmed to sustain the CAMA connection even if the originating station goes on hook. With this option, if the station goes off hook again, it will continue to be connected to the PSAP.

♦ **ISDN** – The DK40i and the DK424i can deliver E911 calls to the PSTN over PRI. The following table shows the availability of these solutions on the Strata DK models. Internal notification includes alerting of attendant consoles, optional conferencing of the emergency call and a Start-of-Call SMDR message. ISDN trunks will not sustain a connection after the originating party hangs up.

**Table 35     E911 Solution by Software Release**

| E911 Solution | DK40 | DK40i | DK424i |
|---|---|---|---|
| Adjunct Equipment | Release 3.1 | Release 3.1 | Release 3.1 |
| CAMA Trunks | | Release 4.3 | Release 4.3 |
| ISDN | | Release 4.3 | Release 4.3 |

## Adjunct Equipment Operation

The Strata DK provides two single-line telephone ports (QSTU2, RSTU, KSTU2, RDSU, PSTU, or PESU) to connect to adjunct E911 equipment. These specially programmed, single-line ports communicate the originating DN to the adjunct equipment using DTMF tones.

The adjunct equipment uses CAMA (Centralized Automatic Message Accounting) trunks to connect the call to the public network. CAMA trunks are analog trunks that use reverse-battery signalling and MF (Multi-Frequency) tones to dial 911 calls and transmit the CESID.

Two companies have been identified that supply the E911 adjunct translation systems: Proctor and Associates, Redmond, WA, (800) 824-9719; and Telident, Inc., Minneapolis, MN, (800) 536-4911.

### Direct CAMA Connections

The DK424i E911 feature provides direct connection of CAMA trunks for flexible dialing of 911 emergency calls. This allows users who are not familiar with DK424i dialing sequences to make an emergency call regardless of how they dial 911 from Toshiba telephones. The DK will seize an idle CAMA trunk and send 911 plus the dialing station's Caller Emergency Service Identification (CESID) over the CAMA trunk via MF tones. Once a 911 call is started, most other buttons/keys on a telephone are disabled to prevent accidentally dropping the 911 call.

### ISDN Operation

The DK40i and DK424i can place E911 calls directly over ISDN Primary Rate Interfaces (PRI). In the ISDN call setup for both cases, the Called Party Information will be "911" and the Calling Party Information will be CESID.

For both Direct CAMA Connections and ISDN Operation, two packets are sent out the SMDR port on each E911 call. The first packet will be sent immediately at the start of the call and the second will be sent at the end of the call when the CAMA or ISDN trunk releases.

## External Page Zones

The Strata DK40i can support up to four External Page Zones and DK424i can support up to eight (Table 29 on Page 50 and Table 30 on Page 50). Station users can access one, four or eight zones simultaneously by dialing a brief access code. The zones are composed of customer-supplied speaker(s) and amplifier(s) which interface with one or two PIOU PCBs. DK14 does not support zone paging.

## Flexible Button Assignment

Each of the flexible buttons on digital and electronic telephones can be assigned for feature or CO line access, enabling station users access to features and lines with the touch of a button. Digital telephones are available in 10- and 20-button models.

## Flexible Directory Numbers

A "flexible" number of digits can be programmed for station [DNs] in the Strata DK. DK station [DNs] can have from one to four digits. The maximum available number of unique station [DNs] ([PDNs] plus [PhDNs]) are listed below:

♦ **DK14** – up to 20 unique station [DNs] are allowed

♦ **DK40i** – up to 56 unique station [DNs] are allowed

♦ **DK424i** – up to 672 unique station [DNs] are allowed

Single-digit [DNs], such as "0", can be assigned to attendant consoles or attendant telephones.

# Flexible Line Ringing Assignment

Each CO line can be programmed to ring the Auto Attendant, night bell, DISA, remote maintenance modem or any station [DN] in the system. A different ringing assignment can be created for each of three ringing modes—Day, Day2 or Night. Stations assigned to ring can do so with any of the following three timing designations:

♦ Immediate – Stations assigned Immediate timing ring as soon as the line rings into the system.

♦ Delay 1 – If stations with Immediate timing have not answered within 12 seconds (three rings), stations assigned Delay 1 timing also begin ringing. Immediate Ring telephones continue to ring when Delay 1 Ring telephones ring.

♦ Delay 2 – If the above stations have not answered within 24 seconds (six rings), stations assigned Delay 2 timing also begin ringing. Immediate and Delay 1 Ring telephones continue to ring when Delay 2 Ring telephones ring.

# Group Paging

Digital and electronic stations can be divided into Paging Groups. Any station user can make a page announcement to just one or all of these groups. The page is sent to the speakers of all idle telephones in a page group. For more information, see Table 40 on Page 109.

♦ **DK14**, **DK40i** each support up to five Paging Groups, including the All Call Page Group.

♦ **DK424i** supports to up to nine Paging Groups, including the All Call Page Group.

**Note** Cordless digital telephones and standard telephones are not compatible with Paging.

# Handsfree Directory Number Paths

All stations can have handsfree conversations simultaneously. Because [DN] paths are nonblocking, the number of conversations is only limited by the amount of digital and electronic stations.

# Hospitality Management Information System (HMIS)

The Toshiba Strata DK Hospitality Management Information System (HMIS) is a PC-based solution, designed to meet the specific operational needs of small- to medium-sized hotels and motels. HMIS tightly integrates with the Strata DK40i, DK424i Digital Telephone System, Release 3.1 or higher, and the Stratagy Voice Processing System, providing a complete and fully-integrated hospitality package.

HMIS is offered as a software kit or as an optional turnkey package that includes both the PC and software. The packaged product includes a Toshiba Equium™ PC with a Pentium II processor, 2GB hard drive, three serial ports, keyboard, mouse, SVGA color monitor, and software (printer not included). The HMIS software is a Microsoft Windows 98/95-based application.

HMIS PC is dedicated to running the HMIS server program and functions as a front desk terminal. In applications requiring multiple front desk terminals, PC HMIS workstations can be networked together to share a common database.

HMIS application provides hotel/motel features and property management capabilities that are not resident within the Strata DK telephone system. HMIS is well integrated with the telephony features of the Strata DK telephone system to which it is attached. Strata HMIS provides guest

check-in/check-out, up to 20-year reservation capacity, automatic wake-up calls, SMDR telephone call tracking and costing, billing, telephone system control, and many other features.

**PMS Interface** – The HMIS Property Management System (PMS) Interface called Hlink, is the interface connecting HMIS to other PMSs. The HMIS server serial port connects to the PMS PC's serial port. This interface enables the customer to use an external PMS to perform front desk operations while the HMIS performs telephone control functions. The HMIS Command window displays completed tasks received from or sent to the PMS. Customers can use the strengths and specific functions of both their PMS and HMIS to meet their specific needs. See the *Hospitality Management Information System General Description* for more details.

# Hotline Service

Standard telephones can be automatically ring a designated extension if they go off hook and do not dial with a preprogrammed time. The receiving digital or electronic LCD station or attendant console displays the station name/number of the off-hook calling station. This feature does not work with digital and electronic telephones.

Hotline Service is very useful for hotel/motel applications, where it may be preferable to have lobby or public area telephones without dialing capability. Standard telephones can be programmed to automatically call a specific number, such as the front desk. This feature is also known as Emergency Ringdown in the healthcare field (see "Emergency Ringdown" on Page 75.)

# Integrated Services Digital Network (ISDN) (DK40i, DK424i only)

ISDN is a set of integrated telecommunications services, available over the public telecommunications networks. ISDN makes it possible to send, receive and modify information using telephone lines in ways that were not previously possible, such as:

♦ Dynamic use of individual or groups of standard (POTS), DID, Tie, FX, WATS, 800 lines on an as-needed basis

♦ Much faster call setup and data transfer up to 128 kbps

♦ Multi-purpose line use, including sharing lines for voice, data, fax, and video

♦ DID functionality based on the number dialed; without needing to reserve a block of numbers

ISDN service comes in two forms:

♦ **Primary Rate Interface (PRI)** supports simultaneous voice or data connections (eight or 12 for the DK40i) (eight, 16 or 23 for the DK424i). PRI is similar to digital T1 service and uses two pairs of wires from your phone company.

♦ **Basic Rate Interface (BRI)** supports up to two simultaneous connections using a single pair of wires.

National ISDN standards were first established in 1992. These were formed for all equipment providers and services to create a common set of functions for these new services. The public network is in the process of implementing nationwide the National ISDN 2 (NI-2) services and some locations have started National ISDN 3. Strata DK Release 4.0 is based on NI-2.

## ISDN Primary Rate Interface (PRI)

PRI is the larger ISDN interface (via the RPTU) and uses the 23B+D transmission format, which has 23 64-kbps bearer channels and one 64-kbps data (control) channel, with total bandwidth of 1.544 mbps.

PRI is designed as the trunk interface to the ISDN network. PRI connects the DK40i or DK424i telephone system to an intra- or inter-LATA communication provider. PRI can be used to send/receive voice and/or data.

More importantly, PRI can save money by enabling the multiple use of the channels on the PRI link for a variety of services, such as DID, Tie, FX, WATS, 800, etc., on demand.

This capability to support multiple services and dynamically allocate channel use as needed is known as the call-by-call feature. PRI lines also support Calling Number Identification Services (CNIS).

A dealer-supplied, UL listed, Channel Service Unit (CSU) is required between the DK PRI interface and the PRI line provider interface in most locations of the U.S. In Canada, a CSA certified DSU/CSU must be installed.

## ISDN Basic Rate Interface (BRI)

Strata DK40i and DK424i support BRI S/T features. As of Release 4.3 and higher, Strata DK40i and DK424i support BRI U basic features.

BRI is the smaller ISDN interface and provides two simultaneous voice or data connections with a single interface. BRI uses the 2B+D transmission format which is defined as two 64-kbps bearer channels and one 16 kbps data (control) channel. The D-channel carries call setup control data.

ISDN BRI station applications allow the connection of ISDN instruments, such as a group IV fax, PC, computer terminal or port, a LAN bridge, video conferencing terminal, Internet access devices, LAN access routers, or other devices that benefit from an all digital transmission link.

BRI applications for the DK424i will include video conferencing, remote access servers, faster Internet access, point-of-sale devices and high-speed data connections from ISDN stations to the public ISDN network, as well as typical voice and fax connections. With the correct external adapter, data can be sent up to 128 kbps.

Like PRI, BRI provides CNIS, DID, Direct Inward Lines, and other data access services when used to access the public network.

The Strata DK BRI cards  support both station side and trunk side connections. The Strata DK systems  also support BRI interface from the public network as a CO line service. There are two types of ISDN BRI interfaces: S/T type (via RBSU/RBSS) and the U-type (via RBUU/RBUS for DK40i and DK424i; TBUU/TBUS for DK40i). Both S/T and U types are used in the U.S.

The Public Switched Telephone Network provides BRI U-type lines only; therefore, a dealer-supplied, external Network Terminal Unit (NT-1) is required to connect DK S/T-type BRI line circuits to the network. The NT-1 must be UL listed (U.S.) or CSA certified (Canada).

## Call-by-Call Service Selection

This feature permits the grouping of individual PRI B-channels to be shared among various types of services specified by the customer, instead of having to dedicate each channel to a particular type of service. Using this common pool of channels provides much improved traffic handling than using dedicated channels.

This dynamic allocation of service can reduce the number of circuits required to access various services, especially if various services have different peak busy periods.

In Release 4.15, the DK424i enables specifying the minimum and maximum number of B-channels used for each service on a common set of B-channels in system programming. Minimum and maximum values can be set for three time periods during the day.

These values can be used to ensure that a minimum number of channels remain available for incoming calls. They can also be used to determine if calls should be rejected because they exceed the maximum number subscribed for that service.

Call-by-Call services can be specified to map Strata DK capabilities to network services such as DID, Tie, FX, WATS, 800, etc. These services can be provided via the local telephone carrier or be connected to any ISDN inter-exchange carrier.

Outgoing calls, specific numbers, or DID numbers can be checked against the Call-by-Call table which lists all valid DNs. DNs can be identified on a per station basis to enable billing calls to a selected service or station. All numbers used for identifying the call must be subscribed from the providing service, otherwise the call will be rejected by the provider.

## Non-Facility Associated Signaling (NFAS)

NFAS provides the ability to create ISDN trunk groups beyond the 23 channels available with a single PRI. This is extremely important when Call-by-Call Services are used since all B-channels must be controlled using a common D-channel.

The Strata DK system will support one additional PRI (two circuits to be linked with one D-channel). This extends the number of call-by-call B-channels to 47 (2 x 24 minus 1). This provides better performance and cost savings in high volume ISDN PRI applications.

## Calling Number Identification Services (CNIS)

CNIS features provide "Calling Party Information" to the network (outgoing calls) and from the network (incoming calls). There are four types of CNIS services:

♦ **Number Provisioning** for outgoing calls is controlled by subscription parameters with your telco provider. The choice is for the number to be necessary or not. The number sent is based on the call originator and the call type. The originator can be a tandem call, a station (with or without DID), or a station with a designated number. The type of call refers to whether it is a direct or redirected (call forwarded) call.

For a tandem call, the Calling Party Number digits received are the digits that will be sent. For a direct station call, the default number assigned to the selected service, and which is programmed into the Strata DK as the Listed Directory Number (LDN), will be the number sent. In this case, the system can send a fixed number (assigned in the system) or it can use the DID programming to determine the number to be sent.

♦ **Number Screening** is normally performed by the public network to ensure that the call being placed has a valid billing number. In systems with a flexible Calling Number Provisioning, the network can determine if the call is for a valid billing number. Based on this, it can either place or reject the call, rather than completing the call and billing it to the default LDN.

♦ **Number Privacy** allows the caller to prevent the public network from delivering the Calling Number to the called party on a per-call basis. Service subscribers can request that the number be presented or not, as a default from the public network. Subscribers can also change default settings. If a public telco service allows changes to be made, then a user can enter change a code to the setting for that call after selecting a trunk group.

♦ **Number Delivery** sends the calling number with the call setup message, if that number is not blocked. The Strata DK handles the number the same way that ANI information from T1 trunks is handled. For instance, the number can display on the called telephone's LCD, or it can be used by TAPI interfaces, or it can be recorded in SMDR data records.

# Least Cost Routing (LCR)

Different route plans may be designed to automatically place outgoing calls over the most cost-efficient routes. See the table below for LCR capacities.

Three different LCR time schedules with their own priority schedules can be set up for the business day. Stations can be grouped into one of eight LCR classes, each with its own routing priority. Selected station users may have priority use of a line, even when the route with the lowest cost is not available. LCR is compatible with ABR.

**Table 36    Least Cost Routing Capacities**

| Least Cost Routing | DK14 | DK40i | B1CU | B2CAU/B2CBU, B3CAU/B3CBU | B5CAU/B5CBU |
|---|---|---|---|---|---|
| | | | DK424i | | |
| LCR route plans | 8 | 8 | 8 | 16 | 16 |
| Area Code/Office Code exception tables | 8 | 8 | 8 | 16 | 16 |
| Time schedules | 3 | 3 | 3 | 3 | 3 |
| Station classes | 4 | 4 | 4 | 8 | 8 |
| Route definition tables | 4 | 4 | 4 | 6 | 6 |
| Modify digit tables | 6 | 6 | 6 | 12 | 12 |

# Line Groups

For easy access, various types of outside lines can be assigned to groups (normally for pooled line and LCR applications). For example, all local lines can be assigned to one group and WATS lines in another group. Station users access line groups by dialing an access code or by pressing a feature button.

♦ **DK14** provides up to four line groups

♦ **DK40i** provides up to eight line groups

♦ **DK424i** each provide up to 16 line groups

# Line Queuing

A station user can use the Automatic Callback feature to enter the queue for a busy outgoing line. When the line becomes available, the system calls the station back. Queuing applies to single lines, line groups, and when calling via LCR.

# Live System Programming

Programming the Strata DK from an on-site or off-site location does not interrupt the operation of the system in most cases. It is interrupted for hardware upgrades.

# Memory Protection

If the power fails, the Strata DK has an internal battery backup that protects data and the customer's programmed configuration. This information will be maintained within a powerless system for at least six years.

