

Strata[®] **DK**

Digital Business Telephone Solutions

Installation and Maintenance Manual

DK14

Software Release 3.1

DK40i

Software Release 4.1

DK424

Software Release 4.1

and ACD

This chapter explains how to install the Strata DK40i system. It includes information on site requirements, wiring diagrams, and step-by-step instructions on how to install the unit(s), the ground wiring, AC power cabling, reserve power (battery backup) cabling, and PCB cabling.

Inspection

1. When the system is received, examine all packages carefully and note any visible damage. If any damage is found, do not open the packages. Contact the delivery carrier immediately and make the proper claims.
2. After unpacking (and before installing), check the system against the packing list and inspect all equipment for damage. If equipment is missing or damaged, contact your supplier immediately.
3. Be sure to retain original packaging materials for re-use when storing or transporting system hardware.

Packaging and Storage

CAUTION! When handling (installing, removing, examining) PCBs, do not touch the back (soldered) side or edge connector. Always hold the PCB by its edges.

- ▶ When packaging and storing the system, remove PCBs from the system cabinet (the power supply may remain installed in the cabinet for storage and shipment). PCBs should be packaged in their original antistatic bags for protection against electrostatic discharge. Be sure to package equipment in its original shipping containers.

Site Requirements

This section defines the installation site requirements necessary to ensure a proper operating environment for the DK40i. Also included are grounding requirements.

Input Power

The system requires an input power source of 115VAC \pm 10VAC, 50/60 Hz, 15 amps. The AC outlet is recommended to be dedicated and unswitched, with a solid third-wire ground. (See “AC Power and Grounding Requirements” on Page 3-4.)

This eliminates interference from branch circuit motor noise or the like, and to prevent accidental power-off. To avoid accidental power turn-off, Toshiba recommends that you do *not* use an ON/OFF wall switch on this dedicated AC circuit.

For the Strata DK40i, a reserve power source (two customer-supplied 12-volt batteries) may be connected to the system to serve as a power failure backup.

Clearance and Location

The minimum clearance requirements for the Strata DK40i Base and Expansion KSUs are shown in Figures 3-1 and 3-2. Refer to Page 3-5 for DK40i KSU mounting instructions.

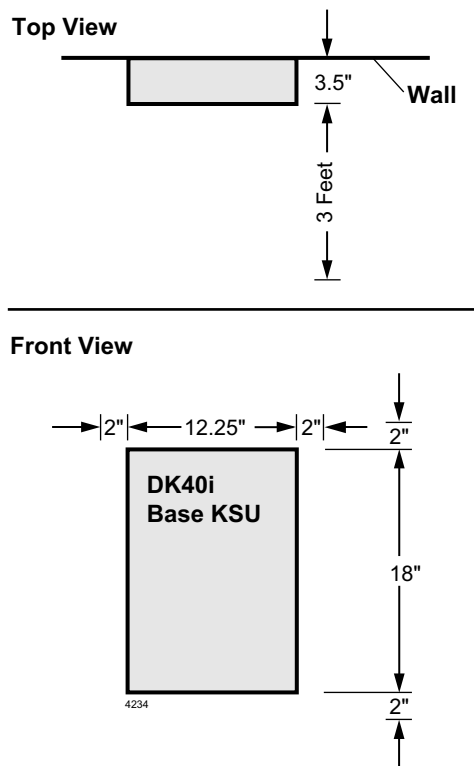


Figure 3-1 DK40i Base KSU Clearance Requirements

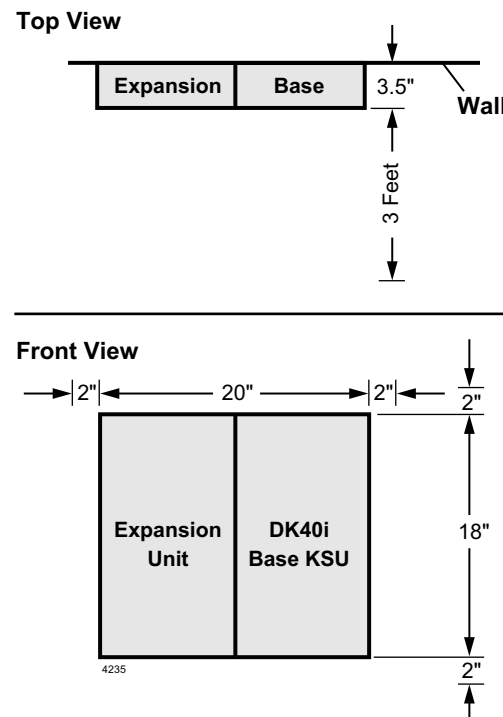


Figure 3-2 DK40i Base KSU and Expansion KSU Clearance Requirements

Consider the following conditions when selecting a location for the KSU(s):

The location *must be*:

- ♦ Dry and clean
- ♦ Well ventilated
- ♦ Well illuminated
- ♦ Easily accessible

The location *must not be*:

- ◆ Subject to extreme heat or cold
- ◆ Subject to corrosive fumes, dust, or other airborne contaminants
- ◆ Subject to excessive vibration
- ◆ Next to television, radio, office automation, or high frequency equipment

If reserve power is to be installed for the Strata DK40i, the batteries will require a well-ventilated location close (within nine feet) to the DKSUB40 (the optional Toshiba-supplied battery cable is nine feet in length).

Table 3-1 provides a summary of the electrical and environmental characteristics

Table 3-1 Summary of Electrical/Environmental Characteristics

DK40i Primary Power	
Input AC (Power Supply Specification)	85~135VAC
AC frequency	50/60 Hz
Power	DK40i - 75 watts maximum
AC input current	1.8A maximum
Environmental Specifications	
Operating temperature	32~104° F (0 ~40° C)
Operating humidity	20~80% relative humidity without condensation
Storage temperature	-4~158° F (-20~70° C)
Power Supply	
DC voltage output specification	-24VDC (-25.94~-28.66VDC) +5VDC (+4.5~+5.5VDC) -5VDC (-4.5~-5.5VDC) - Expansion KSU only
Battery Charger Characteristics	
	Charger: current limiting Nominal float voltage: 2.275 volts/cell Charge current: 0.7 amps maximum Battery discharge cut-off voltage: 20.5 ±0.5VDC
KSTU2, PSTU or PESU (Circuits 1 and 2)	
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 REN maximum per circuit, high or low position
KSTU2, PSTU, or PESU modem interface data rate	14,400 bps maximum
RSTU, 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	-90VDC/one telephone per circuit (max.)
RSTU, RSTU2, or RDSU modem interface data rate	14,400 bps maximum
Traffic Rating Characteristics	
9 CCS per station system-wide	

AC Power and Grounding Requirements

The DK40i requires a solid earth ground for proper operation.

The AC power cord contains a conductor for the “third-wire ground” provided by the commercial power outlet. The third-wire ground should be the only ground necessary for the DK40i; this ground must originate at the buildings main power distribution panel and have a solid connection to earth ground. (See [Figure 3-3.](#))

CAUTION! Lack of proper ground may cause improper operation and, in extreme cases, system failure.

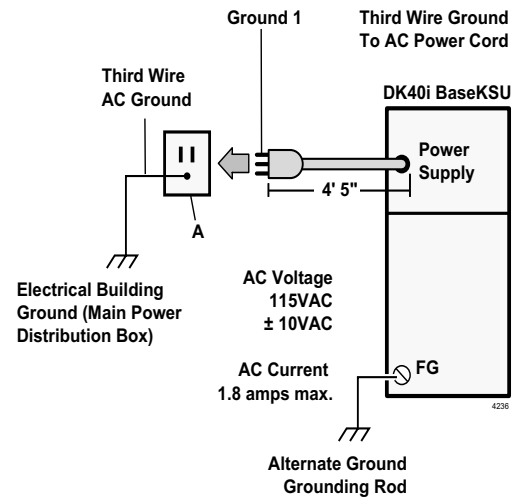


Figure 3-3 DK40i Grounding Diagram

AC Power and Third-wire Ground Test

Test the “third-wire ground” for continuity by either measuring the resistance between the third prong terminal (earth ground) and a metal cold water pipe (maximum: 1 ohm), or by using a commercially available earth ground indicator. If neither procedure is possible, perform the following earth ground test procedure.

WARNING! Hazardous voltages that may cause death or injury are exposed during the following test. Use great care when working with AC power line voltage.

► To perform the earth ground test procedure

1. Obtain a suitable voltmeter, and set it for a possible reading of up to 250VAC.
2. Connect the meter probes between the two main AC voltage terminals (white and black wires) on the wall outlet. The reading obtained should be between 100~125VAC.
3. Move one of the meter probes to the third terminal (green wire ground). Either the same reading or a reading of zero volts should be obtained.
4. If the reading is zero volts, leave one probe on the ground terminal and move the other probe to the second voltage terminal.

CAUTION! If a reading of zero volts is obtained on both voltage terminals (white wire to green wire, black wire to green wire), the outlet is not properly grounded. Omit Steps 5 and 6, and see following CAUTION!

5. If a reading of zero volts on one terminal, and a reading of 100~125VAC on the other terminal is obtained, remove both probes from the outlet.

6. Set the meter to the “OHMS/Rx1” scale. Place one probe on the ground terminal, and the other probe on the terminal that produced a reading of zero volts. The reading should be less than 1 ohm.

CAUTION! If the reading is more than one ohm, then the outlet is not adequately grounded. If the above tests show the outlet AC voltage is not in range or is not properly grounded, the condition should be corrected (per Article 250 of the National Electrical Code) by a qualified electrician before the system is connected.

Alternate or Additional Ground

If the “third-wire” AC ground can not practically be improved or if extreme motor noise or other disturbance causes system malfunction, or if local area lightning storms exist, a separate direct ground may be warranted.

Connect a separate earth ground from a cold water pipe or earth grounding rod directly to the FG screw terminal on the DK40i power supply (see [Figure 3-3](#)).

KSU Mounting Considerations

The Base KSU and the optional Expansion KSU are both designed to be mounted on a wall or other vertical surface. Toshiba recommends using method 1 or 2 (see [Figure 3-4](#)).

Prior to Installation

1. Loosen the screws on the front cover and the side cover of the Base KSU, remove the covers (see [Figure 3-5](#)). [Figure 3-6 on Page 3-11](#) details the interior.
2. Place the BATT jumper plug to the ON position.
3. Install a CO line board, either the TDDU or TCOU onto the TMAU board (see [Figure 3-7](#)).
The TCOU provides four loop start CO lines and can accommodate the Caller ID interface unit.
The TDDU provides four DID lines.
4. Set CO line card switches.
TCOU: Set the TCOU PAD switches (SW400-SW475) to the appropriate position (see [Figure 3-21 on Page 3-32](#)). The factory setting is NORMAL. If CO lines are connected to a PBX or are in close proximity to the central office the PAD position may be required.
TDDU: Set the TDDU PAD switches to the appropriate position. Also, set the high/low voltage jumper plugs as required for proper dial pulse operation. See [Figure 3-22 on Page 3-35](#).
5. If you are not installing a TCIU2, skip to [Step 6](#). To install the TCIU2 (see [Figure 3-20 on Page 3-29](#)), align the prongs P20, P21, and P22 over P120, P121, and P122 of the TCOU and gently press down. Slip the plastic stand-off hook through the hole.

CAUTION! To prevent system malfunction, DO NOT install TCIU1 in the DK40i system.

6. The TCOU or TDDU cards have a green and yellow wire with a two-prong spade on the end. Slip the spade under the second screw from the right on the power supply (see [Figure 3-7](#)).
7. If applicable, install KSTU2 Standard Telephone Interface Unit. The KSTS2 comes pre-installed onto the KSTU2. Then install both boards into the DK40i Base KSU (see [Figures 3-17~3-19](#), beginning on [Page 3-26](#)).
8. If applicable, install the K5RCU or K5RCU2 or K4RCU3 (which provides Automatic Busy Redial and DTMF tone detection) into the Base KSU (see [“K4RCU, K5RCU or K5RCU2 Installation”](#) on [Page 3-23](#)).
9. If applicable, install the KKYS (which provides built-in Auto Attendant) onto the K5RCU or K5RCU2 or K4RCU3.
10. If applicable, install the TSIU Serial Interface PCB into the KSU ([Figure 3-23 on Page 3-37](#)). If the TSIU is used for SMDR or TTY, then the PIOUS/PIOUS SMDR/TTY output is not active.