# Message Waiting

Any station and most voice mail devices can leave a message waiting indication (light) on a designated message waiting light of a digital, electronic, or standard telephone station.

Message waiting lights can be activated when a voice mail message has been left, or they can be turned on by a calling station. The station user can retrieve messages by pressing the button next to the message waiting light.

♦   **DK14 and DK40i** – QSTU2 and KSTU2 PCBs do not support standard telephone MW lamps.

♦   **DK40i, DK424i** – an RSTU2 PCB must be connected to a standard telephone with a MW lamp to enable this feature. These DK systems provide Messages Waiting to standard telephones with a message waiting lamp. The user can enter an access code to retrieve the messages. A standard station can store up to four indications.

# Multiple Directory Numbers

A [DN], sometimes called an "extension number," is the number someone must call to reach a destination within the system. To maximize call coverage flexibility, station [DNs] can appear on multiple telephones. Also, individual telephones can have multiple [DNs] (see Figure 17).

The system provides three types of [DNs]: Primary, Secondary and Phantom. All [DNs] can be used to originate and answer calls. If you press a [DN] while on a call, it releases the existing call and provides dial tone to make another call.

♦   **DK14** supports a maximum of 10 [PDNs] and 10 [PhDNs]

♦   **DK40i** supports a maximum of 28 [PDNs] and 28 [PhDNs]

♦   **DK424i** each support a maximum of 336 [PDNs] and 336 [PhDNs] (See Table 38 for maximum capacities for various common control units)

## Primary Directory Number [PDN]

Each station in the Strata DK has a unique [PDN]. This [PDN] can appear on multiple buttons (up to four) of the primary station.

## Secondary Directory Number [SDN]

When the [PDN] of a station appears on another station, it becomes an [SDN]. Any [PDN] can appear as an [SDN] on all other Toshiba telephones in the system. A [PDN]/[SDN] can ring on up to 120 telephones in the system. Each telephone can be assigned up to four of the same [SDN]. The maximum number of [PDNs] plus [SDNs] on each telephone is 16.

# Phantom Directory Number [PhDN]

This is an additional [DN] that can be dedicated to a station or to a group of stations (usually in the same area or department). Each unique [PhDN] can only appear once on a given telephone, but each telephone can be assigned up to eight different [PhDNs].

Any [PhDN] can appear on all Toshiba telephones in the system. A [PhDN] can ring on up to 120 telephones in the system. Each [PhDN] must be assigned to a designated telephone owner via system programming.

Each [PhDN] is flexibly assigned to an owner telephone in system programming. Only [PhDN] owner telephones have the following privileges:

♦ Set Call Forward for [PhDNs]

♦ Set Call Forward Mailbox destination for [PhDNs]

♦ Receive Message Waiting (MW) indication for up to four [PhDNs] on individual Phantom Message Waiting [PhDN/MW] LEDs
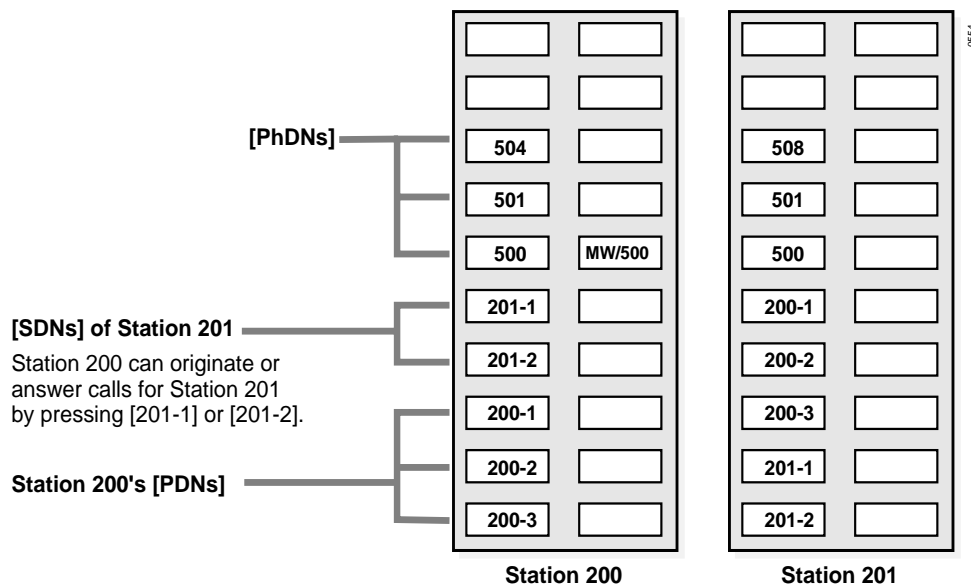
♦ Receive OCA when the [PhDN] is called



**Figure 17    Multiple Directory Number Example**

### Notes

• Incoming calls come in to a telephone's [PDNs] from the top down to prevent "call collisions." For example, incoming calls to Stations 200's [PDN] will first ring the top "200-1" line, a second call will ring "200-2" below it, and a third call will ring "200-3." Auto preference to select a [DN] to make a call by going off-hook is from the bottom [PDN] up. This avoids answering an incoming call while attempting to originate a call.

• Each [PhDN] can have a dedicated Message Waiting [PhDN/MW] LED/button to notify the [PhDN] owner telephone user that there is a message for the person or department associated with the [PhDN]. Up to four [PhDNs/MWs] can be programmed onto the flexible buttons of each telephone. In the above example, [MW/500] is the Message Waiting button for [PhDN 500].

• A station [PDN] shows busy on Busy Lamp Field when the station is in DND mode or off-hook on any [DN], CO line or Tie line. [PhDNs] do not display Busy Lamp indication.

• [PhDNs] are usually associated with a function such as an "800" number for a Technical Support Group; whereas a specific [PDN] is usually associated with a person, for example, Station 200 is assigned to Steve, Station 201 is for Susan, etc.

# Multiple FCC Registration

The DK14 and DK40i can be configured as either a key or hybrid system with separate FCC registration numbers for each type. The DK424i can be configured as either a key, hybrid, or PBX system with separate FCC registration numbers for each type.

Multiple registration ensures compliance with FCC regulations, regardless of how the system is configured. The appropriate configuration for an individual system depends on its function.

Systems configured only for manual selection of lines via line buttons may be registered as key systems; systems with Automatic Line Selection, LCR, **Pooled Line** buttons, etc., usually must be registered as hybrid or PBX systems.

# Music-on-hold (MOH)

A customer-supplied radio, tape player, tuner, compact disc player, or other device can be used to send music or announcements to parties on-hold on CO lines or on [DNs].

# Night Ringing Over External Page

Incoming line or door phone calls can be programmed to ring over an external speaker when the system is in the Night mode. The call can be picked up from any telephone. After-hours employees who are not near a ringing telephone can easily answer calls with this feature.

# Night Ringing Over Selected Page Zones

Lines can be programmed to night ring over four selected PIOU Page zones via customer-supplied paging equipment. Programmed lines can be divided into tenant groups which can then be assigned to night ring over the selected zones:

♦ **DK40i** supports two tenant groups

♦ **DK424i** supports four tenant groups

# Non-blocking Talk Paths

All outside lines and internal [DN] lines can be used at the same time.

# Off-premises Station

Off-site standard telephones can be part of the system, having access to many of the features offered by the Strata DK. Each off-site station requires a special line from the CO.

# Outgoing Call Restriction

Stations can be selectively restricted from originating calls over any number of lines. The same stations can receive incoming calls on those restricted lines.

# Pooled CO Line Button

Several lines can be pooled to appear under one digital telephone, electronic telephone CO **Line** button. The lines are usually pooled in categories, e.g., WATS lines in one pool, regular lines in another, etc. Pooled and single-appearing line buttons are designed for use with loop and ground start lines, not DID, Tie, DNIS, or ANI lines.

# Power Failure Transfer

CO line(s) can be switched directly to dedicated standard telephones (customer-provided 2500- or 500-type) for incoming and outgoing calls in the case of a system power failure. The number of PF telephones available depends on system configuration. Refer to the appropriate configuration chapter in the *Strata DK Installation & Maintenance Manual*.

During normal operation with AC power, in the DK14 or DK40i Base KSU, the PF telephone connected to the base KSU PF jack does not function.

For the DK424i and the DK40i Expansion Units, PF telephones connected to DPFT/RSTU2 do function as a normal standard telephone with all the Strata DK available features, when operating with normal AC power.

During a power failure, the following connections are made:

♦ **DK14** – one CO line is connected directly to the PF phone.

♦ **DK40i** – in the Base KSU, one CO line is connected directly to the PF phone (up to eight more can be added in the Expansion Unit).

♦ **DK424i** – multiple CO lines can be switched. If AC power is lost, the PF telephones are automatically/directly connected to a pre-wired CO lines.

PF transfer requires an external unit called the Power Failure Transfer Unit (DPFT) and the RSTU2 PCB on the DK424i and in the DK40i Expansion KSU (if more than one PF telephone is needed). Each DPFT provides interface for eight power failure telephones.

An RSTU2 PCB is required to supply the DPFT with a -24VDC control signal and ground connections.

# Privacy/Non-privacy Calling

This feature applies to CO **Line** buttons only and does not apply to [DNs]. Outside CO **Line** buttons can be Private or Non-private on a station-by-station basis. Private lines prohibit users from pressing a common CO **Line** button and accessing a line that is already in use, whereas users can do so on Non-private lines.

Private line users can change the mode with a **Privacy Release** button, enabling as many as three stations (total) on a line. Non-private users can block access to their lines with a **Privacy** button.

# Relay Service

The DK14 KSU and DK40i Base KSU provide one relay contact to provide the functions listed below. For the DK40i, DK424i, the PIOU, PIOUS, and PEPU PCBs each have two pairs of relay contacts that can each be programmed for one of the following two functions.

## External Page/Door Lock Control

♦ **External Page** is a Page over external speakers will mute BGM that is being broadcast over the same speakers.

♦ **Door Lock Control Relay** requires PIOU or PIOUS relays. Only the PIOU and PIOUS relays will open a customer-supplied door lock for three or six seconds when a designated button is pressed on selected telephones.

## Night Relay/Hold Relay

♦ **Night Relay** enables answering machine or a night bell (or chime) will be activated when a call rings in during the Night mode.

♦ **Hold Relay** enables an MOH source will turn on only when calls are placed on-hold.

# Remote Administration/Maintenance

See "System Program Administration Software (DKi Admin)" on Page 89.

# Reserve Power

Customer-supplied 12-volt batteries (gel-cell and maintenance free) can be connected to the system power supply as a power failure backup.

If there is a power failure, Strata DK automatically switches over to battery power without any interruption to operation. A built-in charger circuit keeps the batteries charged during normal system operation.

Reserve power duration depends on the condition of the batteries and the system load, and is specific for each Strata DK model. Reserve power batteries must be fully-charged, connected, and tested before a power failure occurs.

♦ **DK14** – see "Power Considerations" on Page 4

♦ **DK40i** – see "Power Considerations" on Page 15

♦ **DK424i** – see "Power Considerations" on Page 30

# Simplified Message Desk Interface (SMDI)

This feature provides system integration between the Strata DK and the Toshiba Stratagy and VP voice processing systems.

SMDI is a standard (RS-232 serial) link; its protocol was developed by Bellcore and is used by many PBX and Central Office telephone systems to integrate with voice mail systems. SMDI does not support Strata DK DNIS mail box routing. SMDI interface requires that the Strata DK have a WSIU, TSIU, PIOU, PIOUS, RSSU, or RSIU PCB installed.

By using this standard integration method, a Strata DK has the flexibility to integrate with a wide range of standard voice mail machines and also to grow with the standard as more features are added for enhanced integration.

Advantages provided by the Strata DK and the Stratagy/VP SMDI integration are:

## Better Port Usage

SMDI is a faster and more efficient integration compared to DTMF (in-band) integration and is recommended for high-traffic installations.

## Improves Call Coverage

Stratagy uses the call forwarding status (e.g., all calls, no answer, busy, etc.) supplied by SMDI to provide better call coverage. The status information also enables Stratagy to perform custom applications using Stratagy RNA and Busy Chain options.

## Streamlines Messaging Procedures

♦ SMDI provides the calling party's extension to Stratagy. Users calling Stratagy from their telephone do not have to enter their User ID to log on to their mailbox.

♦ When an internal party calls an extension that is forwarded to voice mail, SMDI applies the calling party's identification to the message. Since the source of the message is already known, the message recipient does not have to enter the User ID when replying to it.

♦ Caller ID and ANI numbers are delivered to the Voice Mail machine via SMDI packets. DNIS names are not sent on SMDI packets.

# Speed Dial

Speed Dial enables users to dial frequently-called telephone numbers (up to 20 digits per number) quickly by dialing a brief access code or by pushing a feature button. DK and Centrex/PBX feature access codes can also be stored for Speed Dial. There are two types of Speed Dial: System and Station.

## System Speed Dial

System Speed Dial numbers can be used by all stations on the system. A designated station or attendant console or DKAdmin PC can assign System Speed Dial numbers.

♦ **DK14, DK40i** provide up to 40 System Speed Dial numbers that can be used by all stations on the system.

♦ **DK424i B1CU, B2CAU/B2CBU, B3CAU/B3CBU** provide up to 100 Speed Dial numbers.

♦ **DK424i B5CAU/B5CBU c**an have up to 800 System Speed Dial numbers.

## Station Speed Dial

The Strata DK14, DK40i, and DK424i Systems provide up to 40 personal Station Speed Dial numbers for each individual user. Each user Station Speed Dial numbers are exclusive to that user, and are not available to other station users. For more information, see "Speed Dial Buttons" on Page 107.

# Station Hunting

The system supports two types of station hunting:

## Serial Hunt

When a called [DN] ([PDN] or [PhDN]) is busy, the call (data or voice) will hunt to an assigned [DN]. If that [DN] is busy, the call hunts to the next assigned [DN], and so on.

The call is eventually routed to the first idle station, or if it is a CO line call, then the call camps on to the last station in the hunt sequence, if all stations are busy.

If a hunt station is call forwarded, calls to the station will ring at the forwarded destination—not the hunt destination. Internal callers will receive busy tone if calling into a hunt group in which all stations are busy.

## Distributed Hunt (DH)

When a call is directed to the DH group, the system hunts for and sends the call to the next available station that is assigned to the DH group. Calls are evenly distributed to the members of the group on a rotational basis. The rotation of DH calls always follows the last telephone that receives a call.

Each DH group is assigned to a unique [DN]. When a DH-[DN] is called, the call is sent to the [PDN] or **Pooled Line** button of the telephone that is next in rotation to receive calls.

If all stations in the DH group are busy, calls directed to the group will be placed into a call waiting queue and will be routed to the next available telephone in the DH group. Callers in queue will receive ringback tone until a DH group member becomes available to answer the call.

DH calls can be routed or transferred from Caller ID/DID/DNIS/ANI lines, Tie lines, DISA lines, loop/ground start CO lines, [DN] lines, and built-in and/or external AA. They can also be forwarded calls from stations, and overflow calls from ACD groups.

The DK14, DK40i, and DK424i provide a maximum of 16 DH groups. The queue can contain up to 10 calls per group. A telephone can be a member of more than one (up to 16) DH group. Up to 32 telephone [PDNs] can be programmed in any rotation order desired in each DH group. [PhDNs] can be assigned as members of the DH group in Release 3.1 and higher.

# Station Message Detail Recording (SMDR)

The system produces calling information that is sent to a printer or call accounting device connected to a serial interface unit PCB (see below):

♦ **DK14** – WSIU

♦ **DK40i** – TSIU in the base KSU, PIOU, PIOUS in the Expansion Unit

♦ **DK424i** – PIOU or PIOUS or RSIU/RSIS

The station number and the [DN] that made, received, or transferred a call is sent to the SMDR device after the call or transferred call is completed. Account Code information can also be included. ANI numbers, Caller ID numbers, and DNIS/DID/Tie numbers/names can be programmed to appear on the SMDR report. If present, the names take the place of the system Account Codes.

SMDR reports include the called number(s), and the time and duration of calls. Customers can select what type of calls—all calls, outgoing only, long distance calls—they want to appear on the report.

# Station Relocation

This feature enables stations to be moved from one location to another without having to reprogram the Strata DK. Stations which are moved will maintain their set features and all [DNs], including Primary, Secondary, and Phantom. This feature does not work when stations are relocated from a PDKU to a KCDU PCB in the DK40i.

# StrataControl

StrataControl™ is a system administrative tool designed specifically for end users who prefer to administer part of their own telephone system. It is a Windows-based PC application enables limited access to Strata DK40i and DK424i system programming functions.

StrataControl also enables printing telephone keystrips based upon button programming assigned within the Strata DK system. Quick reference user guides can be printed based upon station features and options assigned within the system. StrataControl also includes an on-line telephone user guide, compiled from the end user's DK database, specifically for each telephone.

# System Programming through a Station

The system can be fully programmed with a 20-button, LCD-type digital or electronic telephone. Programming telephones function the same as any other station when they are not in programming mode. See .

# System Program Administration Software (DKi Admin)

Toshiba DKi Admin software enables all customer configuration program options (speed dial, number plan, ring assignment, etc.) to be downloaded and stored on a PC disk. The customer data can be added or changed, using a PC independent of the Strata DK. DKi Admin is fully functional on DK14, DK40i and all processors of DK424i.

The new (or original) customer program options stored on disk can be uploaded into the Strata DK from the PC to change (or restore) customer configuration.

DKi Admin software can be used to change or restore a customer's configuration database stored on the PC disk and then installing at the customer's site or remotely by modem. It enables customer database information to be transferred from one common control PCB to another, even when upgrading to a higher level processor.

Remote maintenance interface is enabled by the WSIU and customer-provided external modem (DK14 only), TSIU customer-provided external modem (DK40i only) or for both DK40i and DK424i, an RSSU and a customer-provided external modem, or a PIOU/PIOUS with IMDU built-in-modem, or an RSIU with RMDS (DK424i only).

An external customer-supplied modem could be used in place of IMDU or RMDS; however, the external modem will require a standard telephone port or CO line.

# T1 Interface (DK40i, DK424i only)

The T1 (DS-1) interface provides the system with up to 24 digital voice channels that can be individually programmed to operate as ANI, DNIS, Tie, DID, loop start or ground start CO lines. This allows the system to connect to a CO, Long Distance Provider or another type of Key or PBX system with a T1 interface.

The T1 interface (via the RDTU2 PCB) provides economic advantages through the high-traffic carrying capacity of its 24 channels for the DK424i and eight or 12 channels for DK40iand the cost-effectiveness of its digital transmission facilities. This feature requires a customer-provided, UL listed CSU in most locations of the U.S. In Canada, a CSA certified CSU/DSU is required.

T1 interface users also benefit from the increased quality and no loss nature of digital transmission. Access to the T1 interface is completely transparent to station users. With DK424i and the DK40i (Release 4.3 and higher), RDTU2 PCBs supports features that require the hook-flash signal on T1 DID/DOD/Tie circuits.

# Tandem CO Line Connections

This feature enables unattended line-to-line connections for the Strata DK, freeing the conferencing analog station or voice mail port for other calls and important tasks (see Table 38 on Page 95 for feature system capacities).

♦ **DK14** enables up to two tandem connections

♦ **DK40i** enables up to three tandem connections

♦ **DK424i** enables up to 10 tandem connections

When a tandem connection is set up with a [DN] only, the [DN] must appear on the originating DKT or EKT.

Standard telephones and/or VM devices can establish tandem analog CO line connections and then release them without disconnecting the tandem connection in the DK424i. After releasing from tandem call, reconnecting to the call can be accomplished by dialing an access code. This feature does not work if one or both of the CO lines are digital. With DK14 and DK40i, standard telephones and VM ports that set up a tandem CO line connection cannot release from the connection.

Tandem CO line volume level depends on the volume loss level of the Telephone Network CO lines (See "Amplified Conference Interface (DK40i, DK424i only)" on Page 66).

# Tenant Service

Businesses in the same office building can share a system.

♦ **DK14** and **DK40i** each support up to two tenants

♦ **DK424i** supports up to four tenants

Tenants can have separate LCR and Toll Restriction plans, Page Groups/Zones, Night Transfer ringing assignments, and flexible door phone and CO line ringing assignments.

# Tie Lines

Tie lines can link the Strata DK40i or DK424i to other Strata DK systems or PBXs that support Tie lines. Incoming Tie line calls can be routed to ring a number of destinations within the Strata DK (see Table 34 on Page 68).

Analog Tie lines are interfaced via the REMU PCB, each of which provides four circuits. The interface options of Tie lines are: E & M Type I or Type II signaling, optional 2- or 4-wire transmission, Wink or Immediate start. Digital Tie lines, available with DK40i and DK424i, are provided by the RDTU2 and RPTU PCBs.

CO lines transferred from Strata DK to another system over Tie lines will recall back to the originating Strata DK if the transferred call is not answered within a specified time (recall time is flexible for each station). The recalling station number may display on the LCD of the telephone being recalled.

An optional DTMF tone receiver PCB is required for Tie line operation:

♦ **DK14** does not support Tie lines

♦ **DK40i** requires the K5RCU tone receiver

♦ **DK424i** requires the BRCS tone receiver

# Toll Restriction

Stations can be individually restricted from making toll calls. Separate restriction levels can be defined, each allowing or denying specific area and office codes, long distance information calls, international calls, and/or operator-assisted calls.

Each station is assigned any one of the available restriction levels or no restriction. Individual lines can be defined as unrestricted. Restriction levels can also be assigned to verified account codes, which require a user to enter an account code before dialing long distance.

# Toll Restriction Override by System Speed Dial

System Speed Dial numbers can be programmed to override Toll Restriction. When employees need to access a toll number that falls into a restricted area/office code for work purposes, an employer can assign the particular toll number as a System Speed Dial number. After overriding Toll Restriction with system Speed Dial, the caller can be blocked from or allowed to dial additional digits. Dialing long distance provider access codes (10XXX and 101XXX) is *not* allowed, except when entered via a System Speed Dial number or LCR.

# Traveling Class of Service

The normal Toll Restriction class of a station can be temporarily changed to another class. Each of the Toll Restriction classes can be assigned a four-digit code.

If one of these codes is entered at any station, the station assumes the class associated with the code for the next dialed number. Then the station reverts back to its normal Toll Restriction class for subsequent calls. Traveling Class codes can be added, deleted, or changed by users from stations selected in programming.

Traveling Class codes will not appear on the SMDR reports. Verified account codes, which can also change Toll Restriction Class of Service, do print out on SMDR reports.

# Unrestricted Call Transfer to Directory Numbers

Any CO, Tie or DID line or internal call can be transferred to any station [DN]. A station does not need a specific CO line's appearance in order to transfer or answer the call.

# Voice First or Tone Signaling

The system can be programmed for either Voice First Signaling to [PDNs] or Tone First Signaling to [PDNs] as the standard method of internal [PDN] call signaling. Tone Signaling is the commonly-used telephone ring when a call comes in. Tone Signaling better ensures privacy. With Tone Signaling, the called telephone receives a one-second ring tone every three seconds.

With Voice First Signaling, station users will hear a tone burst followed by the caller's voice over their telephone speaker when called by another station user. Voice First allows handsfree talkback from the called telephone on internal and private network Tie line calls.

When [PhDNs] are called, they always ring Tone first. Callers can always select the alternative method immediately after dialing a station number by dialing a **1**.

# Voice Mail Integration

The system can be configured with a Toshiba Stratagy, Stratagy DK or VP (Voice Processing) or a customer-supplied voice mail messaging system. The following features are available with many of the systems.

### Automated Attendant

Many voice mail systems offer AA as part of their overall feature package.

### ANI/DNIS Routing to Voice Mailbox

Each DNIS number or all ANI numbers can be assigned to route directly to a voice mailbox independent of telephone user voice mailboxes. Routing ANI/DNIS calls directly to a voice mailbox can be set for all calls or just calls during a particular system mode (Day, Day2, or Night). This feature is available with in-band VM integration only, not with SMDI.

### Call Forward to Voice Mailbox

Each telephone user can forward calls directly to a personal mailbox. The caller bypasses the usual sequence of voice mail commands and simply leaves a message after hearing a tone. Feature integration of special voice mail features in Strata DK software enables the systems to work together more efficiently.

The DK Systems provide SMDI or Inband DTMF tones for voice mail feature integration. These two options function independently of each other or together. All systems require a DK standard telephone port to interface with each Voice Mail port.

♦ **DK14** – the QRCU3 PCB enables DTMF. The WSIU PCB provides SMDI.

♦ **DK40i** – the K5RCU enables DTMF. TSIU, PIOU, PIOUS or RSSU PCBs enable SMDI.

♦ **DK424i** – the BRCS enables DTMF. PIOU, PIOUS, RSSU or RSIU/RSIS PCBs enable SMDI.

## Message Waiting Indication

When a message is recorded in a user's mailbox, the voice mail system automatically sets a message waiting indication—typically a flashing LED—at the user's digital or electronic telephone or the message waiting lamp on a standard telephone connected to an RSTU2 PCB.

A Toshiba telephone can have up to five message waiting buttons/LEDs. A fixed **Msg** button for the telephone's [PDN], and up to four (flexible) message buttons for each of the [PhDN].

## Voice Mail Control via Station

Station users can control voice mail equipment from their telephone dial pads, when not connected in a conference call. DK40i and DK424i station users can control voice mail equipment on a conference call with other station's internal or external CO lines.

**Table 37       Standard and Optional System Features**

| Standard System Feature | |
| --- | --- |
| Abandoned Call Numbers (ABR) | Multiple Directory Numbers |
| Account Codes (forced/voluntary/verified) | Multiple FCC Registration |
| Alternate Point Answer | Music-on-Hold (MOH) Interface |
| Automatic Release from Hold/DISA | Night Ringing Answer Code |
| Background Music Interface[1] | Non-blocking Talk Paths |
| Centrex/PBX Compatible | Outgoing Call Restriction |
| Centrex Ringing Repeat | Pooled CO Line Buttons |
| Conferencing | Pooled CO Release/Answer Button |
| Credit Card Calling | Privacy/Non-privacy |
| Day/Night Modes | Station Hunting |
| Delayed Ringing | Station Speed Dial |
| Distinctive CO Line/Directory Number Ringing | Station Relocation |
| Distributed Hunt (DK424i only) | System Programming through Station |
| DTMF Back Tone | System Speed Dial |
| DTMF and Dial Pulse CO Line Compatible | Tandem CO Line Connections |
| DTMF Signal Time (80/160 ms) | Tenant Service |
| Flexible Button Assignment | Toll Restriction |
| Flexible Directory Numbers | Toll Restriction Override by System Speed Dial |
| Flexible Line Ringing Assignment: | Transfer Recall (CO line and Tie line) |
| ♦  Immediate | Traveling Class of Service |
| ♦  Delay 1 | Unlimited Handsfree Directory Number Talk Paths |
| ♦  Delay 2 | Unrestricted Call Transfer to Directory Numbers |
| Flexible Port/line Assignment | Voice First or Tone Signaling |
| Group Paging | Voice Mail Integration: |
| Least Cost Routing | ♦  ANI/DNIS Routing to Voice Mail Box |
| Line Groups | ♦  Automated Attendant |
| Line Queuing | ♦  Call Forward to Voice Mailbox |
| Live System Programming | ♦  Feature Integration |
| Memory Protection | ♦  Message Waiting Indication |
| Message Waiting[1] | Voice Mail Control via Station |

| Optional Features | |
| --- | --- |
| Alarm Sensor[1] | |
| Alternate Background Music[1] | Hospitality Management Information System (HMIS) |
| Amplified Conference Interface[1] | Integrated Services Digital Network (ISDN) |
| Automatic Call Distribution (ACD)[1] | Loop Start CO Lines |
| Automatic Number Identification (ANI) | Modem Pooling* |
| Built-in Auto Attendant[1] | Night Ringing Over External Page[1] |
| Caller ID* | Night Ringing Over Selected Page Zones[1] |
| Computer Applications[1] | Off-premises Station[1] |
| Data Switching[1] | Power Failure Transfer[1] |
| Dialed Number Identification Service (DNIS) | Printer Sharing[1] |
| Direct Inward Dialing (DID) Lines | Relay Service[1] |
| Direct Inward System Access (DISA) | ♦  External Page/Door Lock Control Relay |
| Door Lock Control[1] | ♦  Night/Hold Relay |
| Door Phones (MDFB) | Remote Administration and Maintenance[1] |
| Enhanced 911 (E911) Service[1] | Reserve Power* |
| External Page Interface[1] | System Program Administration Software[1] |
| External Page Zones[1] | Station Message Detail Recording (SMDR)[1] |
| External Amplified Speaker[1] | Tie Lines |
| Ground Start CO Lines | Voice Mail Interface (SMDI) |

1.  Some feature implementation may require additional auxiliary equipment.

**Table 38      System Feature Capacities**

| Features | DK14 | DK40i | DK424i B1CU | DK424i B2CAU/ B2CBU | DK424i B3CAU/ B3CBU | DK424i B5CAU/ B5CBU |
|---|---|---|---|---|---|---|
| Amplified Conferencing[1] | 0 | 2 | 4 | 4 | 4 | 4 |
| Auto Attendant (built-in) simultaneous calls in queue | 3 | 5 | 12 | 24 | 24 | 24 |
| Caller ID/ANI/CNIS Abandoned Call Numbers:     stored per station | 10~100 | 10~100 | 10~100 | 10~100 | 10~100 | 10~100 |
|     stored per system | 200 | 200 | 400 | 1000 | 1000 | 2000 |
| CO Line Groups | 4 | 8 | 8 | 16 | 16 | 16 |
| Distributed Hunt (DH) Calls in Queue per Groups | 10 | 10 | 10 | 10 | 10 | 10 |
| DH Groups | 16 | 16 | 16 | 16 | 16 | 16 |
| DH stations per Group | 8 | 28 | 32 | 32 | 32 | 32 |
| DNIS Network Routing Numbers | 0 | 100 | 200 | 300 | 300 | 300 |
| DNIS Numbers | 0 | 200 | 350 | 500 | 500 | 500 |
| DTMF receivers | 3 | 5 | 12 | 24 | 24 | 24 |
| External Page Zones | 0 | 4 | 4 | 4 | 4 | 8 |
| Call Park Orbits - general | 20 | 20 | 20 | 20 | 20 | 20 |
| Call Park Orbits - individual | 10 | 28 | 80 | 240 | 240 | 336 |
| Personal LCD Messages per DKT[2] | 10 | 10 | 10 | 10 | 10 | 10 |
| Personal Message DKTs | 8 | 16 | 32 | 96 | 96 | 96 |
| [PhDNs] per System | 10 | 28 | 80 | 240 | 240 | 336 |
| [PDNs] per System | 10 | 28 | 80 | 240 | 240 | 336 |
| Ring Tones | 3 | 3 | 3 | 3 | 3 | 3 |
| Simultaneous Party Conferencing (4-party) | 2 | 3 | 7 | 7 | 7 | 14 |
| Simultaneous Two-CO Line conferencing (3-party) | 2 | 4 | 10 | 10 | 10 | 20 |
| Station Speed Dial | 40 | 40 | 40 | 40 | 40 | 40 |
| Stratagy DK Systems (per tenant group) | 1 | 1 | 1 | 1 | 1 | 1 |
| Stratagy DK Systems (per system) | 0 | 2 | 2 | 4 | 4 | 4 |
| System LCD Messages | 40 | 40 | 40 | 40 | 40 | 40 |
| System Speed Dial | 40 | 40 | 100 | 100 | 100 | 800 |
| Telephone Page Groups | 5 | 5 | 5 | 9 | 9 | 9 |
| Telephone Group Page – simultaneous stations paged | 8 | 28 | 80 | 120 | 120 | 120 |
| Telephone Pickup Groups | 8 | 20 | 20 | 20 | 20 | 20 |
| Tenants | 2 | 2 | 4 | 4 | 4 | 4 |
| Toll Restriction (AC/OC) Table | 8 | 8 | 8 | 16 | 16 | 16 |
| Toll Restriction Classes | 4 | 4 | 4 | 8 | 8 | 8 |
| Verified Account Codes | 300 | 300 | 300 | 300 | 300 | 500 |
| Voice Mail SMDI | Yes | Yes | Yes | Yes | Yes | Yes |

1.  Requires additional customer-supplied hardware.

2.  Personal Messages includes: timed reminder memo and station speed dial memo.

**Table 39    Line Capacities and Universal Printed Circuit Board Slots**

| Lines[3] and PCB Slots | DK14 | DK40i | DK424i | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | | B1CU | B2CAU/ B2CBU | B3CAU/B3CBU | B5CAU/B5CBU |
| Universal slots | 0 | 4[1] | 16 | 14[2] | 28 | 48 |
| CO lines – loop start (analog)[3] | 4 | 12 | 32 | 104 | 120 | 200 |
| CO lines – ground start (analog)[3] | 0 | 12 | 28 | 52 | 120 | 200 |
| DID lines (analog)[3] | 0 | 12 | 28 | 52 | 120 | 200 |
| Tie lines (analog or VoIP)[3] | 0 | 12 | 28 | 52 | 120 | 200 |
| T1 (DS-1) lines each)[4] | 0 | 8 or 12 | 32 | 120 | 120 | 200 |
| ISDN BRI B channel lines[5] | 0 | 12 | 16 | 16 [5] | 16 [5] | 16 [5] |
| ISDN PRI B channel lines[6] | 0 | 8 or 12 | 32 | 120 | 120 | 188 |
| Squared System Maximum (lines + stations) | 4 lines + 4 stations | 12 lines + 12 stations | 32 lines + 32 stations | 64 lines + 64 stations | 124 lines + 124 stations | 188 lines + 188 stations |

1.  There are four universal slots in the DK40i expansion unit.

2.  Due to software limitations, slots S207, S208, S209 and S210 are unavailable.

3.  These CO line capacities assume one cabinet slot is reserved for digital telephones and another slot is used for an option interface PCB.