Testing the System’s Power Supply

If the “AC” or “DC” LEDs fail to light in Steps 1 or 3, see [TPSU16 Circuit Breaker Reset Procedure—Case 1](#).

1. Plug the AC power cable into an outlet (see [Figure 3-8](#)). The “AC” LED on the power supply lights green.
2. Turn ON the DC power switch for the TPSU16 power supply (see [Figure 3-6](#)). The “DC” LED on the power supply lights green.
3. Using a voltmeter or other device which checks voltage, measure the voltages referenced to frame ground (FG) at the P16 connector pins (test points) located on the motherboard. The voltages should fall within the ranges below.
 - ◆ Yellow-green, black, and green wires: 0V
 - ◆ Two yellow wires: -27V
 - ◆ Range: -25.94V~-28.66V

If the voltages do not fall within the ranges, unplug the DC power pins from the P16 connector and measure again at the same location; if the ranges remain unacceptable. See [TPSU16 Circuit Breaker Reset Procedure—Case 2](#).

TPSU16 Circuit Breaker Reset Procedure

Case 1

If the AC and DC LEDs on the TPSU16 power supply in the Strata DK40i Base KSU do not light, even though the AC power plug is inserted into the wall outlet and the TPSU16 DC power switch is turned on, the AC overvoltage circuit breaker may have opened.

► To reset the AC overvoltage circuit breaker

1. Remove the AC power plug from the wall outlet, turn the DC power switch OFF, and wait six minutes.
2. After six minutes, insert the AC plug back into the wall outlet and turn the DC power switch ON. The AC and DC LEDs should turn on and the system should operate.

If the system fails to operate, either the wall outlet is not providing AC power or the system's power supply is defective.

3. If the AC power checks good, replace the power supply (see [“Power Supply Removal and Replacement” on Page 3-19](#)).

Case 2

If the TPSU16 power supply AC and DC LEDs light, but the system does not operate, the TPSU16 DC output overcurrent circuit breaker may have opened because of a DC short circuit.

► To reset the DC output overcurrent circuit breaker

1. Turn the DC power switch OFF for 15 seconds and then turn it back on. The system will go back to normal operation if the overcurrent breaker resets.
2. If the system continues to fail, press in the two -24VDC circuit breakers located on the bottom left corner of the TPSU16 power supply.

If, then, the system does not return to normal operation, the TPSU16 power supply may be defective or an optional PCB may be shorting out the TPSU16.

3. Remove all optional PCBs and the Expansion KSU to locate the short, then repeat Steps 1 and 2 and perform the power supply test.
4. If the power supply fails the test, replace the power supply (see [“Power Supply Removal and Replacement” on Page 3-19](#) for more information.). If the power supply passes the test, the DK40i Base KSU is probably defective.

Mounting the Base KSU

WARNING! To prevent electrical shock, make sure the power supply switch is turned OFF.

► To mount the Base KSU

1. Place the Base KSU on the desired location on the mounting surface and mark the location of the four screw holes (there is one on each corner). See [Figure 3-6](#).

Make sure the location of the Base KSU meets the minimum clearance requirements specified in [Figure 3-1 on Page 3-2](#).

Note The Base KSU AC power cord is 4 feet 5 inches long.

2. Drill holes on these marks.
If mounting the KSU directly to a wall, align screws with studs behind the wall. If using a hard board between the KSU and the wall, install screws first to the hard board, and then secure the hard board to the wall, making certain that screws are aligned with studs.
3. Secure screws approximately two thirds of the way into the top two holes on the mounting surface.
4. Hang the unit from the top two screws and then secure the screws completely into the mounting surface.
5. Finish securing the unit to the mounting surface by completely screwing the bottom two screws into the wall.
6. Ground system according to “[AC Power and Grounding Requirements](#)” on [Page 3-4](#).
7. Connect applicable wiring (e.g., modular CO line cords, 25-pair amphenol connector cable—see [Figure 3-25 on Page 3-41](#)) to the Base KSU and then fasten wiring to the unit with the tie wrap that comes with the Base KSU (see [Figure 3-8 on Page 3-13](#)). Remove amphenol connector clamp from plastic bag that comes with the Base KSU. Fasten the clamp to hold the amphenol connector.
8. Connect Reserve batteries and plug battery cable into BATT connector of the KPSU16 power supply (see “[Reserve Power Option](#)” on [Page 3-17](#)).
9. If the Expansion KSU is going to be installed, refer to “[Mounting the Expansion KSU](#)” on [Page 3-9](#). If not, proceed to [Step 1](#).
10. Plug the AC power cable into an outlet and then turn ON the power supply switch.
11. Reinstall the front and side covers onto the Base KSU.

Mounting the Expansion KSU

Important! For purposes of identification, the labels appear on the boxes and Expansion KSUs (see [Table 3-2](#)).

Table 3-2 Expansion Unit Labels

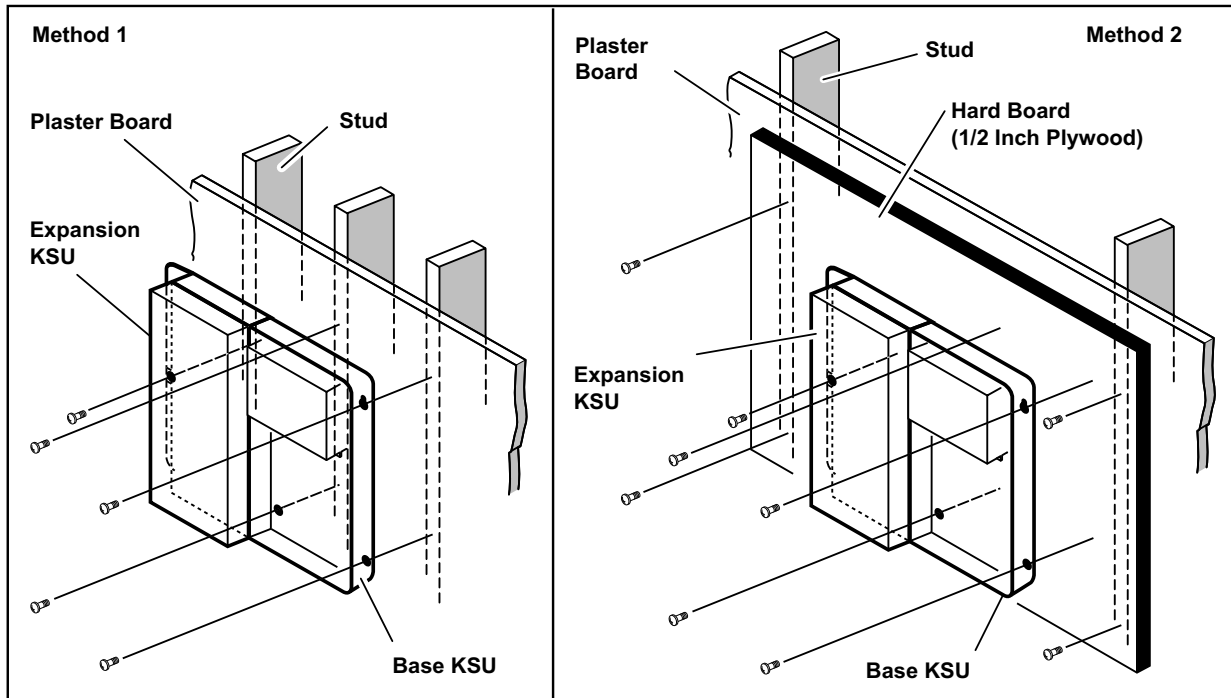
	DK40i	DK40	DK16e	DK16
Expansion Unit Box Labels	DKSUBI40A	DKSUB40A	DKSUBT16A	DKSUB16A
Expansion KSU Model No. (expansion case bottom)	Model DKSUE40A ¹ Strata DK40	Model DKSUE40A Strata DK40	Model DKSUET16A Strata DK16e	Model DKSUE16 Strata DK16

1. Strata DK40 may appear on a label.

WARNING! To prevent electrical shock, make sure the power supply switch is turned OFF.

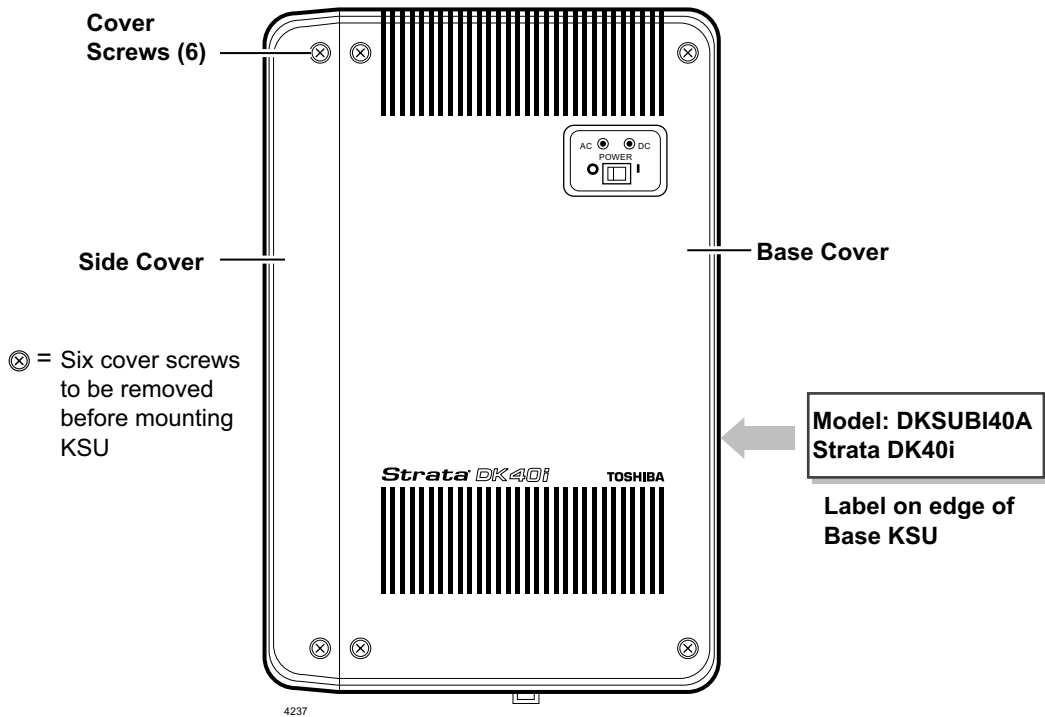
► **To mount the Expansion KSU (see [Figures 3-4, 3-6, 3-8~3-11](#))**

1. Make sure the side cover is removed from the Base KSU. Turn Base KSU DC power switch OFF.
2. Set the Expansion KSU on the Base KSU's hinge mounts, making sure that the Expansion KSU sets properly in place.
3. Remove the safety lock from plastic bag that comes with the Expansion KSU. Install safety lock to the Base KSU as shown.
4. Pull out on the safety lock until it can no longer be moved, securing the Expansion KSU to the Base KSU. Do not detach the lock from the Base KSU.
5. Connect the Expansion KSU ribbon cable to the connector on the Base KSU. Close ribbon cable connector lock on Base KSU.
6. Connect Expansion KSU green/yellow ground wire plug (FG2) to TB1 of the Base KSU. (Make sure the plug locks on FG2.)
7. Making sure that the Expansion KSU is flush against the mounting surface, mark the location of the Expansion KSU mounting screw hole.
8. Swing the Expansion KSU away from the mounting surface, and drill a hole at the mark made in Step 7.
9. Install the PCBs per "[Worksheet 1 – System PCB Assignment Guide](#)" on [Page 2-11](#) and slide the slot lock to the lock position.
10. Swing the Expansion KSU back to the mounting surface and secure it to the surface with a screw.
11. Connect the wiring (e.g., modular CO line cords, 25-pair amphenol connector—per [Chapter 8 – DK40i/DK424 Universal Slot PCB Wiring](#)) to the PCBs.
12. Fasten the wiring with Tie wraps (supplied) to the bottom of the expansion and Base KSUs.
13. Knock out the tab on the bottom of the side cover.
14. Plug the AC power cable into an outlet and then turn ON the power supply switch.
15. Install the side cover to the Expansion KSU.