4.  T1 lines can be loop start, ground start, Tie, or DID (maximum 24 lines per unit, any type or combination).

5.  BRI lines provide CO line services, including Caller ID, DID and Direct Inward Lines (DIL).

6.  PRI lines provide CO line services, including Calling Party Number, DID, Tie, POTS, FX and DIL.

# Station Features 7

This chapter describes the features, in alphabetical order, that are available to Strata DK14, DK40i and DK424i station users. For an overview, see "Station Features by Station Type" on Page 110. Tables 40 and 41 list the station and peripheral capacities and station features.

**Note** Not all features for digital telephones are available on the digital cordless phones.

## Account Code Button

This button, enables digital telephone users to enter Voluntary Account Codes (verified or nonverified), during conversations without interrupting the talk path. It can also be used to enter Verified Account Codes to allow normally restricted stations to dial long distance calls.

## Add-on Module (DADM)

One to two DADMs can be attached to a DKT2000-series digital telephone to provide an additional 20 or 40 buttons (see "Digital Add-on Module (DADM)" on Page 57). DADM buttons can be programmed for outside line access, System or Personal Speed Dial, or Direct Station Selection (Appendix – General Specifications – Table 49 on Page 128).

## Alert Signal Button

This feature enables a digital or electronic telephone user to signal a predesignated station. When the **Alert Signal** button is pressed, a distinct tone signal is sent to the dedicated station. This signal can be used to alert someone about a pre-arranged event or action—No talk path will exist between the called and calling telephones.

An alert signal can be sent to telephones that are idle, or Busy, Call Forward, and/or Do Not Disturb mode. Each station that has this feature can send/receive the alert signal to/from the other station in the alerting pair. Up to four unique **Alert Signal** buttons can be on a station.

## Automatic Busy Redial (ABR)

Digital and electronic telephone users who dial a busy outside telephone number can set ABR, which automatically redials the number at preprogrammed intervals. Busy tone must consist of standard tones. The system will call back the station when it rings the number. ABR is compatible with LCR and ISDN, but is not compatible with outgoing DID or Tie line calls. ABR requires the QRCU3 on DK14 and K5RCU option PCB for the DK40i; it is standard on the DK424i.

# Automatic Callback (ACB)

Station users that call busy or Do Not Disturb (DND) stations can set ACB and have the system call them back when the busy or DND station or trunk group becomes available. When calling a station with multiple [PDNs] in the ring first mode, ACB will be available to the calling station only if all the [PDNs] of the called station are busy.

# Automatic Hold

This option enables a user to place a CO **Line** or [DN] call on Hold by pressing another CO **Line** or [DN] button. The user can then alternate between the new and the old call by pressing the desired **Line** or [DN]. If this feature is not activated, users must press **Hold** before accessing another line and switching between calls.

# Automatic Line Selection

A digital or electronic telephone user with this programmable feature automatically accesses an outside line, a line group, and an internal [PDN] line whenever the handset is lifted or the speaker (**Spkr**) button is pressed.

# Background Music (BGM) with Station Control

Digital telephone users can control BGM playing over their telephone speakers. (Only a designated station can control BGM over External Page speakers.) Besides being able to turn the music on or off, users can also adjust the volume level. Cordless digital telephones attached to a DKT are not compatible with BGM.

# Busy Override

Enables a station user to send tone bursts to a busy station's idle [DN] or CO **Line** button by dialing a **2** or pressing a feature button. The tone burst can either be sent two times (four seconds apart) or repeated continuously every four seconds. If there are no idle [DNs] or line buttons on the busy station, the station will receive two bursts of camp-on tone (See "Call Transfer with Camp-on" on Page 101.)

The busy station can be a digital or electronic and receive this tone. The DKT2000-series telephone users can adjust their telephones to receive the tone over their handset or headset receiver, as well as the speaker. Standard telephones will receive camp-on tone twice from the handset receiver (it is not continuous on standard phones).

# Busy Station Transfer/Busy Station Ringing

The Busy Station Transfer and Busy Station Ringing features operate together to ensure that a busy digital or electronic telephone station always receives transferred calls along with distinct LED and tone indications. A typical application is when an AA device transfers calls frequently to a busy answering position station.

# Call Forwarding

Outside CO Line and internal [DN] calls to stations in the Call Forwarding mode are routed to an alternate station or voice mail device. Stations in this mode can originate calls as usual. Call forwarding can be set by a feature button or access code.

Station users can set Call Forward for the telephone's [PDN] or the [PhDN] that is "owned" by that telephone. The Call Forward destination mailbox can be different for each [PDN] or [PhDN]. LCD telephones display the forwarded [DN] and the "forward to" destination.

On DK424i, a telephone can be designated as the Call Forward controlling telephone in applications that require ground and loop start CO lines to ring a group of telephones. In DK14 or DK40i, CO lines that ring more than one telephone do not Call Forward.

To Call Forward in a particular ringing assignment (immediate, 12-second delay, 24-second delay), the Call Forward control telephone must be the only one designated to ring in the ringing assignment. If the call forwards to voice mail, it is sent to the mailbox controlling telephone's [PDN] or designated [PhDN]. There are six Call Forwarding modes:

## All Calls

This mode forwards all calls to a busy or idle [DN] immediately; the station will not ring.

## Busy

When this mode is set, all calls to a busy [DN] immediately forward. If a station has an idle [PDN], but is busy on another [DN] or CO line call, calls to the [PDN] will not forward if the system has Ring First signaling, but they will forward if the system has Voice First Signaling. If all the station's [PDNs] are in use, then calls to the [PDN] will forward immediately. When a station is in the DND mode, all calls to the station's [PDN] forward immediately, if the [PDN] does not appear on other stations.

## No Answer

Calls to an idle [DN] set with this mode will ring for eight to 60 seconds and then forward. The Ring No Answer time (eight to 60 seconds) can be set by the telephone user. Call Forward No Answer (CFNA) is optional on Handsfree Answerback.

### Notes

- OCA calls will not Call Forward.
- Handsfree internal calls can be programmed to automatically forward if there is No Answer. If this is not programmed, callers can force Call Forward with a one-digit entry.

## Busy/No Answer

When a station is idle and in this mode, calls will ring for eight to 60 seconds and then forward. The Ring No Answer time can be set by the telephone user. When all the station's [DNs] are busy or when the station is in the DND mode, the call will "Call Forward-busy" immediately.

On Ring First systems, if the station is busy on a call, but has an idle [DN], calls will mute-ring the idle [DN] until the CFNA timer expires and then the call will forward. This allows other users to answer the call if the called [DN] appears on their telephones. On Voice First systems, calls will immediately Call Forward-busy when the station is busy on a call, even if it has an idle [PDN]. A station in the DND mode will call forward immediately.

### Fixed

Calls to the [PDN] or private CO line of an idle or busy digital or electronic telephone in this mode will forward immediately to a destination assigned in system programming, but not as defined by the telephone user.

### External Call

Users can set their stations to forward incoming calls (on private or DID lines) to numbers outside the DK System. The forwarding destination can be cancelled or changed to another outside number or an internal voice mailbox (either remotely via DISA or from the user's telephone, security code protected). Internal, Tie line, and transferred calls will not call forward externally, but can forward internally if another Call Forward mode is set simultaneously with Call Forward-external.

**Note** Call Forwarding can be set for [PDNs] and [PhDNs] individually, with the exception of Call Forward External and fixed Call Forward which applies only to [PDNs].

## Call Park Orbits

The Call Park feature enables a station user to place a call temporarily in an orbit so that the call can be retrieved by any user, either from the same station or from a different station. There are 20 General Park Orbits for the system and one Personal Park Orbit for each station. Personal Park Orbits are available to any type of telephone, including standard telephones.

If a call is parked, but not retrieved within a preprogrammed time period, it will recall the parking telephone. The Park recall time is set individually for each station.

### Park and Page

This feature enables a user to park a call (in a General or Personal Park Orbit), enter a Page Zone or Group access code, and then announce the orbit number of the waiting call to the Paged party. A pre-programmed flexible button can be assigned to telephones to automatically connect to a predesignated External Paging circuit, a Telephone Paging group or both.

### Auto Park

This feature is only available to LCD telephones. When a telephone user parks a call, the user can enter **999** instead of a specific Orbit Number. The system will then automatically select the next available General Park Orbit and park the call. The parking telephone's LCD will show the Park Orbit that has been automatically selected for the parked call.

## Call Pickup

By pressing a button or by going off-hook and dialing an access code, any station can pick up the following type of calls:

♦ [PDN] or [PhDN] calls on hold or ringing at other stations

♦ CO/DID/Tie lines calls ringing at other stations, either all lines or designated lines. (See "Tenant Service" on Page 90.)

♦ External or Station Group Page

♦ CO line ringing during the Night mode over External Page or night bell

♦   Door phone calls

♦   Incoming CO line calls

♦   Parked calls

♦   Any ringing line or designated Tenant Group lines

♦   Tandem CO line connections (by tandem origination telephone)

# Call Pickup Groups

Up to 20 Call Pickup groups can be created to enable station users to pickup calls ringing at other stations with the touch of a Pickup feature button or by dialing brief access codes.

Station users can pick up a call that is ringing or transferred to any station in their own group with a single access code or feature button, and can pickup calls ringing stations in other groups with selected codes. Any station can be in all the different pickup groups.

# Call Transfer with Camp-on

A station user can transfer a CO, DID, or Tie line or internal call to a busy station, which will receive an alert tone indicating that a call is camped-on. If the busy station fails to answer, the camped-on call will recall the transferring station.

A camp-on tone is also sent to electronic or digital telephones that are busy and that do not have an idle [DN] or **Line** button to receive the call. Camp-on tone consists of two tone bursts, followed by silence. It can be enabled or disabled for each individual station.

# Call Transfer Immediate

For Digital LCD telephones: If the Feature Prompting Soft Key is used to transfer a call, the call immediately transfers after the last digit of the destination is dialed. If the called station is not available or is busy, the call automatically camps-on to it. This feature is helpful to people who process a large number of calls with no time to wait for transferred calls to be answered.

# Call Transfer Music or Ringing Option

This feature enables ringing or music to be heard by the caller when a call is transferred, depending on system programming. Prior to Release 3.2, callers heard music during the transfer process and no ringing option in programming was available.

# Call Transfer Recall

CO, DID, or Tie lines that are transferred (internally or over Tie lines) will recall to the transferring station if the called station does not answer. The recall time is individually set for each transferring station.

# Centrex/PBX Features

System Speed Dial buttons can be programmed with access codes, plus any flashes or pauses necessary to access features through a host switching system.

# Conferencing

A variety of Conferencing combinations are available to all station users, as listed below. Stations and lines can be added in any order. (See "Amplified Conference Interface (DK40i, DK424i only)" on Page 66)

♦ One or two stations and two outside lines

♦ Two or three stations and one outside line

♦ Four stations on one internal [DN] line

♦ Three to four simultaneous Conference calls (Table 38 on Page 95).

♦ Voice Mail plus one station and two other parties (internal or outside line for DK424i, Release 3.2 and above. (Outside line must be analog, not digital.)

# Continuous Dual-tone Multi-frequency (DTMF) Tone

The DTMF dial signal sent to an outside line or voice mail/auto attendant device can continue as long a DKT2000-series digital telephone user presses a button on the dial pad. This feature is not available with electronic or DKT1000-series digital telephones.

# Data Call Button

A flexible button on a digital telephone can be assigned as a **Data Call** button, which can be used to dial internal data calls. The telephone must be equipped with an RPCI-DI for **Data Call** button applications.

# Direct Station Selection (DSS) Buttons

Digital telephone users can ring selected stations by pressing a flexible feature button assigned for a DSS function. The LED associated with the button provides the busy status of the station and the station's [PDN]. Each flexible button can be assigned as a DSS button to a different station [PDN]. DSS buttons can also be assigned on DADMs.

# Direct Station Selection (DSS) Console Features

On DK40i, DK424i, digital and electronic telephones can operate with DSS consoles, which offer the following features:

♦ Automatic CO line Hold

♦ Feature buttons

♦ All Call Voice Page

♦ Outside Line access buttons

♦ DSS with busy LED indication

♦ Night Transfer

♦ Speed Dial

♦ Voice First or Tone Signaling

♦ Call Forward Override

# Directory Number [DN] Buttons

These are the telephone's call buttons, used to originate and receive internal and external calls. See "Multiple Directory Numbers" on Page 82 for information on the different types of [DNs].

# DISA Security Code Revision

Certain digital telephones selected in programming can revise the DISA security code.

# Distinctive LED Color and Flash Indications

♦ Outside CO **Line** and [DN] button LEDs light red or green to help digital telephone users determine the status of calls. Electronic telephone LEDs are always red when they light.

♦ Digital and electronic telephone LEDs flash at varying rates to indicate calling status.

# Distinctive Station Ringing

Digital and electronic telephones can have one of three different ring tones for incoming CO and DID line calls to help distinguish incoming calls. Also, ring tones for transferred CO and DID line calls are different from the ring tones of direct CO line calls to the same telephone.

# Do Not Disturb (DND)

Station users with digital telephones can activate DND to prevent any calls from ringing them. Callers will hear a fast busy tone. If a DND station's [DN] appears on other telephones, callers will ring the [DNs] on those other telephones. The [DN] will then flash on the DND station, but it will not ring. Stations in DND mode can originate calls. Also, Call Forward-Busy will operate on a DND telephone, even if the telephone has idle [DNs].

# Do Not Disturb (DND) Override

Stations with this special feature programmed can override stations in the DND mode with a tone that indicates that somebody is trying to contact them.

# DP/DTMF Mode Change

This feature allows digital and electronic telephone users to change the line out-dialing signal mode from Dial Pulse (DP) to DTMF with the touch of a feature button.

# Exclusive Hold

Exclusive Hold enables a digital telephone user to place a call on hold so that the call can only be picked up at that station or at another station using Directed Call Pickup. No other station can pick up the call by simply pressing the [DN] or line button that the call is being held on.

# Executive Override

Stations with this feature programmed can enter any conversation, except ACD and ACD/PBX calls, in the system by dialing an access code or pressing a Feature Prompting Soft Key. An optional warning tone notifies the parties that another party is about to conference into their conversation. Executive Override can be blocked selectively to any station in system programming for security with modem (data) calls, voice mail calls, fax machine calls, etc.

# Feature Prompting with Soft Keys

As an alternative to dialing access codes and using feature buttons, station users with LCD digital telephones use Soft Keys (shown on their LCD) to access features. Abbreviated feature names appear during a call (when the telephone is in the ring or talk state) on the LCD above fixed keys. Users can select a feature by pressing the associated key. The LCD feature selections change according to the call state to provide the most logical options.

# Flash Button

An optional button on a digital or electronic telephone can be used either to disconnect a line and regain CO dial tone, or to gain access to Centrex features. The timing choice is system-wide by system programming.

# Handsfree Answerback

When a voice-announced internal [DN] call comes in to a digital or electronic telephone, users can answer without lifting the handset. Cordless digital telephones and standard telephones are not compatible with this feature.

# Hearing Aid Compatible

All Toshiba digital telephones are hearing aid compatible.

# Liquid Crystal Display (LCD) Features

LCD model telephones provide a number of features, such as: ANI, Caller ID, CO Line Identification, DNIS, and more. for a list of LCD features.

# Microphone Cut-off Button

Digital telephones can be programmed with a Microphone Cut-off (**Microphn Cut-off**) button to turn the microphone inside the telephone on and off while idle. This "push-on/push-off" button enables/disables Handsfree Answerback to the telephone. When Microphone Cut-off is on, it blocks room monitoring and Hands-free Answerback.

# Microphone (External Unit)

An external microphone (RFDM) can be connected to the DKT2020-FDSP digital telephone enhancing "full-duplex" operation by virtue of the "superdirectional" characteristic of the microphone. When this option is on, the internal microphone is disabled on all but Voice First Handsfree Answerback calls and OCA calls. The external microphone is powered by the DKT and does not need to be turned off when not in use.

# Modem Button

This button enables a digital telephone user to reserve a modem from a pool or to switch from a voice to a data call. Its LED indicates the availability of modems. The telephone must be equipped with an Integrated PC Interface Unit (RPCI) for **Modem** button applications.

# Modular Handset and Line Cords

All Toshiba telephones are equipped with modular handset and line cords.

# Modular Headset

Digital telephones may be optionally equipped with a modular headset jack by installing an HHEU PCB.

# Off-hook Call Announce (OCA)

OCA allows a station user to send a voice announcement to a busy digital or electronic telephone. The call must be directed to a station's [PDN] or [PhDN]. OCA will not occur when the called station is not the owner of the dialed [PDN] or [PhDN]. Only the [PhDN] owner telephone can receive OCA on calls to the [PhDN].

In order for a station to receive OCA, the station must be assigned with OCA-receive capability in the system database. Depending on system programming and hardware availability, the called station can receive OCA in one of the following ways:

### Handset Mode

An OCA announcement can be sent through the handset receiver to called party who is off-hook and engaged in a conversation. Only digital telephone sets can have this feature. If the called party's station has been programmed with Handset Mode and OCA-receiving capability, an OCA warning tone (optional) and announcement can be sent to through the handset. Cordless digital telephones will also receive the warning tone and announcement.

The called station user, while off-hook and engaged in a conversation, will hear the outside talking party and the OCA calling party, but the outside talking party cannot hear the OCA calling party. The called station user can hold down the **Mic** button to respond and talk to the OCA calling party through the handset; the outside talking party will not hear the response.

A digital telephone feature button can be programmed to work with "push-on/off" action. When "push-on/off" is used, the outside party will hear MOH, if installed, when the called party talks back to the OCA party; otherwise, the outside party hears nothing when excluded from the talk path. Receiving handset OCA calls is available to digital telephones only; no special hardware additions are required.

The DKT2001 telephone can receive handset OCA annoucements, but the user cannot respond, since the DKT2001 does not have **Mic** button.

### Speaker Mode

An OCA announcement can be sent through the speaker to a called party who is off-hook and engaged in a conversation. The called phone user must be equipped with a digital telephone with the optional DVSU PCB and the station must be programmed for OCA-receiving capability. Cordless digital telephones are not compatible with Speaker OCA.

The called station user can respond to the OCA caller by talking into the telephone's microphone. With more than one party connected, two-way simultaneous conversations are possible. However, the RPCI PC/Data Interface cannot be used if speaker mode OCA is installed or vice versa. Electronic telephones are compatible with speaker OCA (optional hardware is required).

# On-hook Dialing

Digital and electronic telephone users can dial calls without lifting the handset, freeing their hands for other tasks. System dial tone, dial pulsing, ringing, and the voice of the answering party are all heard over the telephone speaker. The handset does not need to be lifted until after the party answers, and on speakerphone models does not need to be lifted at all.

# Personal Computer Interface (RPCI-DI)

An optional PC interface unit that replaces the normal digital telephone base and provides the telephone with simultaneous computer-telephone interface and voice/data features as described in "Integrated PC Interface (RPCI-DI)" on Page 57.

# Pooled Line Buttons

A group of CO lines can appear under one button on digital and electronic telephones. The system can support up to 16 line groups. A station can have up to four buttons for the same group for handling calls in the same group. Pooled and single appearing line buttons are designed for use with loop and ground start lines, not Tie, DID, DNIS, or ANI lines.

# Private CO Lines

The system can be programmed to allow certain "private" CO lines to appear only on one digital or electronic telephone and is accessible only by that station.

# Push-button Dialing

All Toshiba telephones are equipped with push-button dial pads.

# Release Button

Users can complete a transfer or disconnect from a call and become idle just by pressing an optional **Release** button on their digital telephones; going on-hook or pressing the hookswitch is not required. This feature is useful for headset-equipped stations.

# Release/Answer Button

The **Release** and **Ans** button enables a station user that is talking on a call to release and transfer or disconnect the active call and automatically answer a new incoming call. This is useful for DSS console's telephones or stations that must process many incoming calls.

# Remote Retrieval of Held/Parked Calls

Calls placed on hold or parked by a station can be picked up selectively by another station by pressing a feature button or dialing an access code.

# Repeat Last Number Dialed

The last number dialed by a digital or electronic telephone is stored in system memory, and may be redialed automatically by accessing a CO line and pressing **Redial** or dialing an access code.

# Ringing Line Preference

A digital or electronic telephone user with this programmable-by-station feature can answer an incoming CO, DID, or Tie line call ringing at their station just by lifting the handset or pressing the **Spkr** button, without having to press the button associated with the line.

# Saved Number Redial

After dialing a telephone number, a digital telephone user can "save" the number by pressing an optional feature button. The system will automatically redial the saved number when the user accesses a [DN] or CO line and presses the button again.

# Speed Dial Buttons

This feature enables digital station users to dial telephone numbers with the push of a button. Standard telephones can dial System and Station Speed Dial numbers with access codes. There are two types of Speed Dial buttons:

♦ **Station Speed Dial Buttons** – Station users can store their own personal telephone numbers on Station Speed Dial buttons. Each button uses one of the assigned 40 station speed dial number storage locations.

♦ **System Speed Dial Buttons** – A designated station user can store numbers for System Speed Dial buttons, which can be assigned to any digital or electronic telephone. For the number of available system speed dial numbers, see .

# Telephone Application Programming Interface (TAPI) Compatibility

The DK can interface with computer applications which conform to the Microsoft Windows TAPI format. TSPI software, which allows the DK to communicate with TAPI applications, is bundled with the RPCI in the form of a 3-1/2" IBM-compatible disk.

The TAPI connection is made with a customer-supplied RS-232 cable connected to a communication port on a PC and through a DKT2000-series digital telephone with an installed RPCI. The PC must be able to run Microsoft Windows software.

# Timed Reminders

Five separate "reminders" (i.e., a tone which sounds at a preset time) can be set at any telephone to ring only once or at the same time daily.

# Toll Restriction Override Code Revision

Privileged digital telephone stations can change Toll Restriction Override Codes.

# User Programmable Feature Buttons

This feature enables digital and electronic telephone users to program their personal Speed Dial buttons with codes to access features and/or dial telephone number. As many as 20 digits and button functions—such as Hold, [PDN] access, and Conference/Transfer (two digits each)—can be stored. More than one feature can be linked under one button to allow functions like placing a line on hold and accessing the Page system with the touch of one button.

**Table 40    Station and Peripherals Capacities**

| Stations | DK14 | DK40i | DK424i | | | |
|---|---|---|---|---|---|---|
| | | | B1CU | B2CAU/ B2CBU | B3CAU/ B3CBU | B5CAU/ B5CBU |
| Add-on modules (DADM) | 8 | 12 | 40 | 120 | 120 | 200 |
| Attendant consoles | 0 | 0 | 0 | 4 | 4 | 4 |
| DKT2104-CT Cordless Telephone | 8 | 28 | 56 | 104 | 192 | 328 |
| DKT2104-CT simultaneous calls | 30 | 30 | 30 | 30 | 30 | 30 |
| DKT2004-CT Cordless Telephone | 8 | 28 | 56 | 104 | 192 | 328 |
| DKT2004-CT simultaneous calls | 9 | 9 | 9 | 9 | 9 | 9 |
| Door locks | 2 | 3 | 5 | 5 | 5 | 5 |
| Door phones | 6 | 9 | 12 | 12 | 12 | 12 |
| DSS consoles | 0 | 3 | 4 | 8 | 8 | 8 |
| ISDN BRI station circuits TE-1 and TA (2B+D per circuit)[1] | 0 | 10 | 16 | 48 | 60 | 100 |
| Handset;OCA stations | 8 | 28 | 56 | 104 | 192 | 336 |
| Off-premises stations | 2 | 20 | 56 | 104 | 192 | 328 |
| PDIU-DS[2] | 7 | 24 | 48 | 96 | 184 | 248 |
| RPCI-DI used for data + TAPI, per system [2] | 8 | 24 | 56 | 104 | 152 | 248 |
| RPCI-DI used for TAPI only: per cabinet [2] | N/A | N/A | 56 | 56 | 56 | 56 |
| per system [2] | 8 | 24 | 56 | 104 | 152 | 248 |
| Speaker OCA stations [2] | 8 | 28 | 56 | 104 | 152 | 248 |
| Standard stations | 2 | 20 | 48 | 96 | 184 | 328 |
| Telephones – DKT | 8 | 28 [3] | 56 | 104 | 192 | 336 |
| Telephones – EKT | 0 | 16 [3] | 56 | 104 | 192 | 336 |

1. ISDN BRI TE-1 and TA include ISDN telephones, modems, video conference interfaces, etc. Up to two stations (TE-1 and/or TA) can connect to and share one BRI S-type circuit. Only one station can connect to a BRI U-type circuit.

2. Speaker OCA, PDIU and RPCI capacity is determined by 2B channel slot availability and power supply limits.

3. To install the maximum of 28 total DKTs and EKTs in the DK40i, up to 16 of the stations can be EKTs and at least 8 of the stations must be DKTs.

**Table 41 Station Features by Station Type**

| Feature | Digital Phones | DKT2001 Phone | Digital Wireless Phones | Cordless Phones | Electronic Phones | Standard Phones | Analog Wireless Phones | Standard Feature |
|---|---|---|---|---|---|---|---|---|
| Account Code Button | X | | X | X | X | | | X |
| Account Code Revision | X | X | | | X | | | X |
| Add-on Module (DKT2000-series only) | X | | | | | | | |
| ANI/Caller ID | $X^2$ | | | X | $X^2$ | | | |
| Alert Signal Button | X | | | | X | | | X |
| Automatic Busy Redial (ABR) | X | X | X | X | X | | | $X^3$ |
| Automatic Callback (ACB) | X | X | X | X | X | X | X | X |
| Automatic Hold | X | | X | X | X | | | X |
| Automatic Line Selection | X | X | X | X | X | | | X |
| Background Music with Station Control [3] | X | X | | | X | | | X |
| Busy Override (receive) | X | | X | X | X | | | X |
| Receive over Handset/Headset | X | X | X | X | | | | X |
| Busy Station Transfer/Busy Station Ringing | X | X | X | X | X | X | X | X |
| Call Forward: | | | | | | | | X |
| All Calls | X | X | X | X | X | X | X | X |
| Busy | X | X | X | X | X | X | X | X |
| No Answer | X | X | X | X | X | X | X | X |
| Busy/No Answer | X | X | X | X | X | X | X | X |
| Fixed | X | X | X | X | X | | | X |
| External Call | X | X | X | X | X | X | X | X |
| Call Park Orbits: | | | | | | | | X |
| Park/Page | X | X | X | X | X | X | X | X |
| Auto Park/Page | $X^2$ | | | | $X^2$ | | | X |
| Orbit Lists | $X^2$ | | | | $X^2$ | | | X |
| Call Pickup: | | | | | | | | X |
| Night Bell | X | X | | X | X | X | X | X |
| Tenant Ringing Lines (4-Groups) | X | X | X | X | X | X | X | X |
| Station Groups (20-Groups, All Call Types) | X | X | X | X | X | X | X | X |
| Any Ringing Line | X | X | X | X | X | X | X | X |
| Directed Station (All Call Types) | X | X | X | X | X | X | X | X |
| Held CO Lines (Selectively) | X | X | X | X | X | X | X | X |
| Door Phone | X | X | X | X | X | X | X | X |
| Parked Call | X | X | X | X | X | X | X | X |
| External Page | X | X | X | X | X | X | X | X |
| Call Transfer with Camp-on | X | X | X | X | X | X | X | X |
| Call Transfer Immediate | X | | | | | | | |
| Call Transfer Recall | X | X | X | X | X | X | X | X |
| Centrex/PBX Compatible | X | X | X | X | X | X | X | X |
| CO/Centrex Feature Buttons | X | | X | X | X | | | X |
| Conferencing | X | X | X | X | X | X | X | X |
| Continuous DTMF Tones | X | X | | | | | | X |
| Data Call Button [4] | X | | | | | | | |
| Direct Station Selection Buttons | X | | | X | X | | | |
| Direct Station Selection Console Features | X | | | | X | | | X |
| Directory Number Buttons | X | X | | X | X | | | X |
| DISA Security Code Revision | X | | | | X | | | X |
| Distinctive Ringing - CO vs. Station | X | X | | | X | X | X | X |
| Distinctive Ringing - Station (for CO calls) | X | X | | | X | X | X | X |
| Do Not Disturb (DND) | X | | | X | X | | | X |
| Do Not Disturb Override (receive) | X | | X | X | X | | | X |
| DP/DTMF Mode Change | X | | | X | X | | | X |
| Exclusive Hold | X | X | | X | X | | | X |
| Executive Override | X | X | X | X | X | X | X | X |

**Table 41     Station Features by Station Type** *(continued)*

| Feature | Digital Phones | DKT2001 Phone | Digital Wireless Phones | Cordless Phones | Electronic Phones | Standard Phones | Analog Wireless Phones | Standard Feature |
|---|---|---|---|---|---|---|---|---|
| Feature Prompting with Soft Keys | X | | | | | | | |
| "Flash" Ability | X | X | X | X | X | X | X | X |
| Flexible Buttons | X | | | X | X | | | X |
| Handsfree Answerback | X | | | | X | | | X |
| Headset Interface [3] | X | | X | X | X | | | |
| Headset Receiver Volume Control [3] | X | | X | X | | | | X |
| Hearing Aid Compatible | X | X | X | X | X | | | X |
| LED - Distinctive Indications | X | | | X[7] | X | | | X |
| LED - Dual Colors | X | | | | | | | X |
| Liquid Crystal Display | X | | X | X | X | | | |
| Message Waiting Indication | X | X | X | X | X | X[3] | X[3] | X |
| Multiple Message Waiting | X | X | | X | X | X | X | X |
| Microphone Control Button (fixed) | X | | | | X | | | X |
| Microphone Sensitivity Control by User | X | | | | | | | |
| Modem Button | X | | | | | | | X |
| Modular Handset and Line Cords | X | X | | | X | | | X |
| Modular Headset\Loud Ringing Bell Interface | X | | | | X | | | |
| Night Lock | X | | | | X | | | X |
| Night Transfer | X | | | | X | | | X |
| Off-hook Call Announce - Handset Mode | X | X[5] | X | X | | | | X |
| Off-hook Call Announce - Speaker Mode | X | | | | X | | | |
| Off-premise Station | | | | | | X | X | |
| On-hook Dialing | X | | | | X | | | X |
| Page Access | X | | X | X | X | X | X | X |
| PC Interface - Telephone Application Program Interface (TAPI) Compatibility | X | | | | | | | |
| Phantom Message Waiting Indication | X | | | X | X | | | X |
| Pooled Line Buttons | X | | | X | X | | | X |
| Private CO Lines | X | X | | X | X | | | X |
| Push-button Dialing | X | X | X | X | X | | | X |
| Release Button | X | | | X | X | | | X |
| Release/Answer Button | X | | | X | X | | | X |
| Remote Retrieval of Held/Parked Calls | X | X | X | X | X | X | X | X |
| Repeat Last Number Dialed | X | X | X | X | X | | | X |
| Ringing Line Preference | X | | | X | X | | | X |
| Saved Number Redial | X | | X | X | X | | | |
| Speed Dial Buttons | X | | | X | X | | | |
| Timed Reminders | X | X | | | X | | | X |
| Toll Restriction Override Code Revision | X | X | | | X | | | X |
| Two CO Line Conference | X | X | X | X | X | X[6] | X[6] | X |
| User Name Display | X | | X | X | X | | | X |
| User Programmable Feature Buttons | X | | | X | X | | | X |

1. Does not apply to DK14.

2. For LCD EKTs and DKTs

3. Standard on DK424i; optional on DK14 and DK40i.

4. May require customer-supplied hardware.

5. The DKT2001 can receive handset OCA, but cannot respond (no **Mic** button).

6. Not applicable on DK14 or DK40i. DK424i requires software Release 3.2 or higher.

7. Only applies to DKT2004-CT.

# PC Attendant Console Features      **8**

The Strata DK PC Attendant Console (DK-PCATT) offers many new features, not available on the older model DK Attendant Console (see  on Page 119). Additionally, it offers all of the features available on digital telephones and the older DK Attendant Console. Most features can be operated either from the DK-PCATT-KB keyboard or from a PC mouse.