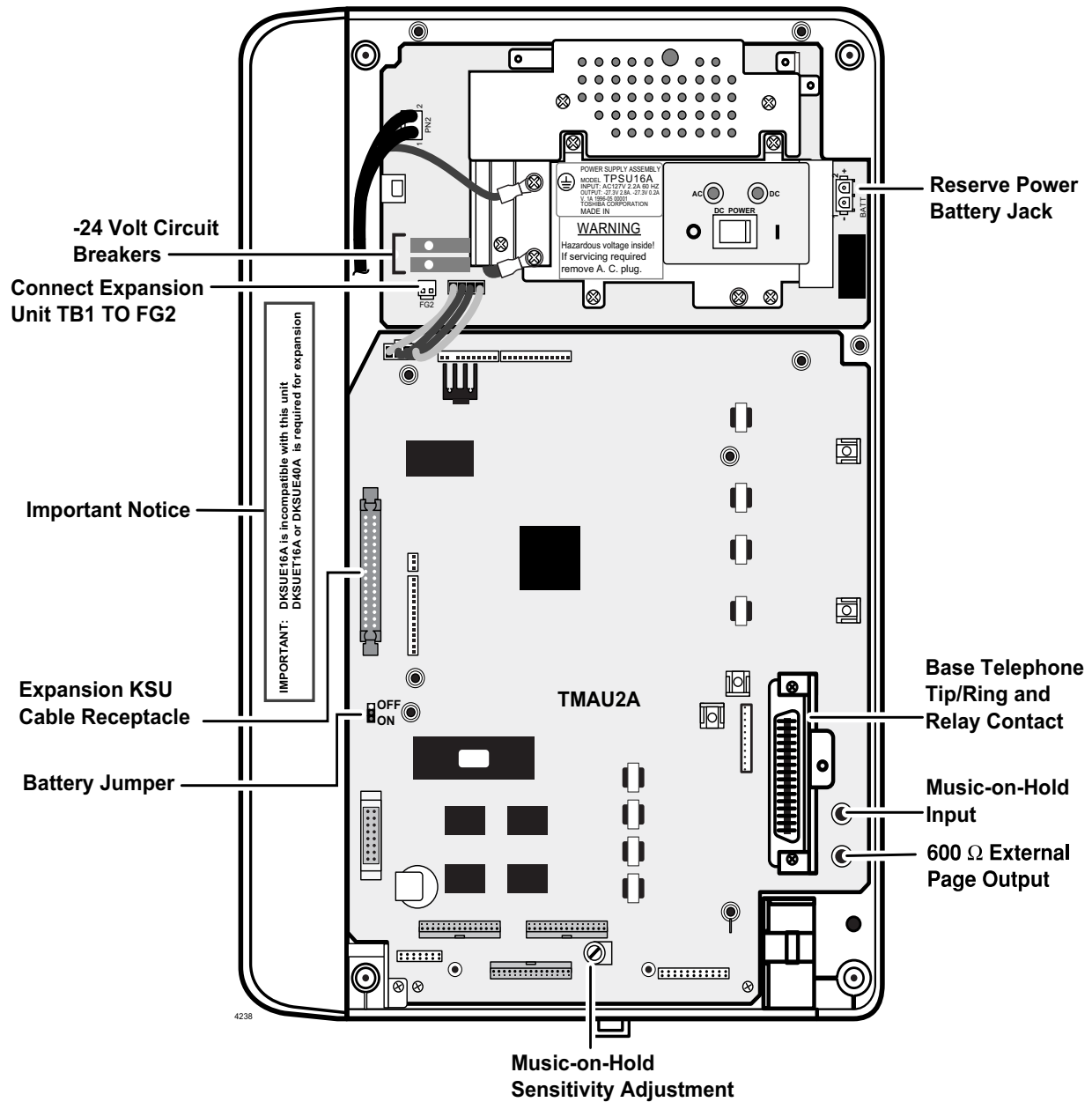
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Figure 3-4 KSU Wall Mounting



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Figure 3-5 Base KSU Exterior