The Strata DK PC-ATT software runs on the computer as a Windows application. Toshiba recommends using a dedicated PC for the console; however, other applications can run simultaneously on the same PC. The PC can toggle between Attendant Console mode and other applications.

The console commands are similar to other Windows applications, making training easier for previous Windows users. Either a mouse or keyboard can be used for console operation.

**Note**      For minimum requirements and an illustration of the DK-PCATT screen, see "Strata AirLink Wireless Systems" on Page 60.

This chapter describes specific console features that are available to DK-PCATT users.

## Answer Button

Automatically answers the next ringing call based upon the system defined priority (incoming CO, recall, transferred, etc.—see Answer Priority). Multiple ringing calls are automatically queued to the **Answer** button. The system can prioritize on a first-in first-out (FIFO) basis, or according to the priority defined by the user with the Answer Priority feature.

## Answer Priority

Enables the **Answer** button to answer multiple ringing calls in a priority sequence. The priority sequence is programmable except for emergency calls, which are always the highest priority. The program default priority sequence is (highest to lowest) Emergency Call, Park Orbit Recall, Transfer Recall, Hold Recall, Transferred to "O" Call, Incoming CO Line Call, Internal "O" Operator Call, Internal to Operator Directory Number [DN] Call.

## Answer Prompting

When an incoming call rings the console, the screen displays can display prompts for answering the various CO line or DNIS call. These prompts are stored from the console.

# Attendant Conference Setup

This enables the Attendant to set up a conference call with up to four members. Conference members can be another console, station, or CO line user. The conference can be originated by the Attendant or requested by a station user or outside party.

# Auto Day/Night Mode Switching

The DK-PCATT can automatically switch the Strata DK between Day, Day2, and Night modes, according to the time of day and day of week. Parameters are programmed from the attendant console. With automatic mode switching, the **Night Transfer** button does not have to be pressed. Automatic mode switching is only available with a DK-PCATT and is not a standard system feature of the Strata DK.

# Auto Dialing

When Auto Dial is on, the DK-PCATT can search for names and numbers in the directory, and then automatically dial the number. If Auto Dial is off or no match is found, the Attendant can use the directory and press a button to call a party or enter a number to be dialed.

# Busy Lamp Field (BLF) Display

The console screen shows station status (busy/idle), so the Attendant can see who is busy. BLF data displays in the directory area of the screen, either with or without station names.

# Call Waiting Count

The number of calls waiting to be answered in the attendant console answer queue is displayed and constantly updated.

# Color CRT Display

Console text information is displayed on the monitor screen in full color. Various colors indicate different status or conditions, making them more distinguishable to the Attendant.

# Dial "O" For Attendant

Up to four attendant consoles can be installed per system. To call any available console, station users dial O. To call a specific console, dial the specific console [DN].

# Dial Outside Number For Station User

The Attendant can access a CO line and dial an outside destination number for a station user. To do this, the Attendant must be in the talk state with a station user, an outside caller, or a caller on an incoming Tie trunk.

# Direct Station Selection (DSS)

The Attendant can make direct station calls or transfers by pressing a button, or pointing and clicking the mouse button on the station name or number on the internal directory screen.

# Directory Display and Dialing

The directory listing area of the screen can display both names and numbers of internal station users. The Attendant can point and click on a name to automatically dial the number.

♦ The Internal Directory displays the names, directory numbers, and station status (busy/idle) of station users and ACD groups. This facilitates quick and easy call processing, primarily transfer of incoming calls.

♦ A scroll bar enables the Attendant to quickly scan all of the names in the directory listing.

# DTMF Signaling from Dial Pad

The Attendant can press a button to send DTMF tones from the dial pad. DTMF tones are used to signal external devices such as voice mail, auto attendants, answering machines, etc.

# Emergency Calls

Emergency calls from internal stations that arrive at an attendant console receive higher priority call treatment than other calls. Emergency calls display in the incoming call area of the screen. If the call is placed on hold, hold time appears in red to highlight this call for quick retrieval.

# Emergency Page

An attendant console equipped with an assigned **Emergency Page** button can Page the All Call Page group. The Page sounds over the speakers of all idle telephones in the All Call Page group, but does not sound over the external paging speakers.

# Feature On-Line Help

On-line Help provides feature instructions at the touch of a button or a click of the mouse. It functions the same as other Windows PC applications. On-line Help provides more details than the Soft Key feature prompts. For even more detailed explanations and instructions, refer to the *Strata DK PC Attendant Console User Guide*.

# Feature Prompting with Soft Keys

Feature Prompting with Soft Keys provides access to various console features. On-screen instructions and Soft Key functions change according to the state of the Attendant Console.

Examples are:

♦ Sending a message waiting indication to a station

♦ Breaking into an ongoing conversation

♦ Performing a transfer, conference, or voice page

# Flexible Programmable Buttons

There are 16 flexible buttons on the display screen which can be programmed with a variety of feature assignments, trunk access, or as Incoming Call (In) buttons.

# Headset Operation

In addition to the handset, the console can be used with a headset. The headset can be plugged into the RATI attendant console interface unit.

# Hold Button

When the **Hold** button is selected, the current call is placed on hold. If the call is not answered within a preprogrammed time period, the Attendant is reminded by an on-screen ring indicator.

# Hold Timer Display

The timer information screen shows the amount of time each call has been on hold. This serves as a reminder for the Attendant, ensuring that the held calls will not be ignored or forgotten. Also, the color indicates whether the call is on Hard Hold, Consultation Hold, Supervised Hold, or Emergency Call Hold.

# Incoming Call Identification

This feature enables selective answering of all categories of calls to the Attendant (internal [DN], transferred, park recall, hold recall, transfer recall, emergency, operator, and incoming CO for all 16 CO line groups). The Attendant can select and answer calls in the incoming call display area, instead of using the **Answer** button. Thus, the Attendant can override the FIFO or priority order established by the **Answer** button and the Answer Priority feature.

# Incoming Call Statistics

The DK-PCATT collects incoming call statistics, such as the number of calls received per hour, total talk time (in seconds) per hour, total incoming talk time per hour, total waiting time (in seconds) in queue per hour, and the maximum number of calls in queue each 15-minute interval. The data is stored on disk for display or printing. Today's data can be displayed on screen and the previous day's data can be printed.

# Interposition Call Transfer

This feature allows calls to be transferred from one attendant console to another.

# Join Button

Allows the Attendant to connect an incoming call with an outside party on hold or an internal station. Rather than transferring the call, the Attendant presses the **Join** button to create a temporary conference from which the Attendant can drop out.

# Keyboard or Mouse Operation

Most of DK-PCATT functions can be operated by clicking a mouse on screen buttons or by pressing the equivalent keyboard buttons. Attendants can choose the easiest method for them.

# Load Sharing

In a multiple-console environment, incoming calls are distributed among the available consoles (up to four) on a call-by-call rotation basis, which increases efficiency and call coverage flexibility.

# Loop Hold Display

This display lists the calls on hold and the hold time. If a call is not answered within a preprogrammed time, it recalls with a ring indicator and appears on the Incoming Call display.

The console can be set for Supervised loop operation, which keeps the call in the Loop display even after it's transferred, enabling the Attendant to monitor it or re-enter the conversation. With release loop operation, the held call appears briefly in the Loop display area until it is answered by the station receiving the transferred call. Then it disappears from display.

The Attendant can type a note, such as who the call is for, the caller's name, etc., while still connected to the call. This note is associated with the call so that Attendant can provide personal attention to each caller.

# Message Center

The Attendant can use the DK-PCATT keyboard to enter a message into the message database. When a message is entered, the station's message light is automatically lit. At a later point, the station user can press **Msg** and call the Attendant. If the station is an LCD phone, the display will show that the Attendant called. Once the station user is connected with the Attendant, the Attendant can display a list of messages for that caller and read them back.

# Multi-tasking

The Strata DK-PCATT software runs as a standard Windows application. Toshiba recommends using a dedicated PC for the console to maximize response time and efficiency. However, other applications can be run simultaneously on the same PC, enabling the Attendant to use the PC for multi-tasking purposes.

When call traffic is light, the PC can toggle from the Attendant Console mode to another application. If a call is received while in another application, the PC can immediately switch back to Attendant Console mode to handle the ringing call. The DK-PCATT can be set to toggle automatically (Auto Activate on) or manually.

# Name or Number Dialing

The DK-PCATT directory can include individuals who do not have stations within the system. This accommodates personnel located off-site (in other facilities, working at home, etc.). The directory can include information on reaching these people. It also provides an area for entering messages for them.

The Attendant can use the directory to select parties by name, number, or department. If Auto Dial is on, a matching name or number invokes automatic calling or transferring. A department list shows the names and/or numbers of people within a department.

# Overflow

Calls that have been waiting in the ringing queue too long will be re-routed to another console, station, or answering device. This feature is controlled by the overflow timer, and can be manually activated by the Attendant during high-traffic conditions via the **Overflow** button.

# Override

There are three different ways to override calls:

♦ Busy Override lets the Attendant send a tone to a busy station to signal a call is waiting.

♦ DND Override lets the Attendant send a tone to an idle station in the DND mode to indicate that an important call is coming in.

♦ Executive Override lets the Attendant enter an established conversation.

# Position Busy Mode

This feature places the console in Unattended mode. It should only be used when multiple attendant consoles are sharing the load of incoming calls.

When one console is in Position Busy Mode, new calls are sent to other console(s). Held and unanswered transferred calls will continue to recall to the console that processed them. When the last console in the Attendant group is placed in Position Busy mode, the entire group is considered Unattended. Consoles must set Call Forward and/or Night Transfer in order for calls to be rerouted to another destination, such as Night Bell, alternate answer position, etc.

# Release Button

This button releases the console from any connection by transferring (or extending) the call and placing the console in the idle state.

# Speed Dial Calling

Speed dial numbers and names can be used for calling or transferring. When a speed dial name or location number is entered on the "active keyboard," speed dial information displays. Up to 40 station speed dial numbers and 100 system speed dial numbers (for RCTUB, RCTUC/D, B1CU, B2CAU/B2CBU, B3CAU/B3CBU), or 800 system speed dial numbers for RCTUE/F and B5CAU/B5CBU can be stored in the speed dial list.

From the console, the Attendant enters the names for the speed dial numbers; these names can be different from those entered in the system records, so the Attendant can customize them.

# Split/Switch Button

The `Split/Switch` button is used to alternate between source and destination parties; the two parties are kept separate. This feature can only be used during a three-way conference (console, source and destination party). The parties can be connected on outside lines only, either on [DN] lines only, or on a combination of outside and [DN] lines. The Split feature does not work on four-party conference calls.

# Three-way Calling

Three-way Calling enables an Attendant to talk simultaneously with the source and destination parties. This feature requires a connection with a station user or outside caller, including a party on Consultation Hold.

# Through Dialing

This feature lets an Attendant provide outgoing call privileges to a restricted station user. On a call-by-call basis, the Attendant can access otherwise denied trunks and then pass the dial tone to the station user. The station user can then complete the call dialing procedure. Through Dialing can also be applied to callers using DISA and incoming Tie trunks.

# Transfer Direct to Voice Mail

A button on the DK PC-ATT enables direct transfer of outside callers to a station user's voice mailbox. This is more efficient than directing a call to a busy station which, if call forward was set to voice mail, would then forward. This is also helpful when the Attendant knows a station user is unavailable. This feature is also useful the called party does not own a station set, but they do have a voice mailbox. The Attendant can release the call when voice mail answers.

# Trunk Group Busy Indication

This feature shows the trunk groups and whether all members of the group are busy. Trunk groups with no members are always shown busy.

# Trunk Group Control

Outgoing CO line groups can be restricted on an as-needed basis. This feature also restricts outgoing calls on two-way CO line groups. This enables the Attendant to control outgoing traffic on heavily-used line groups during busy hours.

# Volume Control

The `Vol Up` and `Vol Dn` buttons adjust the console's ringing and handset/headset volumes.

**Table 42        PC Attendant Console Feature List**

| Attendant Console Features | |
|---|---|
| Answer Button | Incoming Call Identification |
| Answer Priority | Incoming Call Statistics |
| Answer Prompting by CO Line or DNIS | Interposition Call Transfer |
| Attendant Conference Setup | Join Button |
| Auto Day/Night Mode Switching | Keyboard or Mouse Operation |
| Auto Dialing | Load Sharing |
| Busy Lamp Field (BLF) Display | Loop Hold Display |
| Call Waiting Count | Message Center |
| Color CRT Display | Multi-tasking |
| Dial "0" For Attendant | Name/Number Dialing |
| Dial Outside Number for Station User | Overflow |
| Direct Station Selection (DSS) | Override |
| Directory Display and Dialing Internal [DN] | Position Busy Mode |
| DTMF Signaling from Dial Pad (Tone Button) | Release Button |
| Emergency Calls | Speed Dial Calling - Outgoing Speed Dialing |
| Emergency Page | Split/Switch Button |
| Feature On-Line Help | Three-way Calling |
| Feature Prompting with Soft Keys | Through Dialing |
| Flexible Programmable Buttons | Transfer Direct to Voice Mailbox |
| Headset Operation[1] | Trunk Group Busy Indication |
| Hold Button | Trunk Group Control |
| Hold Timer Display | Volume Control |
| | Windows PC Operation |

| Station Features Performed by the Attendant Console | |
|---|---|
| Account Code Calls | Conferencing |
| Alarm Set | Dialed Number Identification Service (DNIS) Display |
| ANI/Caller ID Display[1] | Directory Number User Name/Number Display |
| Automatic Callback | DISA Security Code Revision |
| Automatic Hold | Door Lock Control |
| Automatic Recall | Door Phone Operation |
| Parked Calls | DTMF Tone Signaling from Dial pad |
| Held Calls | Last Number Redial |
| Transferred Calls | Message Waiting |
| Background Music Control | Night Transfer |
| Call Forward | Paging |
| Call Park | ♦  External Speakers[1] |
| ♦  Call Park Orbits | ♦  Telephone Speakers |
| ♦  Auto Park/Page | Privacy Release |
| ♦  Call Pickup | Saved Number Redial |
| Call Transfer with Camp-On | User Programmable Feature Buttons |

1. Some feature implementation may require additional auxiliary equipment.

# Appendix – General Specifications

This appendix contains reference information for the DK14, DK40i, and DK424i systems and compatible stations. The information here applies to all systems unless noted otherwise.