DK40i Installation

Figure 3-6 DK40i Base KSU Interior

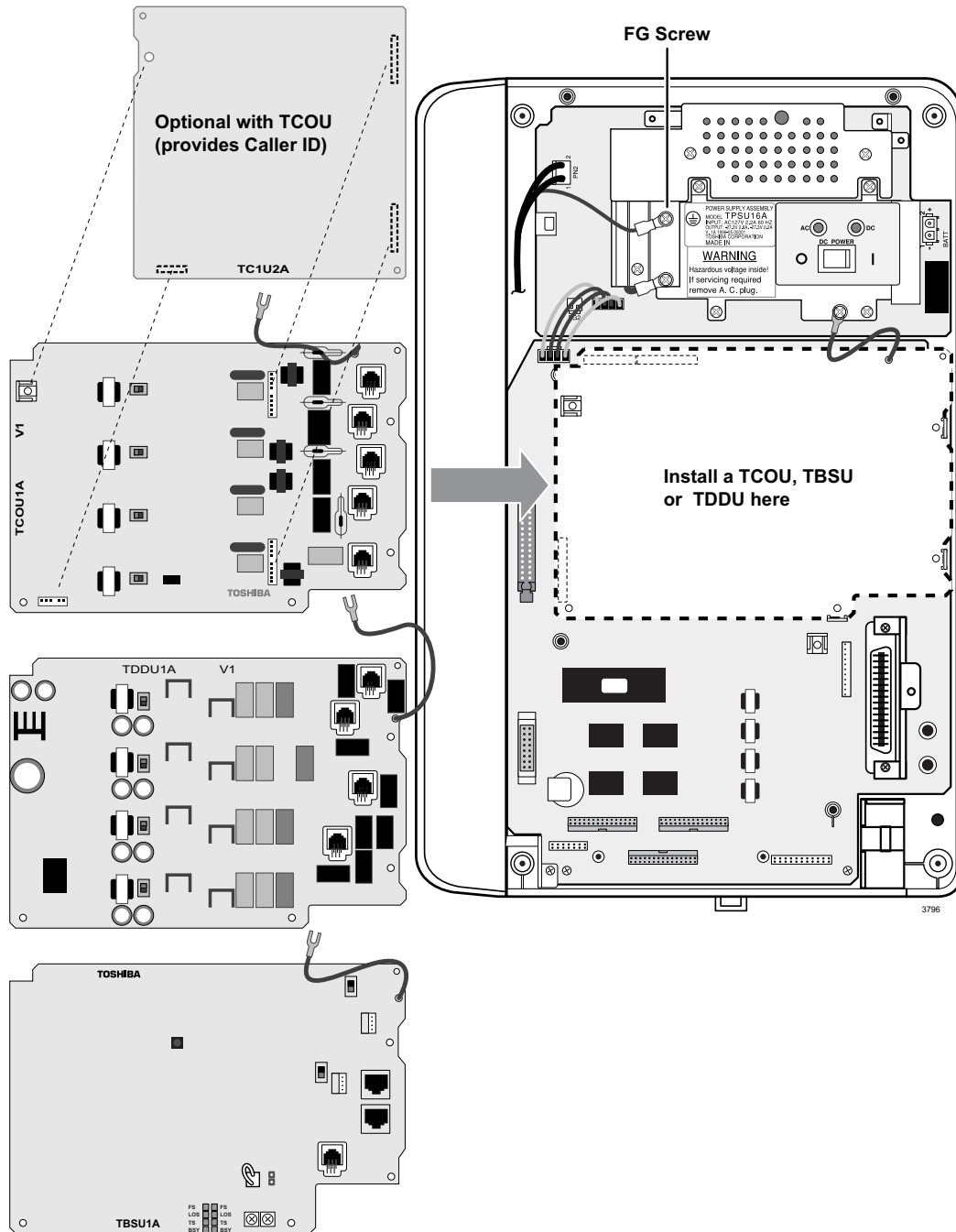


Figure 3-7 CO Line Board Installation into DK40i Base KSU

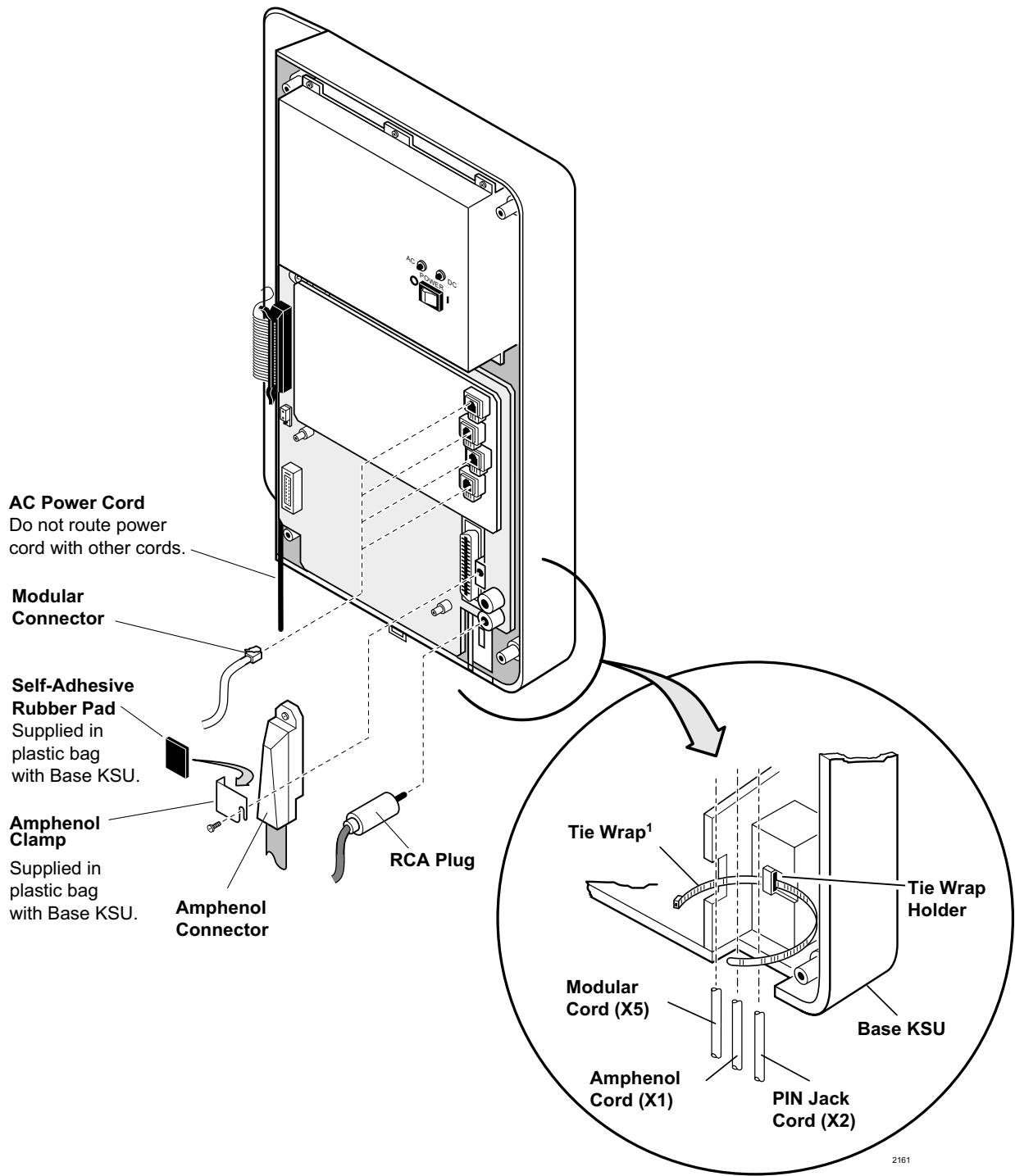
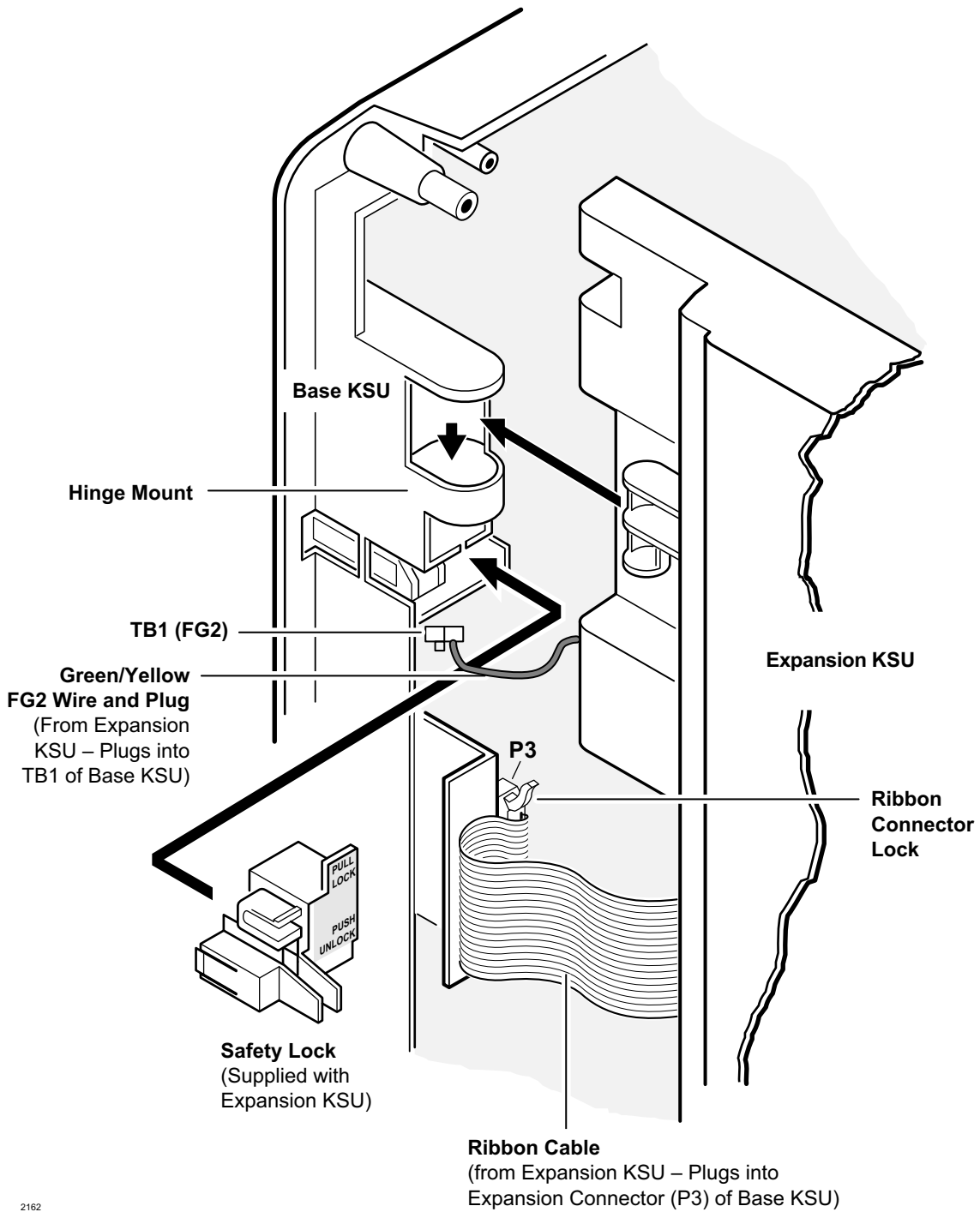
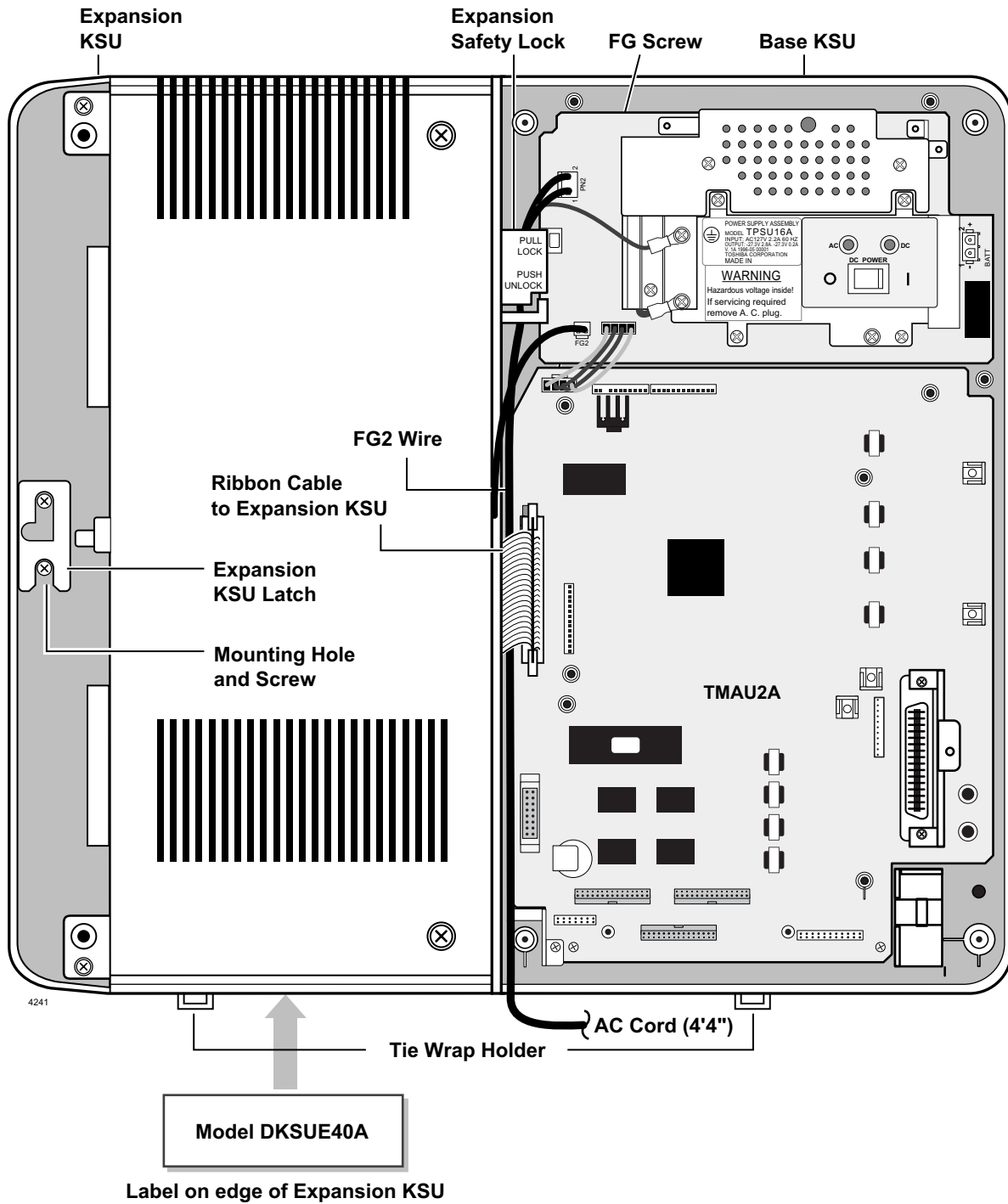


Figure 3-8 Base KSU Cables and Connectors



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Figure 3-9 Base to Expansion KSU Connection



DK40i Installation

Figure 3-10 Expansion KSU Mounting and Connections

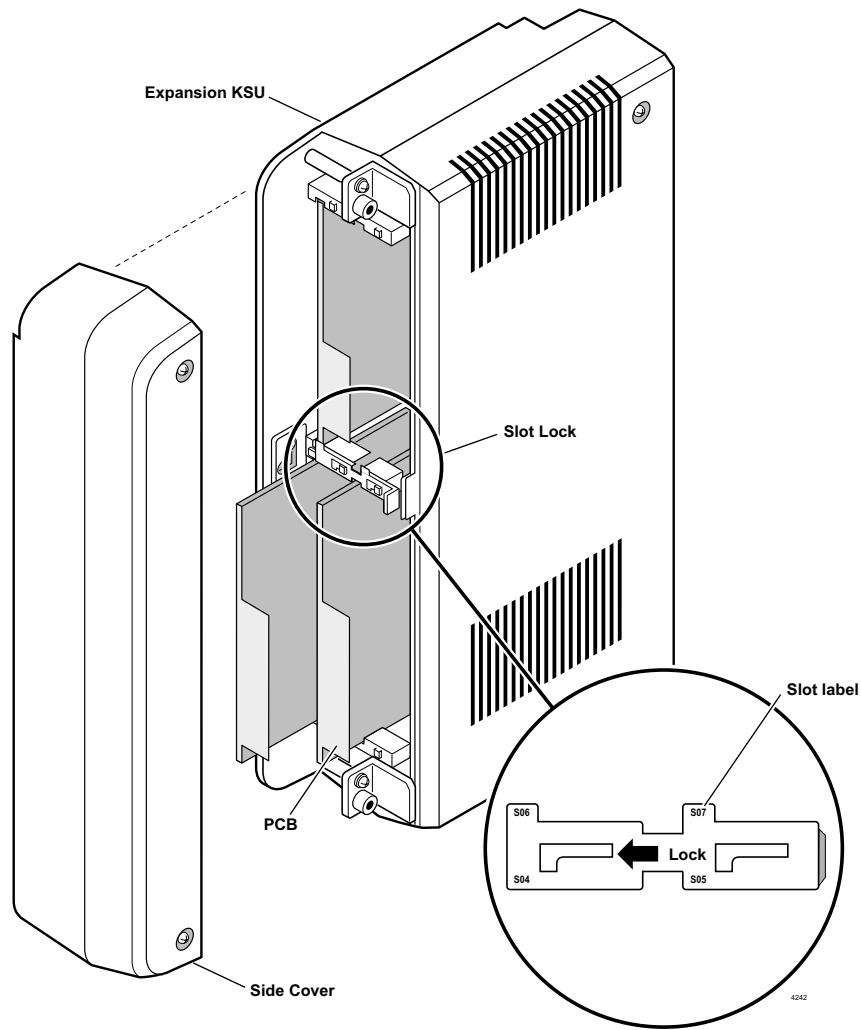


Figure 3-11 Expansion KSU Slot Lock

The DK16e Expansion Cabinet can be used on the DK40i Base Unit. The DK16e and DK40i Expansion Cabinet slot labels are different from the Program 03 slot numbers. [Table 3-3](#) provides the slot labels and Program 03 slot numbers.

Table 3-3 DK16e and DK40i Expansion Cabinet Slot Names

DK40i Slot Label	DK40i Prg 03 Slot Number
S04	S15
S05	S16
S06	S17
S07	S18

Reserve Power Option

A reserve power source (two customer supplied 12-volt batteries) can be connected to the DK40i power supply to ensure uninterrupted system operation in the event of a power failure. A pre-assembled interface cable for installation of the Reserve Power option is available from Toshiba (PBTC-3M), see [Figure 3-12](#).

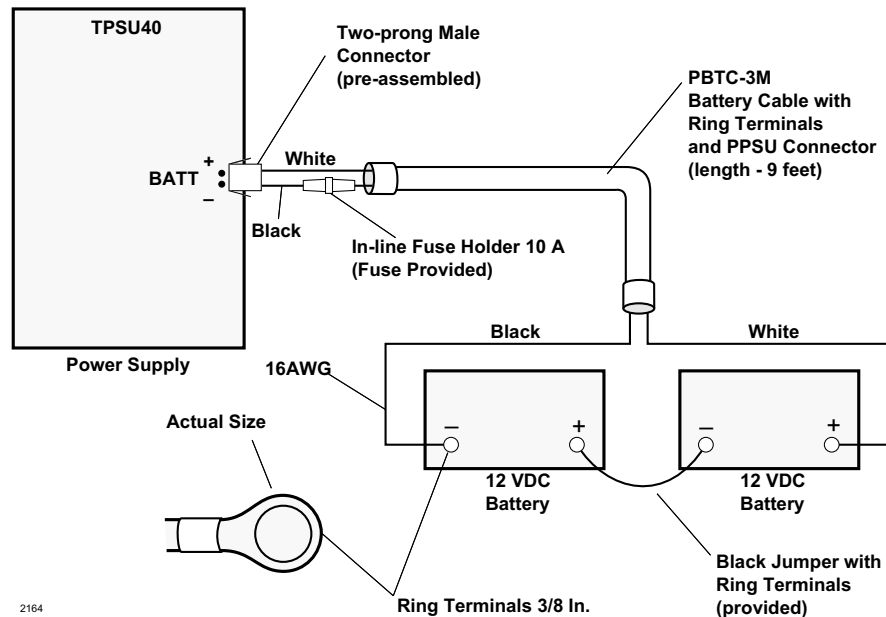


Figure 3-12 System Power Supply Wiring

Important! *Local ordinances may dictate battery type and installation details.*

The batteries require a well-ventilated location within nine feet of the system (the interface cable is nine feet long).

WARNING! To reduce the risk of fire or injury to persons, read and follow these instructions:

- Use only 12-volt, gelcell batteries.
- Do not dispose of the batteries in a fire. The cells may explode. Check with local codes for possible special disposal instructions.
- Do not open or mutilate the batteries. Released electrolyte is corrosive and may cause damage to the eyes or skin. It may be toxic if swallowed.
- Exercise care in handling batteries in order not to short the battery with conduction materials such as rings, bracelets, and keys. The battery or conductor may overheat and cause burns.
- Charge the batteries provided with or identified for use with this product only in accordance with the instructions and limitations specified in this manual.
- Observe proper polarity orientation between the batteries and battery charger.

Reserve Power Installation

1. Connect the PBTC-3M black jumper wire from the positive terminal of one 12VDC battery to the negative terminal of the second 12VDC battery. See [Figure 3-12](#).
2. Ensure that a serviceable 10-ampere fuse is installed in the in-line fuse holder of the PBTC-3M battery cable.
3. Connect the white lead of the PBTC-3M battery cable to the open positive terminal of the 12VDC battery. Connect the black lead to the open negative terminal of the second 12VDC battery.

Important! *The KSU must be connected to the live operating (hot) AC power source, and the power supply ON/OFF switch set to ON prior to the final step of connecting the reserve power batteries to the power supply via the BATT +/- receptacle. If the batteries are connected after AC power is lost, reserve power will not function.*

4. Connect the PBTC-3M battery cable two-prong male plug to the power supply BATT +/- receptacle.
5. To test reserve power operation, disconnect the system AC power plug with the power supply power ON/OFF switch in the ON position. The system should continue to operate without any interruption.
6. Plug the AC power cable into PN2.
7. Plug the AC power cable into an outlet and turn ON the power supply switch.
8. See “Prior to Installation” to confirm that the power supply is working properly.
9. Plug reserve battery cable into BATT connector of power supply.

Power Failure Emergency Transfer Option

To enable this option, a dedicated standard telephone must be connected to the Power Failure Transfer Interface (PF1) of a DK40i Base KSU equipped with a TCOU.

Note During normal operation, this telephone cannot be used and does not count as a station (does not reduce the number of system’s available stations).

If there is a power failure, the telephone automatically is connected to CO Line 1. When power is restored, the system resumes normal station and CO line assignments, and the dedicated telephone becomes inoperative again.

Important! *This is not available on a DK40i system with a TDDU installed.*

Installing Power Failure Emergency Transfer

- ▶ Connect a standard telephone to the PF1 connector in the Base KSU (see [Figure 3-13](#)).

Testing Power Failure Emergency Transfer

1. Turn the system power switch OFF.
2. Lift the emergency standard telephone handset, and verify that there is CO dial tone.

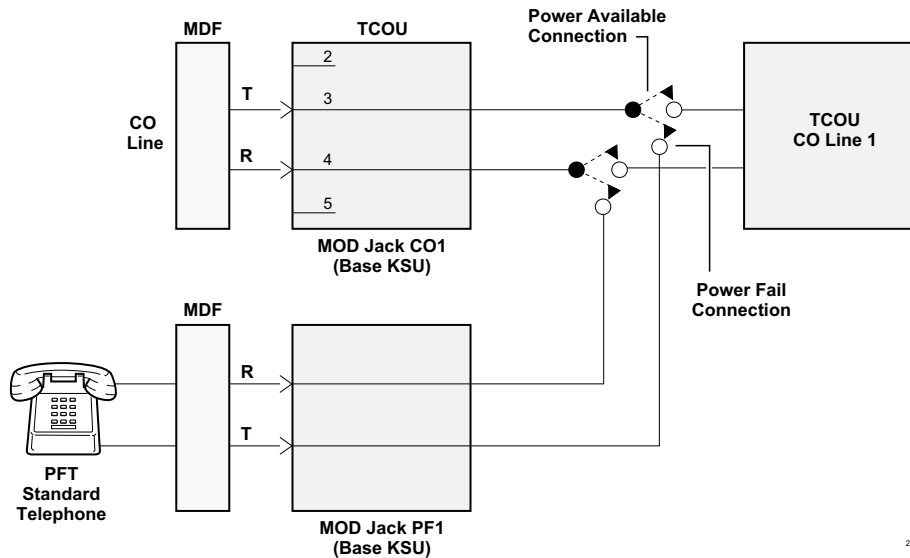


Figure 3-13 Base KSU Power Failure Transfer (PFT) Circuit Diagram

Power Supply Removal and Replacement

The power supply (TPSU16A) comes factory-installed in the Base KSU; if necessary, it can be removed and replaced.

Power Supply Removal

1. Make sure that the power supply switch is OFF and that the AC power cable is not plugged into an outlet. Confirm that the green AC LED is not lit (see [Figure 3-14](#)).

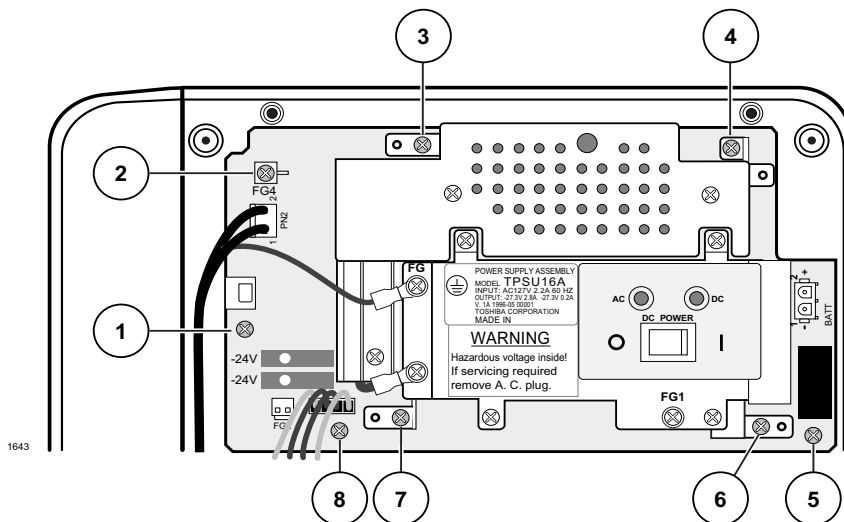


Figure 3-14 Power Supply (TPSU16A)

2. Unplug reserve battery cable from BATT connector of power supply.

3. Unplug the FG2 plug from the Expansion KSU ground wire.
4. Unplug the DC cable from the DC OUT connector (P16).
5. Remove the FG screw from left side of power supply to free FG wire/terminal and building ground wire.
6. Unplug the AC power cord from PN2.
7. Remove the seven screws that attach the power supply to the Base KSU. Remove the power supply.

Power Supply Replacement

1. Set the power supply in its proper place in the Base KSU (see [Figure 3-14](#)).
2. Secure the power supply to the Base KSU with the seven screws.
3. Connect the FG1 wire from the TCOU or TDDU to the FG1 screw on the power supply.
4. Plug the DC cable into the DC OUT connector. The green/yellow wire is on right-hand side.
5. Fasten FG green wire ring terminal and building ground wire to the left side of the power supply with the FG screw.
6. Plug the Expansion KSU green/yellow ground wire into FG2.

Printed Circuit Board (PCB) Installation

This section details Strata DK40i system PCBs installation into the Base and Expansion KSUs. Also described are optional configuration information and programming considerations for each PCB.

Base KSU PCBs

The Strata DK40i processor is built into the motherboard (TMAU2) and comes with eight digital telephone circuits (ports). The line circuits are on the TCOU or TDDU PCBs, which attach to the P10, P11 and P12 connectors on the TMAU. The PCBs that can be installed into a DK40i KSU are shown in [Table 3-4](#).

Table 3-4 DK40i Base KSU PCBs

PCB	Provides	Installs On	Comments
TCOU	Four loop start CO line circuits	TMAU2 motherboard	Only one TCOU, TBSU or TDDU can be installed on the motherboard.
TDDU	Four DID line circuits		
TBSU	2 BRI (S/T) circuits		
TCIU2	Four caller ID circuits	TCOU	To prevent system malfunction, do not install a TCIU1 in the DK40i system.
KSTU2	Four standard telephone circuits	TMAU2 motherboard	Only one TSIU can be installed per DK40i system. When installed, the TSIU does not use a slot.
TSIU	Up to two serial interfaces (TTY and SMDR)		
K5RCU2, K5RCU or K4RCU3	Recognizes DTMF tones generated by a standard telephone and is required for DISA, Tie and DID lines and the DK40i built-in Auto Attendant. Also used to detect busy tone for the ABR feature.		
KKYS	Automated Attendant	K5RCU2, K5RCU or K4RCU3	

Toshiba recommends installing the Base KSU option PCBs, K5RCU2, K5RCU or K4RCU3 and/or KSTU2, before mounting the Base KSU on the wall. Install the Expansion KSU per [Page 3-9](#), then install the Expansion KSU option PCBs.

The Base KSU slots 00~14 are automatically assigned the following codes in Program 03 when the system is turned on and the Base KSU PCBs are installed.

Slot 00: Code 91 without K4RCU3; Code 92 with K4RCU3; Code 98 with K5RCU2 or K5RCU

Slot 11: Code 62 eight digital telephones with OCA/DIU, 64 for OCA/DIU/DSS.

Slot 12: Code 11 for TCOU, 16 for TDDU or 77 for TBSU (four loop, four DID lines or two BRI circuits).

Note If installing TBSU, set each BRI circuit for station side or line side before installing more PCBs. Each BRI station circuit uses two station ports and each BRI line circuit uses two CO lines.

Slot 13: Code 31, four KSTU2 ports

Slot 14: Code 81, four TCIU2 circuits

Expansion KSU PCBs

A DK40i Expansion KSU from the factory does not come with any PCBs installed. (See [Table 2-3 on Page 2-3](#) for a list of PCBs supported by the DK40i Expansion KSU and Chapter 7 – DK40i/DK424 Universal Slot PCBs for detailed descriptions/installation instructions.) Toshiba recommends that PCBs which support electronic, digital or wireless telephones be installed into slots 15 and 16 because slots 17 and 18 cannot support speaker Off-hook Call Announce (OCA) or Data Interface Units (DIUs) or more than 8 wireless handsets. See “[Base/Expansion KSU Compatibility](#)” beginning on [Page 2-3](#) for configuration information for DK40i PCBs.

PCB Hardware/Software Options

PCBs can be configured for a variety of hardware and software options. Hardware options are defined as either internal (generally related to optional PCB subassemblies) or external (related to connection of peripheral equipment, such as background music, voice mail, etc.). Hardware and software options for each PCB are identified in the individual PCB installation procedures in this chapter.

PCB Hardware Options

Each PCB must be configured for the applicable hardware options prior to installation of the PCB. Configuration instructions for internal hardware options are provided in the individual PCB installation procedures in this chapter and Chapter 8 – DK40i/DK424 Universal Slot PCB Wiring. Configuration instructions for external hardware options are provided in Chapter 10 – Peripheral Installation.

PCB Software Options

After installation of the PCBs in the KSU, configure the PCBs for software options through programming. A programming overview for each PCB is provided in this chapter. Refer to the *Strata DK Programming Manual* for more detailed programming instructions.

PCB Installation/Power Supply Considerations

WARNING! To avoid electrical shock, make sure that the power supply is OFF whenever removing or installing PCBs.

Before installing any PCBs, make sure the power supply has been tested, and the ground has been checked. (See “[AC Power and Grounding Requirements](#)” on [Page 3-4](#).)

PCB Wiring

See “[MDF Wiring Diagrams](#)” on [Page 3-41](#) in this chapter for DK40i Base KSU wiring and [Chapter 8 – DK40i/DK424 Universal Slot PCB Wiring](#) for Expansion KSU wiring. See [Chapter 16 – Strata AirLink Systems](#) for RWIU wiring.

Digital Telephone Circuits

The eight digital telephone circuits that come standard with the system are integrated into the DK40i motherboard in the Base KSU. These circuits are identical to the digital circuits found on the PDKU. The motherboard does not have to be configured for the digital circuits to operate. For wiring, see “[MDF Wiring Diagrams](#)” on [Page 3-41](#).