The tables in this appendix include:

# Network Requirements

**Table 43    PCB Network Requirements**

| PCB/Interface | Facility Interface Code | Network Jack | Ringer Equivalence | Universal Service Order Code |
|---|---|---|---|---|
| QSTU2/PESU/RSTU2/ KSTU2/RDSU[1] (Off-premises Station) | OL13A (PESU) OL13B (QSTU2, RSTU2, –24V) OL13C (RSTU2, RDSU with R48S-48V) | RJ21X | N/A | 9.0F |
| QCDU2/RCOU/RCOS, TCOU (loop start line) | 02LS2 | RJ11C/RJ21X (QCDU2 only) RJ14C/RJ21X (all others) | 0.3B | N/A |
| RDDU, TDDU | 02RV2-T (Dealer-supplied CSU) | RJ14C/RJ21X | 0.0B | AS.2 |
| REMU type 1 or type 2 | TL11M, 2-wire TL31M, 4-wire TL12M, type 2, 2-wire TL32M, type 2, 4-wire | RJ2EX RJ2GX RJ2FX RJ2HX | Not Available (N/A) | 9.0F |
| RGLU2 (ground or loop start line) | 02GS2 (ground) 02LS2 (loop) | RJ14C/RJ11CX | 0.3B | N/A |
| RDTU (DS-1/T1)[2] | (See last bullet note on Note 2 below.) | RJ48C/RJ48X/ RJ48M | N/A | 6.0P |
| RCIU2/RCIS (Caller ID) | N/A | RJ21X/RJ14C | 0.3B | N/A |
| RPTU (PRI)[3] | 04DU9-1SN (Dealer-supplied CSU) | RJ48C/RJ48M | N/A | 6.0P |
| RBSU/RBSS (S/T, BRI)[3] | 02IS5 (Dealer-supplied NT-1) | RJ48C/RJ48X | | |
| RBUU/RBUS (U, BRI)[3] | 02IS5 | RJ48C/RJ48X | | |
| RMCU/RCMS (CAMA) | 02RV2-O | RJ11C/RJ21-X | | |
| TBSU (S/T, BRI) | 021S5 (Dealer-supplied NT-1) | RJ48C/RJ48X | | |
| TBUU (U, BRI) | 021S5 | RJ48C/RJ48X | | |

1. Only PESU circuits 1 and 2, and RDSU circuits 1~4 provide Off-premises Station (OPS) capability. PESU must use OL13A or equivalent line conditioning for OPS connection. RDSU must use OL13A or OL13B if providing –24 volt loop voltage. If equipped with the –48 volt loop option PCB (R48S), OL13A, OL13B, or OL13C may be used for OPS connection.

2. When ordering DS-1/T1 circuits, six items must be specified:

   - The number of channels per T1 circuit, fractional increments are normally 8, 12, or 16 channels, full service is 24 channels. Unused channels must be bit-stuffed.

   - Type of CO line assigned to each channel: Loop Start, Ground Start, Tie (Wink or Immediate Start), DID (Wink or Immediate).

   - Frame Format Type: Super Frame (SF) or Extended Super Frame (ESF). The T1 provider normally specifies the Frame Format to be used, either is adequate for DK424 CO digital voice lines. ESF provides a higher level of performance monitoring, but requires trained personnel and the ESF CSU normally costs more than an SF only CSU.

   - Line Code Type: Alternate Mark Inversion (AMI) or Bipolar 8 Zero Substitution (B8ZS). The T1 provider normally specified the Line Code to be used, either is adequate for DK424 T1 CO digital voice lines.

   - The customer may have to provide the Channel Service Unit (CSU) to interface the DK424 T1 circuit to the Telco T1 circuit. (CSUs are a Telco requirement.)

   - RDTU Network Channel Interface Codes: 04DU9-BN, 04DU9-DNZZ, 04DU9-1SN, 04DU9-1KN, 04DU9-1ZN.

3. For information on how to order ISDN PRI/BRI circuits, you should refer to the Toshiba ISDN Training CBT. ISDN circuits may require a customer-provided CSU for PRI and/or Terminal Adapter or Network Terminal units for BRI. In U.S. CSU/TAs must be UL-listed in the U.S. In Canada, they must be CSA certified.

**Table 44    Environmental Characteristics**

| Environmental Specifications | |
|---|---|
| Operating temperature<br>Operating humidity<br>Storage temperature | 32~104° F (0~40° C)<br>20~80% relative humidity without condensation<br>-4~158° F (-20~70° C) |
| **BTU Rating** | |
| PDKU (5)<br>RCOU/RCOS (1)<br>B1CU (1)<br>DKTs (40) | 190 BTUs (56 watt hours) per cabinet |
| **Traffic Rating Characteristics** | |
| *In hundred call seconds (CCS):*<br>9 CCS per station system-wide<br>36 CCS per ACD/SMIS station<br><br>**Note**    There are system limits for the number of simultaneous Agents depending on traffic. See the *Strata DK Call Center Solutions General Description* for details. | |

# Customer-supplied Peripherals and Interfaces

The Strata DK supports many customer-supplied peripheral devices, a number of which are listed in Table 45 (with the supporting PCB or data interface unit noted). For a depiction of these devices, see Figure 16 on Page 56.

**Table 45      Customer-supplied Peripherals and Interfaces**

| Peripheral | Interface |
|---|---|
| Auto Attendant (built-in) digital announcement devices | QSTU2, KSTU, RSTU2, RDSU, or PESU |
| Alternate BGM interface | QRCU3, QSTU2, KSTU2, RSTU2, RDSU, PEKU, or PESU |
| Caller ID | KSTU2, WSIU, TCIU2, TCOU, RSIU, RCIU/RCIS, RGLU, RCOU, RCOS, PIOU |
| Dictation equipment | QSTU2, RSTU2, RDSU, or PESU |
| DTMF | An optional QRCU3, K5RCU, K5RCU2 or RRCS tone receiver is required if a DTMF signalling peripheral is connected to QSTU2, KSTU2, RSTU2, RDSU, or PESU; or if Tie, DID or DISA lines are used. |
| External page equipment | PIOU, PIOUS, PEPU, DK14 KSU or DK40i Base KSU |
| External remote maintenance modem | WSIU, TSIU, PIOU, PIOUS, RSSU or RSIU |
| Fax machines | QSTU2, RSTU2, RDSU, or PESU |
| Local maintenance terminal | WSIU, TSIU, PIOU, PIOUS, RSSU, or RSIU |
| Mainframe computers | PDIU-DS |
| Modems | WSIU, TSIU, RSTU2, RDSU, KSTU2, QSTU2, PESU, or PDIU-DS |
| Personal computers | RPCI or PDIU-DS |
| Radio paging equipment | QSTU, KSTU, RSTU2, RDSU, or PESU |
| Remote maintenance (built-in) | RSIU with RMDS, PIOU or PIOUS with IMDU |
| Standard telephones | QSTU2, KSTU2, RSTU2, RDSU, or PESU |
| Standard telephone with Message Waiting neon lamp | RSTU2 |
| SMDR printer/call accounting device or SMDI | WSIU, TSIU, PIOU, PIOUS, RSIU, RSIS |
| Voice mail device voice ports | QSTU2, KSTU2, RSTU2, RDSU, PESU or Stratagy DK |
| ISDN Terminal Adaptors/ Terminal Equipment[1] | RBSU/RBSS, RBUU/RBUS, TBUU, TBUS, RPTU |
| Local Area Network, Wide Area Network | BVPU, RBSU |

1. ISDN Terminal Adaptors (TA) and Terminal Equipment (TE-1) are ISDN status devices, such as ISDN telephones, G-4 fax machines, modem and video conference interfaces, etc.

# Station Specifications

**Table 46        Station Loop Requirements**

| Device | No. of Wire Pairs (24 AWG twisted pair) | Max. Loop Resistance (includes device) | Max. Distance (KSU/Cabinet to Device) |
|---|---|---|---|
| Digital telephones[1] DDSS consoles PDIU-DS DDCB | 1-pair | 40 ohms | 1000 ft. (303 m) |
| HDCB | 2-pair | | |
| Attendant Console (DK424i and DK424 only, except RCTUA) | | | |
| RATI (DK424 and DK424i only, except RCTUA) | 1- or 2-pair | | |
| Electronic telephones | 2-pair; 3-pair for OCA | | |
| RPCI-DI or PDIU-DI2 | Shares digital telephone wire-pair[1] | | |
| DADM | | | |
| HDSS consoles | 2-pair | 20 ohms | 500 ft. (152 m) |
| Standard telephones, voice mail, AA, etc. | 1-pair | 300 ohms | Approx. 3000 ft. (909 m) with 150 ohm device.[2] |
| | | 600 ohms | Approx. 9000 ft. (2727 m) with 150 ohm device.[2] |
| | | 1,200 ohms | Approx. 21000 ft. (6363 m) with 150 ohm device.[2] |
| BRI-TE1 (S or U type)[3] | 4-pair modular | 100 ohms | 1650 ft. |
| BRI-TA (S or U type)[3] | | | 1650 ft. |

1. Two-pair wiring or optional telephone power supply is required to achieve maximum range with DADM, OCA, Headset, or DIU.

2. See manufacturer's product specifications for exact resistance of device.

3. ISDN station devices (telephones, fax machines, modems, etc.) are classified as Terminal Equipment (TE-1) or Terminal Adapters (TAs). There are generally two models available for each particular device: S-type or U-type.

**Table 47        Station Dimensions**

| Device | Height | Width | Depth |
|---|---|---|---|
| 10-button Digital Telephone with Handsfree Answerback (DKT2010-H) | 3.3 inches (85 mm)[1] | 7.8 inches (199 mm) | 9.0 inches (230 mm) |
| 10-button Digital Telephone with Speakerphone and Liquid Crystal Display (DKT2010-SD) | 3.8 inches (97 mm)[1] | 7.8 inches (199 mm) | 9.0 inches (230 mm) |
| 20-button Digital Telephone with Speakerphone (DKT2020-S) | 3.3 inches (85 mm)[1] | 7.8 inches (199 mm) | 9.0 inches (230 mm |
| 20-button Digital Telephone with Speakerphone and Liquid Crystal Display (DKT2020-SD) | 3.8 inches (97 mm) | 7.8 inches (199 mm) | 9.0 inches (230 mm) |
| 20-button Digital Telephone with Speakerphone and Liquid Crystal Display (DKT2020-FDSP) | 3.8 inches (97 mm) | 7.8 inches (199 mm) | 9.0 inches (230 mm) |
| Digital Single Line Telephone (DKT2001) | 3.8 inches (97 mm)[1] | 5.4 inches (137 mm) | 9.0 inches (230 mm) |
| Add-on Module (DADM) | 3.3 inches (85 mm) | 2.8 inches (71 mm) | 9.0 inches (229 mm) |
| Direct Station Selection (DSS) Console | 3.3 inches (85 mm) | 7.8 inches (199 mm) | 9.0 inches (230 mm) |
| Stand-alone Data Interface Unit (PDIU-DS) | 1.5 inches (38 mm) | 4.8 inches (122 mm) | 7.3 inches (185 mm) |
| External Speaker Amplifier (HESB) | 10.3 inches (263 mm) | 10.3 inches (263 mm) | 5.0 inches (128 mm) |
| Door Phone/Lock Control Unit (DDCB) | 4.6 inches (117 mm) | 5.5 inches (140 mm) | 1.5 inches (38 mm) |
| Door Phone (MDFB) | 5.5 inches (140 mm) | 3.1 inches (79 mm) | 1.3 inches (33 mm) |
| Attendant Console Interface (RATI) (DK424 only) | 1.5 inches (38 mm) | 4.8 inches (122 mm) | 7.3 inches (185 mm) |
| Handset with Handset Cradle (RATHC) (DK424 only) | 2.8 inches (70 mm) | 2.8 inches (70 mm) | 9.5 inches (241 mm) |
| Strata AirLink Wireless Telephone Handset | 6.0 inches (152 mm) | 2.3 inches (58 mm) | 1.0 inches (25 mm) |
| **DKT2104-CT Digital Cordless Telephone** | **Height** | **Width** | **Depth** |
| Base (without antenna) | 2.5 inches (64 mm) | 4.5 inches (115 mm) | 7.5 inches (190 mm) |
| Charger Base | 3.25 inches (83 mm) | 3.75 inches (95 mm) | 4.625 inches (118 mm) |
| Handset (with antenna) | 8.75 inches (222 mm) | 2 inches (51 mm) | 1.5 inches (38 mm) |
| Charger Base with handset | 9.5 inches (241 mm) | 3.75 inches (95 mm) | 4.625 inches (118 mm) |
| **DKT2004-CT Digital Cordless Telephone** | **Height** | **Width** | **Depth** |
| Base (without antenna) | 3.7 inches (95 mm) | 5.0 inches (128 mm) | 7.5 inches (190 mm) |
| Handset (with antenna) | 1.1 inches (27 mm) | 2.2 inches (55 mm) | 8.3 inches (210 mm) |
| Base with handset (with antennas) | 8.7 inches (221 mm) | 5.4 inches (137 mm) | 8.8 inches (223 mm) |

1.  4.1 inches (105 mm) with handset.

**Table 48      System Tones**

| CO Line | | | | | |
|---|---|---|---|---|---|
| Idle digital and electronic telephones | Ring Tone Options | 1 | 2 | 3 | All tones are interrupted at 10 Hz |
| | Direct Ring Call | 500/640 Hz | 1200/1500 Hz | 800/1000 Hz | |
| | Ring Transfer Call | 540/760 Hz | 1300/1780 Hz | 860/1180 Hz | 1-sec. ON – 3 sec. OFF |
| Busy station (queuing) to DKT/EKT | | 2400 Hz, interrupted at 10 Hz, 1 sec. ON – 3 sec. OFF (twice or continuous 4 sec. apart) | | | |
| Busy station transfer (camp-on) to DKT/EKT | | 2400 Hz, interrupted at 10 Hz, one-time 1 sec. tone burst (twice or continuous 4 sec. apart) | | | |
| Standard telephone or voice mail port | | 20 Hz | | | |
| Normal ring option | | 1 sec. ON – 3 sec. OFF | | | |
| Camp-on tone options to standard telephone | | No tone or two 160 msec. bursts of 1209 Hz 160 msec. apart, twice, 3 sec. apart | | | |
| Distinctive ring option (standard telephone) | | 0.4 sec. ON – 0.2 sec. OFF – 0.4 sec. ON – 3 sec. OFF | | | |
| Tie or DISA line calls | | | | | |
| To busy station | | 480/620 Hz, 0.50 sec. ON – 0.50 sec. OFF | | | |
| Internal [DN] Calls (except for DKT-2004-CT) | | | | | |
| Tone first (EKT/DKT ring signal) | | 500 Hz, 1 sec. ON – 3 sec. OFF (twice or continuous) | | | |
| Door phone | A & C | 870 Hz, 1 sec./710 Hz, 0.5 sec. twice per ring (1 or 5 rings) | | | |
| | B | 870 Hz, 0.5 sec./710 Hz, 0.5 sec. twice per ring (1 or 5 rings) | | | |
| Alert Signal to idle telephone | | Six - 160 msec. burst of 350/440 Hz, twice 1 sec. apart | | | |
| Alert Signal to busy telephone | | 2400 Hz, interrupted at 10 Hz, 1 sec. ON, twice, 1 sec. apart | | | |
| Busy station transfer (camp-on) to DKT/EKT | | 2400 Hz, interrupted at 10 Hz, one-time 1 sec. tone burst (twice or continuous 3 sec. apart) | | | |
| Busy Override/DND Override | | 2400 Hz, 1 sec. ON – 3 sec. OFF (twice or continuous 3 sec. apart) | | | |
| Dial Tone (internal) | | 350/440 Hz, continuous | | | |
| Ringback Tone | | 440/480 Hz, 1 sec. ON – 3 sec. OFF (once: voice first; continuous: ring first) | | | |
| Busy Tone | | 480/620 Hz, 0.5 sec. ON – 0.5 sec. OFF | | | |
| Reorder Tone | | 480/620 Hz, 0.25 sec. ON – 0.25 sec. OFF | | | |
| Do Not Disturb | | 480/620 Hz, 0.125 sec. ON – 0.125 sec. OFF | | | |
| Voice Page Warning | | 500 Hz, 1 sec. ON (via DKT/EKT telephone speaker) | | | |
| Speaker OCA Warning | | 500 Hz, 1 sec. ON only (via DKT/EKT telephone speaker) | | | |
| Handset OCA Warning | | 350/440 Hz, 0.5 sec. (via DKT handset) | | | |
| Executive/Privacy Override Warning | | 440 Hz, 1 sec. ON only (via handset or speaker) | | | |
| Hold Recall | | 2400 Hz, interrupted at 10 Hz, 1 sec. ON – 1 sec. OFF | | | |
| Standard telephone ringing | | 20 Hz, 1 sec. ON – 3 sec. OFF | | | |
| Standard telephone Busy Override | | 160 msec. burst of 1209 Hz, twice, 3 sec. apart | | | |
| Standard telephone Camp-on tone | | Two 160 msec. bursts of 1209 Hz, 160 msec. apart, twice, 3 sec. apart | | | |
| Voice Mail Special Tones | | | | | |
| Answer: | DTMF "A" | | | | |
| Disconnect: | DTMF "D" | 80 or 160 msec., dual tone | | | |
| Recall: | DTMF "B" | | | | |
| Special Confirmation Tones | | | | | |
| Verified Account Code confirmation tones (sent only to the station that enters the code, not to the outside party) | Code valid | 350/440 Hz, 0.5 sec. ON | | | |
| | Code not valid | 350/440 Hz, 0.125 sec. ON – 0.125 sec. OFF – 0.125 sec. ON | | | |
| Station option programming confirmation tones (Call Forward, Timed Reminders, etc.) | | 350/440 Hz, 1 sec. ON | | | |
| ACD | | | | | |
| Supervisor Monitoring Tone | | 350/440 Hz, 0.5 sec. every 15 sec. | | | |
| Queue Alarms | Alarm 1 | 2400 Hz, interrupted at 10 Hz, 1 sec. ON – 0.5 sec. OFF | | | |
| | Alarm 2 | 2400 Hz, interrupted at 10 Hz, continuous | | | |