K4RCU3, K5RCU and K5RCU2 DTMF Receiver/ABR Tone Detector Unit

- System:** *DK40i Base KSU*
- Circuits per PCB:** *K4RCU3: four DTMF receivers and four ABR busy tone detectors
K5RCU, K5RCU2: five DTMF receivers and five ABR busy tone detectors.*
- Interfaces with:** *automatic busy redial (ABR)
interprets DTMF tones
DISA, DID, Tie lines
built-in auto attendant*
- Older Version(s):** *K4RCU (not compatible with DK40i)
K4RCU3 or K5RCU (compatible with DK16 and DK40i)*

The K4RCU3, K5RCU or K5RCU2 must be installed to recognize Dual-Tone Multi-Frequency (DTMF) tones generated by a standard telephone (or any other device connected to a standard telephone circuit) and to enable ABR to operate. The K5RCU2 is the same as the K5RCU, except that it has jumper settings for A law and Mu law, which makes it applicable to more countries.

Configuration

The K4RCU3, K5RCU, or K5RCU2 does not have to be configured for operation. If built-in auto attendant is required, see auto attendant KKYS installation.

K4RCU, K5RCU or K5RCU2 Installation

1. Make sure that the power supply switch is OFF.
2. Make sure SW1 is set for Mu law if installing K5RCU2. The jumper must be set for Mu law in the U.S. and Canada.
3. Making sure that the component side of the K4RCU3, K5RCU or K5RCU2 is face down (toward the power supply), plug the K4RCU3, K5RCU P602A and P602B female connectors into the P2A and P2B (K4RCU3, K5RCU or K5RCU2) connectors on the motherboard. See [Figure 3-15](#).

K4RCU, K5RCU or K5RCU2 Programming

- Program 03: Enter code 92 for Slot 00 if K4RCU3 is installed or Code 98 with K5RCU or K5RCU2.

Program 12: Sets K4RCU3, K5RCU or K5RCU2 release time.

Program 15: Sets K4RCU3, K5RCU or K5RCU2 operation after CO line flash. Assigns DTMF/Dial Pulse dialing, DISA, and additional attributes to each line.

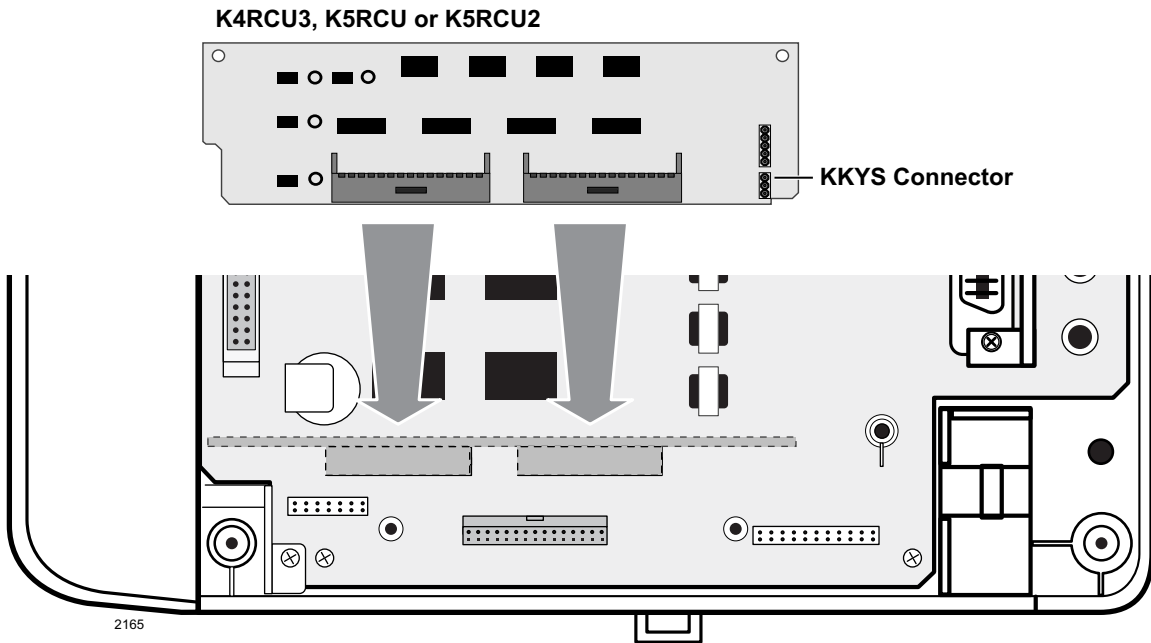


Figure 3-15 Auto Busy Redial/DTMF Receiver Board (K4RCU3, K5RCU or K5RCU2) Installation

KKYS Auto Attendant

- System:** *DK40i Base KSU*
- Circuits per PCB:** *one*
- Interfaces with:** *optional built-in auto attendant*
- Older Version(s):** *none*

The KKYS installs onto the K5RCU2 card in the Base KSU. (See [Figure 3-16](#).)

KKYS Installation

- Install the KKYS onto the K5RCU2 to add the optional built-in auto attendant feature.

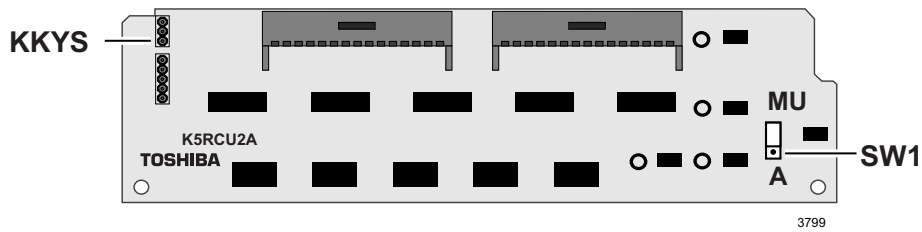


Figure 3-16 K5RCU2 Printed Circuit Board

KSTU2

Four-circuit Standard Telephone Interface Unit

- System:** *DK40i Base KSU*
- Circuits per PCB:** *four standard telephone circuits*
- Interfaces with:** *standard telephones (no message waiting)*
other single-line devices
alternate BGM source (circuit 4)
fax machine
voice mail devices
- Older Version(s):** *KSTU1 (not compatible with DK40i—KSTU2 is compatible with DK16 and DK40i)*

KSTU2 controls and indicators are illustrated in [Figures 3-17 and 3-18](#) and described in [Table 3-5 on Page 3-27](#).

Note For the system to recognize the Dual-Tone Multi-Frequency (DTMF) tones generated by standard telephones (or any other device connected to a KSTU2 port), a K4RCU3 must be installed in the Base KSU.

KSTU2 Configuration

The KSTU2 hardware has to be configured only for the square wave ring generator voltage level, nothing else.

KSTU2 Installation

1. Make sure that the power supply switch is OFF.
2. Before installing the KSTU2 in the Base KSU, set the SW1 ring generator to 130V P-P or 190V P-P.

Note Most standard telephones and two-wire devices require 190; however, some devices may experience ring-trip at 190, and should be set at 130.

3. Plug the KSTU2 cable into the P4 connector on the motherboard in the Base KSU. The red wire on the cable should match up with pin 1 on the lower side of the connector.
4. Plug the KSTU2 P508 female connector into the P8 male connector on the motherboard.
5. Secure the KSTU2 to the standoffs with the two provided screws.

KSTU2 Wiring

Refer to DK40i Base KSU KSTU2 wiring in [Figure 3-25 on Page 3-41](#).

The KSTU2 must be connected to a OL13A (or equivalent) type lines for off-premises stations (300 ohms loop resistance max., including the telephone or other devices DC off hook resistance).

KSTU2 Programming

Program 03: Specify code 31 for KSTU2 slot.

Program 31: Configures all KSTU2 ports connected to voice mail (see Chapter 8 – DK40i/DK424 Universal Slot PCB Wiring for voice mail installation).

Program 10-2: Not required for Background Music (BGM) connection.

Program 19: BGM connection to KSTU2 Port 11.

CAUTION! Port numbers in the Expansion KSU shift by four ports if KSTU2 or TDDU is installed (or removed after it is installed). This determines whether or not the DDCB can be connected on the KCDU in slot 15.

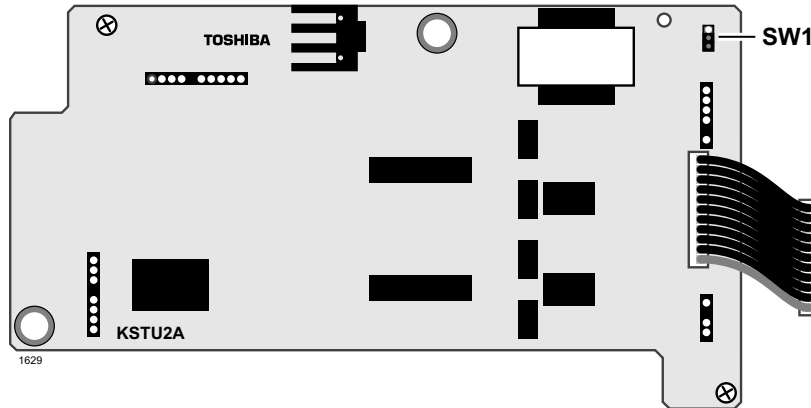


Figure 3-17 Standard Telephone Interface Board (KSTU2)

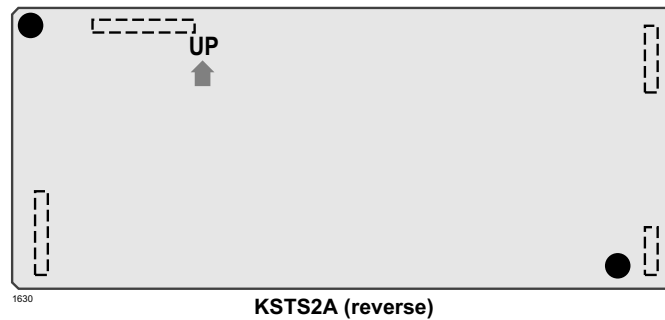


Figure 3-18 Standard Telephone Interface Subunit (KSTS2)

Table 3-5 KSTU2 Controls and Interface Connectors

Control/Indicator/Connector	Type of Component	Description
Ring voltage jumper plug SW1	3-terminal jumper	Sets ring generator voltage level for all circuits: H = 190V P-P L = 130V P-P
Connector cable P504	Cable	Connects to P4 connector on the motherboard
P10 (connects to KSTS2 P20)	7-pin connector	Interface connector for optional KSTS2. The KSTS2 arrives installed onto the KSTU2 from the factory.
P11 (connects to KSTS2 P21)	9-pin connector	
P12 (connects to KSTS2 P22)	3-pin connector	
P13 (connects to KSTS2 P23)	5-pin connector	

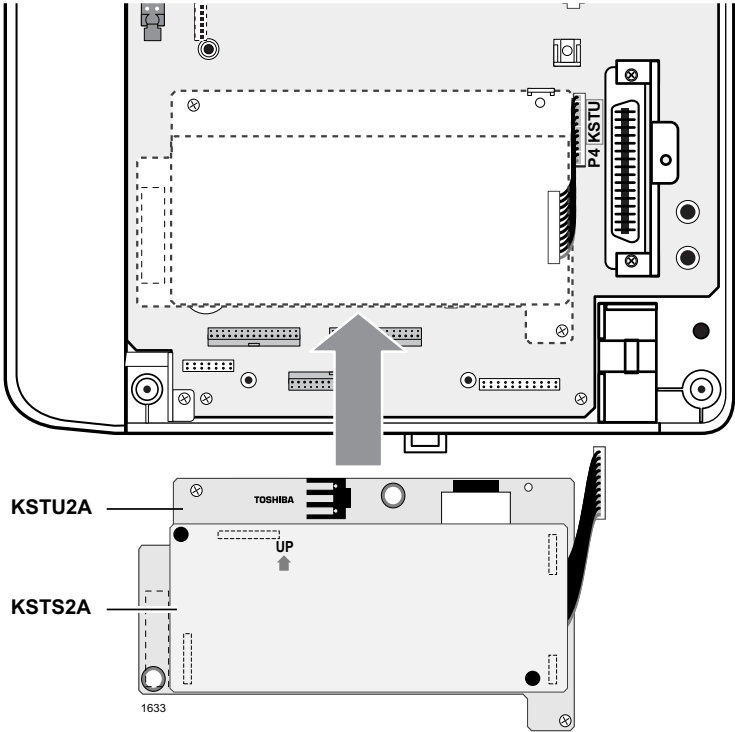


Figure 3-19 KSTU2/KSTS2 Installation

TBSU

See “RBSU/RBSS and TBSU Interface Units” on Page 14-18 in Chapter 14 – ISDN Interfaces for TBSU installation documentation.

DK40i Installation

TCIU Caller ID

System: *DK40i Base KSU (mounts on TCOU)*

Circuits per PCB: *four caller ID circuits*

Interfaces with: *caller ID
loop start CO lines*

Older Version(s): *none*

To receive Caller ID, a TCIU2 circuit must be available to each line. (See [Figure 3-20](#).)

CAUTION! To prevent system malfunction, do not install TCIU1 in the DK40i system.

Each TCIU2 Caller ID circuit has a two-wire tip/ring interface which must be bridge-wired across its corresponding ground or loop start CO line tip/ring. This is done automatically by the PCB connectors when the TCIU2 is mounted on the TCOU. However, if installing an RCOU/RCIU2 in the Expansion KSU, the connection is made on the Main Distribution Frame (MDF). See the RCIU wiring diagram in Chapter 8 – DK40i/DK424 Universal Slot PCB Wiring.

TCIU2 Installation

1. Turn power OFF.
2. Install the TCIU2 onto the TCOU PCB by aligning the three sets of connectors marked TCOU or TCIU2, depending on the card.
3. Press down evenly and firmly on the TCIU2 card.

TCIU2 Programming

Program 03: Automatically assigns TCIU2 (Caller ID circuit) to slot 14 (code 81) when the TCIU2 is installed and power is turned on.

Note TCIU2 Caller ID circuits are numbered automatically in numerical order starting from 01~04 when the TCIU2 is installed. Slots with code 81 will increment the Caller ID circuit numbers by four circuits on the DK40i.

Program *50: Assigns TCOU lines that will receive Caller ID to the associated TCIU2 Caller ID circuit number. TCIU2 circuits 1~4 must be assigned to TCOU circuits 1~4, respectively. RCIU circuits 5~8 should be assigned RCOU or RGLU circuits 5~8.

After assigning CO lines to Caller ID circuits, turn system power OFF for approximately five seconds and then back on or run Program 91-2 to activate Program *50 assignments.

Program *51: Sets the Caller ID (CLID)/Automatic Dialed Number Identification (ANI) memory allocation for the appropriate stations. This memory is used to save CLID/ANI telephone numbers for calls that are received but not answered (abandoned calls). CLID/ANI numbers are not saved in station memory if they are answered. Stations can be allocated with memory to save up to 100 numbers in 10-number increments.

The total memory allocated to all stations in a system is 200 numbers.

Note When a CO line rings multiple stations, a station must be the owner of the Caller ID or ANI CO line to be able to save abandoned call (Caller ID and/or ANI) telephone numbers. (See Program *52.)

Program *52: Assigns stations as owners of Caller ID CO lines. These stations will store the Caller ID telephone numbers received on abandoned (not answered) calls for the lines which they own. Typically all common CO lines are assigned to one designated telephone or attendant console and private lines are assigned to individual private line telephones.

Note A station must also be allocated with Caller ID/ANI storage memory in Program *51 to store abandoned call telephone numbers.

Program 39, Code 462: Assigns the Caller ID/ANI Lost Call Auto Dial button to LCD telephones that store Caller ID and/or ANI abandoned call telephone numbers. A user can scroll through the stored abandoned call phone numbers and auto dial the selected number using this button.

Program 60-1, Key 01: Determines which information will be sent out the system SMDR port, e.g., system Account Codes or CLID and/or ANI telephone numbers.

- Turn LED 01 ON if CLID and/or ANI information should be sent out the SMDR port.
- Turn LED 01 OFF if Account Codes information should be sent out the SMDR port.

Note The system will initialize with LED 01 OFF, e.g., Account Codes information will be sent out the SMDR port.

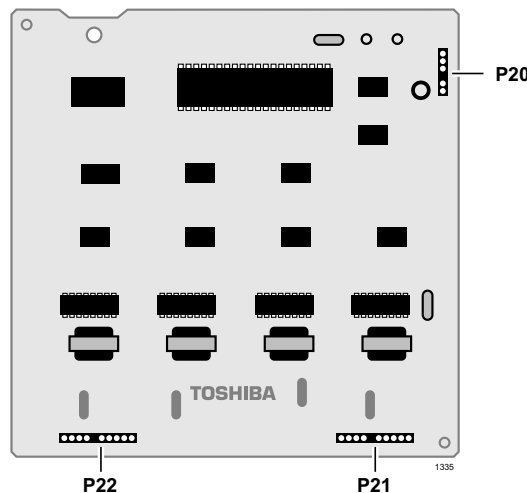


Figure 3-20 DK40i Caller ID Interface Unit (TCIU2)

Table 3-6 TCIU2 Controls, Indicators, and Connectors

Control/Indicator/Connector	Type of Component	Description
P20	5-pin plug	To P120 of TCOU
P21	9-pin plug	To P121 of TCOU
P22	9-pin plug	To P122 of TCOU

DK40i Installation

TCOU

Four-circuit Loop Start CO Line Board

System: DK40i Base KSU (mounts on KSU TMAU)

Circuits per PCB: four loop start CO line circuits

Interfaces with: loop start lines

Older Version(s): none

The optional TCOU PCB installs onto the TMAU motherboard. (See [Figure 3-21](#) and [Table 3-7](#) for information on controls, indicators and connectors.)

Note Only one TCOU or TDDU can be installed on the motherboard.

TCOU Hardware Options

The TCOU PCB accepts the optional Caller ID (TCIU2 not TCIU1) board. When the TCIU2 is installed on the TCOU, the tip/ring of the TCOU circuits 1~4 are automatically connected to the tip/ring of TCIU2 circuits 1~4 respectively.

TCOU Installation or Replacement

1. Make sure the power supply (TPSU16A) DC power switch is OFF.
2. Mate the TCOU male connectors P110, P111, P112 to P10, P11 and P12 respectively on the TMAU. Apply firm, even pressure to ensure proper connection. See [Figure 3-7](#) for installation information and [Figure 3-27 on Page 3-43](#) for wiring.
3. Secure the three plastic stand-off tabs and install screws in upper right and lower left corners.
4. Set decibel (dB) PAD switches SW101, SW201, SW301, and SW401 to the appropriate position. In most cases set to the normal position (NOR). Switches are factory set at the 0 (0 dB signal level drop) position. If CO lines are connected to a PBX or are in close proximity to the central office, set the PAD positions to 3 to provide a -3 dB signal level drop between the PBX and CO.
5. Slip the spade connected to the green/yellow wire under the second screw from the right on the TPSU power supply (see [Figure 3-21](#)). Tighten the screw until the spade is snugly secured.

TCOU Removal

If you need to remove/replace the TCOU, make sure the power supply (TPSU16A) DC power switch is turned OFF.

► To remove the TCOU

1. Loosen the screw on the TPSU power supply and free the spade.
2. Loosen and remove screws securing the TCOU to the TMAU (see [Figure 3-21](#)).
3. Pull back the three plastic stand-off tabs and pull up on the TCOU until P110, P111 and P112 are unplugged.

TCOU Programming

Program 03: Code 11 is specified automatically when TCOU is installed.

Program 10-1: Enables or disables line-to-line Conference and Direct Inward System Access (DISA).

Program 15: Assigns DTMF/Dial Pulse dialing, DISA, and additional attributes to each line. Automatic Release (AR) assignments only need to be made for loop start lines; AR is automatically enabled for ground start CO lines.

Program *15: Makes tenant assignments.

Program 16: Assigns lines to line groups.

Program 39: Assigns line access buttons to digital and electronic telephones.

Program 40: Assigns station access to lines (incoming and outgoing).

Program 41: Assigns station access to lines (outgoing only).

Programs 45~48: Defines Toll Restriction for any line.

Programs 50~56: Defines Least Cost Routing assignments.

Program 78: Assigns special ringing of lines: includes Night Ring Over Page, DISA, Remote Maintenance via the Internal Maintenance Modem (IMDU), and Integrated Auto Attendant.

Programs 81~89

- ◆ Assigns lines to ring selected stations and DH groups.
- ◆ Assigns Delayed Ringing to any line.

Programs *81, *84, *87: Assigns which [DN] will flash when the CO line rings a telephone.

Program 93: Assigns names to lines.

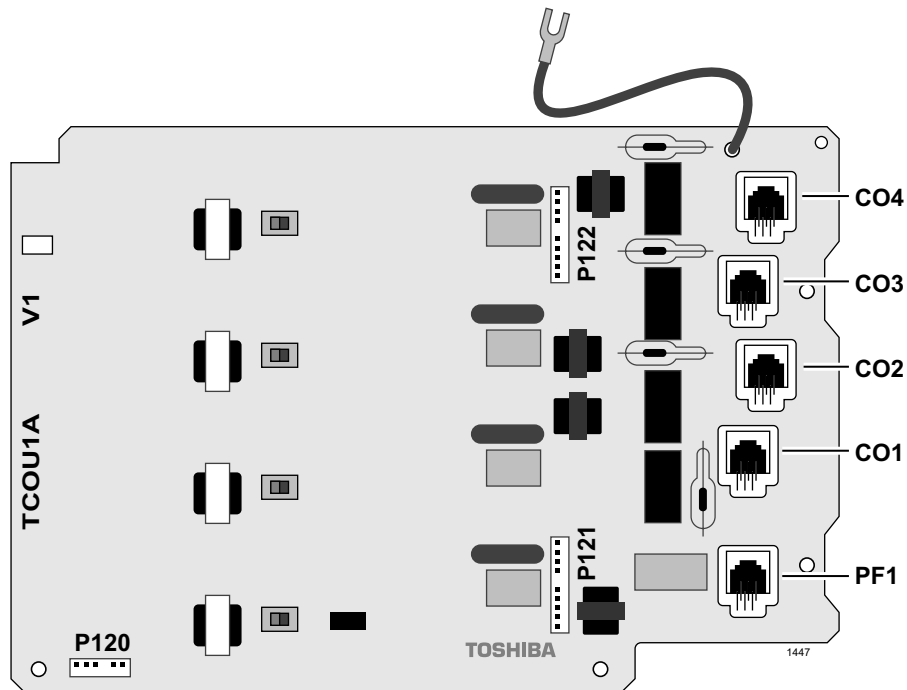


Figure 3-21 DK40i Loop Start CO Line Board (TCOU)

Table 3-7 TCOU Controls, Indicators, and Connectors

Control/Indicator/Connector	Type of Component	Description
CO line connectors 1~4	Modular connector	Interface connector for CO line circuits.
PF1	Modular connector	Power Failure Telephone Interface
PAD switch SW202, SW302, SW402 (circuits 1~4)	2-position slide switch	Enables -3 dB signal level drop for CO line circuit
P120	6-pin connector	To P20 of TCIU2
P121	10-pin connector	To P21 of TCIU2
P122	10-pin connector	To P22 of TCIU2

TDDU

Four-circuit DID Line Digital Telephone Interface Unit

System: DK40i Base KSU (mounts on KSU TMAU)
Circuits per PCB: four DID line circuits
Interfaces with: DID lines
Older Version(s): none

The optional TDDU PCB installs onto the TMAU motherboard. (See [Figure 3-22](#) and [Table 3-8](#) for information on controls, indicators and connectors and [Figure 3-27](#) for wiring.)

Note Only one TCOU or TDDU can be installed on the motherboard.

TDDU Installation

1. Make sure the power supply (TPSU16A) DC power switch is OFF.
2. Mate the TDDU male connectors P110, P111, P112 to the TMAU female connectors. Apply firm, even pressure to ensure proper connection. (See [Figure 3-7 on Page 3-12](#) for installation and [Figure 3-27 on Page 3-43](#) for wiring.)
3. Secure the three plastic stand-off tabs and install screws in the upper right and lower left corners.
4. Set decibel (dB) PAD switches SW101, SW201, SW301, and SW401 to the appropriate position. Switches are factory set at the 0 (0 dB signal level drop) position. If CO lines are connected to a PBX or are in close proximity to the central office, set to the PAD positions to 3 to provide a -3 dB signal level drop between the PBX and CO.
5. Sensitivity jumpers SW102~SW402 are used mostly for dial pulse operation to adjust for dial pulsing at different loop lengths. If close to the CO, the sensitivity should be set to low (L). As the loop length increases, set it to high (H).
6. Insert the TDDU into the appropriate slot and apply firm, even pressure to ensure proper mating of connectors.

TDDU Programming

Program 03: Specify Code 16 for slots that will support TDDUs. Make sure DTMF operation is enabled.

Note Program 03 can be skipped and Program 91 run instead.

Program *09: Assigns DID line extensions to route to station [PDNs].

Program 10-1: Enables or disables Two-line Conference.

Program 15: Assigns DTMF/Dial Pulse dialing, and additional attributes to each line.