**Table 49    Subassemblies for Toshiba Telephones**

| Subassembly | Host Telephone | Function | Capacity per Telephone |
|---|---|---|---|
| DVSU[1] | 2000- and 1000-series Digital Telephones | Provides interface for digital telephone to receive Speaker OCA. Not required for Handset/Headset OCA. | 1 |
| RPCI-DI[1] | 2000-series Digital Telephones | Provides two modes of operation: TAPI PC application interface and Data Calling interface. | |
| HVSU2 | 6500-series Electronic Telephone | Provides interface for electronic telephone to receive OCA. | |
| HHEU | 2000- and 1000-series Digital Telephones. 6500- and 6005-series Electronic Telephones | Provides interface for headset and Loud Ringing Bell to telephone. Can be installed with DVSU, RPCI-DI, or DADM. | |
| DADM[1] | 2000-series Digital Telephones | Provides telephone with 20 (or 40 with two DADMs) additional feature buttons for DSS, System or Station Speed Dial, or CO line appearances. | 1 or 2 |

1. Only one of the following subassembly types is allowed per telephone: DVSU, RPCI-DI or DADM.

**Table 50    Standard Telephone Ringer Specifications**

| Standard Telephone Ring Voltage QSTU2  or PESU (Circuits 1 and 2) | |
|---|---|
| Square wave output with high/low option jumper: Low position 130 ± 20VDC peak-to-peak (no-load) High position, 190 ± 25VDC peak-to-peak (no-load) | |
| Ringing capability | 2 ringers maximum per circuit, high or low position |
| **KSTU2** | |
| Ring voltage | Square wave output with high/low option jumper: Low position 130 ±20VDC peak-to-peak (no-load) High position, 190 ±25VDC peak-to-peak (no-load) |
| Ringing capability | 2 ringers maximum per circuit, high or low position / Ringing capability |
| **RSTU2 or RDSU** | |
| Ring voltage | 80V RMS sine wave |
| Ringing capability | 1.5 REN per circuit, with or without Message Waiting |
| RSTU2 Message Waiting voltage | -90 VDC/one telephone per circuit (max.) |
| RSTU2 or PESU modem interface data rate | 14,400 bps maximum |

**Table 51      Data Interface Specifications**

| Item | Specifications |
|---|---|
| Terminal or personal computer interface specification | RS-232C (EIA) <br><br> V.24/V.28 (CCITT) <br><br> TAPI compatible (RPCI-DI only) |
| Data transmission speed | Up to 19.2 kbps, asynchronous |
| Flow control | Half and full duplex, utilizing RTS/CTS/CD control leads |
| Automatic dialing | Based on AT commands: <br><br> ♦ Data speed of AT command is 300, 600, 2300, 2400, 4800, or 9600 <br><br> ♦ Data bit: 7 or 8 bits <br><br> ♦ Stop bit: 1 or 2 bits <br><br> ♦ Parity bit: even, odd, or no parity |
| Maximum distance: KSU to DKT with integrated RPCI-DI or stand-alone DIU | ♦ With system power supply; 1000 feet with 2-pair (24 AWG) <br><br> ♦ With battery back-up; 330 feet with 1-pair or 675 feet with 2-pair (24 AWG), or 1000 feet with external power to telephone |
| Number of wire pairs | 1-pair or 2-pair (24 AWG) |
| LED indicators (stand-alone DIU only) | Power: lights when power is on <br><br> Ready: lights when DTE and DIU are ready <br><br> Connect: lights when DIU is in transmission or ringing mode |
| Automatic disconnect time-out | Forced hang up when RPCI-DI or PDIU does not detect data on SD or RD within nine minutes. |
| LSI technology (RPCI-D1/ PDIU-DS only) | ♦ One-chip CPU with a clock frequency of 12.288 MHz <br><br> ♦ Memory: ROM, 16KB; RAM, 512KB <br><br> ♦ Ping-pong transmission: LSI with bearer transmission rate of 512kbps, 2B+D-type link |
| Strata DK option compatibility | Digital telephones with integrated RPCI-DI: <br><br> ♦ No DVSU (Speaker Off-hook Call Announce only) <br><br> ♦ No Add-on Module <br><br> ♦ Compatible with associated DDSS console <br><br> ♦ Compatible with headset (HHEU) <br><br> ♦ Desktop or wall mount compatible |
| Cabling/connectors | ♦ RPCI-DI, PDIU-DS to DTE/DCE device: 9-wires, 50 feet maximum, 24AWG: compatible with RJ45, 8-wire modular cable and RJ45 to DB25 RS-232 modular adaptors <br><br> ♦ Stand-alone DIU: RJ11 modular connector <br><br> ♦ Integrated RPCI-DI: connected inside digital telephone <br><br> ♦ Stand-alone DIU jumper plugs enable straight wire connection to a DTE or DCE device without null-modem cables or adaptors |

# Glossary

| Term | Definition |
| --- | --- |
| AA | Auto Attendant (built-in or external). This feature acts as an automatic operator that directs incoming callers to stations by offering a menu of dialing prompts. |
| ABR | Automatic Busy Redial. |
| ACB | Automatic Callback. |
| ACD | Automatic Call Distribution. Allows incoming calls to be distributed to a group of ACD agents. The ACD Supervisor's LCD telephone displays ACD Agent and Group information which allows the Supervisor to monitor calls and assist agents. |
| ADM | Add-on Module—*See DADM.* |
| AMI | Alternate Mark Inversion. |
| ANI | Automatic Number Identification—Telephone number of the calling party is sent to the Strata DK system over incoming DID or Tie lines. This feature is provided by some long distance telephone service companies. |
| B-channel | Used in ISDN. Data or voice information is transmitted on the B-channels of an ISDN line at 64kpbs. The B-channel refers to the frequency range of transmissions on a copper pair; it is a logical, rather than physical channel. Also see BRI and PRI. |
| B8ZS | Bipolar 8 Zero Substitution. |
| BGM | Background Music—Allows customer-supplied music to be sent to telephone speakers and external speakers. |
| BLF | Busy Lamp Field. |
| BPS | Bits Per Second—Unit of measure that refers to the transmission speed (baud rate) of electronic signals. It is used when describing the Data Interface Unit and modem operation. |
| BRI | Basic Rate Interface—ISDN line with 2B + 1D channel. BRI lines can have a U-interface with RJ11 jacks and single twisted pair wiring, or RJ45 four pair S/T interface wiring. BRI is the a smaller ISDN interface than PRI. |
| BSIA | Base Station Interface Adapter–Interface between the Strata Airlink™ Wireless Telephone Base Stations and the host telephone system. |
| CESID | Caller's Emergency Service Identification—The number used to identify the calling terminal within the context of the emergency service system. |
| CLASS | Custom Local Area Signaling Services—Defines a number of features offered by local telephone companies. |
| CLID or CND | Calling Line Identification or Calling Number Delivery—Telephone number or name of the calling party sent to the Strata DK system over incoming ground or loop start CO lines. This feature is one of the "CLASS" features offered by some local telephone companies. |

| Term | Definition |
|---|---|
| **CO** | Central Office—The facility which houses switching equipment that provides telephone service (CO lines, E & M Tie lines, DID lines, Centrex lines, etc.) for the immediate geographical area. |
| **CODECs** | Coder/Decoder—Semiconductors that allow the system to process analog-to-digital and digital-to-analog conversions. |
| **CSU** | Channel Service Unit. Required between the DK PRI interface and the PRI line provider interface in most locations of the U.S. |
| **CNIS** | Calling Number Identification Services—Caller ID for ISDN. CNIS is calling party information for outgoing and incoming calls sent to the ISDN network. |
| **DADM** | Digital Add-on-Module—Optional device that connects to 2000-series digital telephones to provide the telephones with 20 flexible feature buttons that can be assigned individually for Direct Station Selection, System and Personal Speed Dial, and CO line access. |
| **D-channel** | Used in ISDN. This channel transmit call control information (out-of-band signaling) for B-channels. The D-channel is a logical, not physical channel. |
| **DDCB** | Digital Door Phone/Lock Control Unit—A peripheral hardware unit compatible with designated digital telephone circuits that supports optional door phones (MDFBs) and provides door lock control. |
| **DDSS** | Digital Direct Station Selection Console—A device that helps facilitate the processing of a heavy load of incoming calls. The DDSS connects only to designated digital telephone circuits, and is associated with a digital telephone. |
| **DH** | Distributed Hunt. |
| **DID Line** | Direct Inward Dialing line—Allows external callers to dial directly to an internal number. |
| **DIL** | Direct In Line—Refers to two-way, standard CO trunk lines that are assigned to a particular extension or hunt group. |
| **DISA** | Direct Inward System Access—Enables an outside party to access the Strata DK system internal stations or outgoing CO lines without having to go through an operator or automated attendant. An optional security code may be set to prevent unauthorized access to outgoing CO lines for through system calling. |
| **DKT** | Digital Key Telephone. |
| **[DN]** | Directory Number. |
| **DNIS** | Dialed Number Identification Service—Telephone number of called party is sent to the Strata DK over incoming DID or Tie lines. This feature is provided by some long distance telephone companies. |
| **DSS** | Direct Station Selection—Enables a telephone user (as well as a DSS console and ADM user) to call another station with the touch of a flexible feature button. |
| **DTMF** | Dual-tone Multi-frequency—Push-button tone dialing. |
| **DVSU** | A subassembly that equips a digital telephone with the capability to receive Speaker Off-hook Call Announce (OCA) calls. DVSU is not required to receive Handset OCA (HS-OCA). |
| **EKT** | Electronic Key Telephone. |
| **ESF** | Extended Super Frame. |
| **FIFO** | First-In, First-Out. |
| **HDCB** | Electronic Door Phone/Lock Control Unit—A peripheral hardware unit compatible with designated electronic telephone circuits that supports optional door phones (MDFBs) and provides door lock control. |

| Term | Definition |
|------|------------|
| **HDSS** | Electronic Direct Station Selection Console—A device that helps facilitate the processing of a heavy load of incoming calls. The HDSS console connects only to designated electronic telephone circuits, and is associated with electronic telephones. |
| **HESB** | External Speaker Box—A speaker/amplifier that can be configured with the system to provide a variety of functions, such as a paging speaker and/or Background Music (BGM) speaker. |
| **HHEU** | Headset/Loud Ringing Bell Interface—Subassembly that fits inside a digital telephone or a 6500-series electronic telephone to allow a headset or an external speaker box (HESB) to be connected to the telephone. |
| **ISDN** | Integrated Services Digital Network. ISDN service requires service subscription from a telco with ISDN equipment. It allows digital information to be exchanged directly at each end of the line, without the need to convert analog to digital signals. Connection speeds are faster and audio quality is superior. |
| **LATA** | Local Access and Transport Area. |
| **LCD** | Liquid Crystal Display—The optional display on digital and electronic telephones that displays calling information. |
| **LCR** | Least Cost Routing. |
| **LSI** | Large Scale Integration—Related to circuit design technology. Strata DK system printed circuit boards (PCBs) use LSI circuit design. |
| **MDF** | Main Distribution Frame—The wiring frame usually located in a phone closet. |
| **MDFB** | Door Phone Box—A peripheral two-way speaker box option. |
| **MOH** | Music-on-Hold—Customer-supplied music or announcements can be sent to parties on-hold on CO lines or the intercom. |
| **NFAS** | Non-facility Associated Signaling—provides the ability to create ISDN trunk groups beyond the 23 channels available with a single Primary Rate Interface. |
| **NT-1** | Used in ISDN. Network Termination device that powers a U-interface ISDN line and enables multiple S/T ISDN devices to connect to it. The NT-1 must be UL-listed (U.S.) or CSA-certified (Canada). |
| **OCA** | Off-hook Call Announce. There are two types: Handset OCA and Speaker OCA. |
| **PBX** | Private Branch Exchange—Industry-standard term which refers to a telephone switch, usually on-premises, which serves an individual company, and is connected to a public telephone exchange through the Central Office (CO). |
| **PCB** | Printed Circuit Board. |
| **[PDN]** | Primary Directory Number. |
| **PF** | Power Failure. |
| **[PhDN]** | Phantom Directory Number. |
| **PRI** | Primary Rate Interface—A trunk interface to the ISDN network, which enables multiple use of channels for DID, Tie, FX, WATS, 800, etc. It supports multiple services and dynamic channel allocation. PRI is the larger ISDN interface (via the RPTU) with 23B+D transmission format. Channels are 64-kbps. Also see BRI. |
| **PSAP** | Public Safety Answering Point—Used for E911 calls. |
| **RAM** | Random Access Memory—Refers to the type of system memory that holds individual system configuration and feature programming. RAM is read/write memory, and can be easily revised in programming. |

| Term | Definition |
|------|------------|
| **ROM** | Read Only Memory—Refers to the type of system memory that holds static software that comprises the mechanics of the features' functions. ROM is only revised by Toshiba software engineers. |
| **[SDN]** | Secondary Directory Number. |
| **SF** | Super Frame. |
| **SLT** | Single-line Telephone. |
| **SMDI** | Simplified Message Desk Interface—RS-232 link from PIOU, PIOUS, RSSU, RSIS, or RSIU modular jack connected to a voice mail machine to provide Strata DK voice mail integration. |
| **SMDR** | Station Message Detail Reporting. |
| **SMIS** | Software Management Information System (SMIS). |
| **S/T Interface** | Reference interface points ("S" or "T") of an ISDN network. S/T interfaces are RJ45, 8-wire connection interfaces for ISDN equipment. An NT-1 is needed to network U-type BRI lines to S/T type interfaces. |
| **TAPI** | Telephone Application Programming Interface. |
| **TA** | Terminal Adapter or ISDN modem that converts PC and other types of protocol into a signal that works with ISDN. Generally, TAs support RJ11 voice ports and RS-232C or V.35 or V.449 data interfaces. |
| **TE** | Terminal Equipment. This refers to devices using ISDN service (telephones, faxes, computers, etc.). TE1 supports ISDN formats with S/T or U-type interfaces. |
| **TSPI** | Telephony Service Provider Interface. |
| **U Interface** | A single twisted pair of copper wire on an RJ11 jack. The wiring is identical to POTS, with different signaling. Only one U-interface device can be attached per line. |

# Index