Program *15: Makes tenant assignments.

Program 16: Assigns lines to line groups.

Program *17: Assigns intercept port for DID calls to wrong or vacant numbers.

Program 17: Tie and DID line options.

DK40i Installation

Printed Circuit Board (PCB) Installation

- ◆ Assigns Immediate or Wink start to DID lines and auto camp-on and no-dial tone return for DID lines.
- ◆ Assigns DID lines to route per DNIS and ANI options (Program 71 and 72) or DID numbers (Program *09).

Program 30: Disables RRCS for dial pulse operation.

Program 40: Assigns station access to lines (incoming and outgoing).

Program 41: Assigns station access to lines (outgoing only).

Program 42-0, 1~8: Assigns behind PBX/Centrex operation to each line.

Programs 45~48: Defines Toll Restriction for any line.

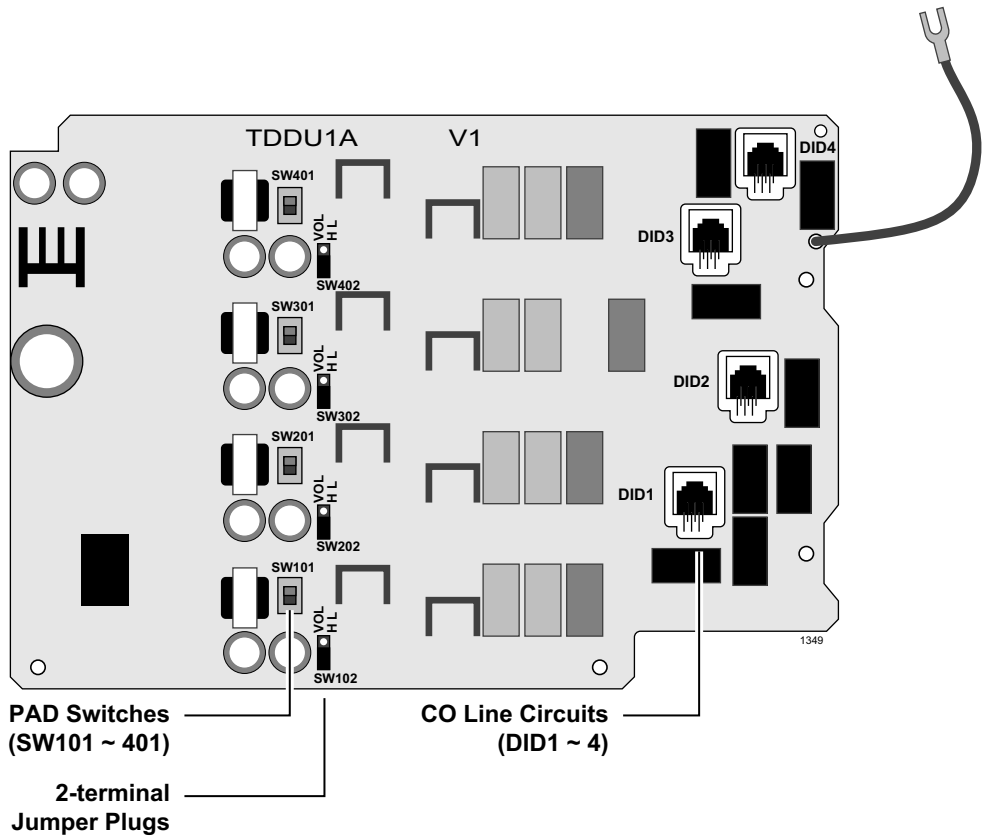
Programs 50~56: Defines Least Cost Routing assignments.

Programs 71 (1~5): Assigns DNIS or ANI option to DID lines.

Programs *71~*73: Assigns telephone to ring called [DN].

Program 93: Assigns names to lines.

The TDDU provides four DID lines and uses four station ports when installed.



DK40i Installation

Figure 3-22 DK40i DID CO Line Board (TDDU)

Table 3-8 TDDU Controls, Indicators, and Connectors

Control/Indicator/Connector	Type of Component	Description
CO line busy LEDs 1~4 (DID1~DID4)	Red LED	Lights to indicate DID line circuit is operating. Trunk indicator will not light unless TDDU is connected to a DID line.
CO line connector (DID)	Modular connector	Interface connector for CO line (DID) circuits.
PAD switch SW202, SW302, SW402 (circuits 1~4)	Two-position slide	Enables 3dB signal level drop for CO line circuit (when set in PAD position).
SW102, SW202, SW302, SW402 (circuits 1~4)	2-terminal jumper plug	Adjusts for dial pulsing at different loop lengths.

CAUTION! Port numbers in the Expansion KSU shift by four ports if KSTU2 or TDDU is installed (or removed after it is installed). This determines whether or not the DDCB can be connected on the KCDU in slot 15.

TSIU

Serial Interface Board

- System:** DK40i Base KSU (plugs into KSU main PCB)
- Circuits per PCB:** two TTY/RS-232 interface ports
- Interfaces with:** SMDR connection for call accounting device
customer-provided external modem for local/remote maintenance from a PC with DK Admin
- Older Version(s):** none

The TSIU PCB enables the DK40i system to connect to various hardware devices. It does not have an internal modem and does not support IMDU. (See [Figure 3-23](#).)

Only one TSIU can be installed per DK40i system. When installed, the TSIU port functions are identified and enabled automatically when power is turned on and the PIOU can still be installed for zone paging. Port 01 is TTY (Program 76-1, code 1) and Port 02 is disabled (Program 76-1, code 0). If the same function is programmed for an TSIU port and a PIOU or PIOUS port, only the TSIU port functions.

The communication parameters for all TSIU TTY ports are:

- ♦ Data word bits = 7
- ♦ Parity = even
- ♦ Stop bits = 1

The communication parameters for a TSIU SMDR port is:

- ♦ Data word bits = 8
- ♦ Parity = none
- ♦ Stop bits = 1

TSIU Installation

- ▶ See [Figure 3-23](#) for installation.

TSIU Programming

Program 03: No assignment is necessary. TSIU is automatically enabled when installed and power is turned ON. It is not assigned to a slot.

Program 76-1X-Y: Assigns each installed TSIU port to a function. Where X identifies the TSIU port number (1~4) and Y identifies the TSIU port function:

- ♦ Y=1, RS-232 TTY (Program 77-1, LED 14 OFF)
- ♦ Y=2, SMDR
- ♦ Y=4, SMDI
- ♦ Y=0, No function - this should be used for any TSIU ports that are not used.

Note Function codes set in Program 76-1X-Y override PIOU and/or PIOUS function codes 41 set in Program 03.

Program 76-2X-Z: Assigns each installed TSIU port to operate at a specified transmission rate. Where X identifies the TSIU Port number (1, 2). Z identifies the TSIU/port transmission rate in bits-per-second (bps):

- ♦ Z=1; 9600
- ♦ Z=2; 4800
- ♦ Z=3; 2400
- ♦ Z=4; 1200

Note The sum of TSIU port 1 and port 2 bps rate cannot exceed 9600 bps.

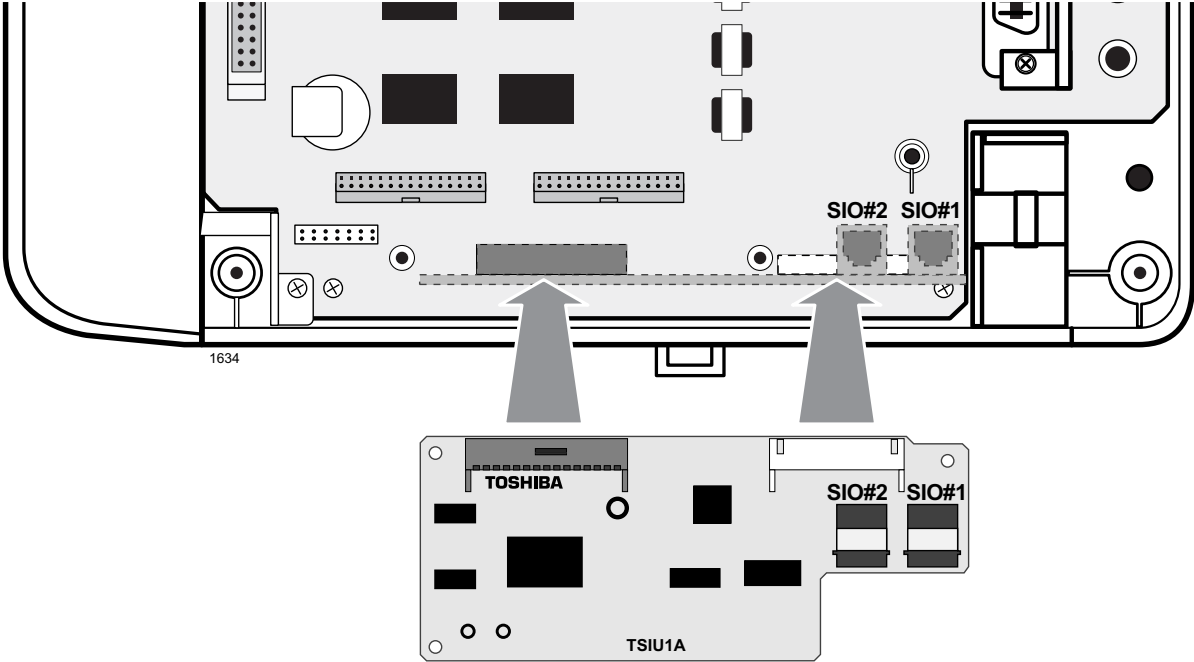


Figure 3-23 Serial Interface Board (TSIU) Installation

Universal Slot PCBs

The following PCBs can be used in the universal slots of either the Strata DK40i Expansion KSU or the Strata DK424 cabinets (see [Table 3-9](#)).

Table 3-9 Universal Slot PCB Descriptions

PCB	Title	Description	Page
KCDU	CO Line/Digital Interface Unit	Provides two loop start CO line circuits and four digital telephone circuits.	7-4
PDKU	Digital Telephone Interface Unit	Provides eight digital telephone circuits that can support the same peripherals as the digital circuits in the Base KSU.	7-6
PEKU	Electronic Telephone Interface Unit	Provides eight electronic telephone circuits that can interface with electronic telephones, an alternate BGM source, an HDSS, an external amplifier for DISA or two CO line conferencing.	7-8
PESU	Standard/Electronic Telephone Interface Unit	Provides two standard telephone or two-wire device circuits/four electronic telephone circuits in the Expansion KSU.	7-13
PIOU and PIOUS	Option Interface Unit	Provides interfaces for SMDR, IMDU and external zone paging - (PIOU only).	7-17
RCOU	CO Line Interface Unit	Adds four CO lines to the system and can only be installed in the Expansion KSU. Assigns Delayed Ringing to any CO line. You cannot piggy-back a RCOS.	7-28
RDDU	DID Line Unit	Provides four Direct Inward Dialing (DID) lines. Each line can have one office code and a block of extensions.	7-33
RDSU	Digital/Standard Telephone Interface Unit	Provides two standard telephone circuits and four digital telephone circuits.	7-36
REMU	E&M Tie Line Unit	Provides four Tie line circuits.	7-39
RGLU2	Loop/Ground Start CO Line Interface Unit	Provides four line circuits.	7-43
RSSU	PC Interface Unit	Provides two RS-232 connections.	7-51
RSTU2	Standard Telephone Interface Unit	Has eight circuits that support single-line devices, such as: rotary and push-button standard telephones, fax machines, dictation equipment, modems, a separate BGM source, off-premises stations, Toshiba voice mail (Stratagy, Stratagy DK or VP), digital announcement devices for the optional built-in auto attendant feature and customer-supplied voice mail devices.	7-53
RWIU	Strata AirLink Unit	Supports Digital Wireless Handsets: same as PDKU, except no DDSS console, Stand-alone Cordless Telephone, PDIU-DS, or DDCB.	16-36
Stratagy DK	Stratagy Voice Mail Unit	The Stratagy voice mail systems come with 2, 4, 6, or 8 voice mail ports. All of the Stratagy DK systems use 8 station ports in the DK40i and DK424 software.	10-42
RBSU/ RBSS	ISDN S/T-type Basic Rate Interface Unit and Basic Rate Interface Subassembly	RBSU provides two BRI S/T circuits. Each circuit provides two simultaneous voice and/or data connections with a single interface. The RBSS attaches to the RBSU to provide two additional BRI S/T type circuits that can be used for station-side connections only.	14-18

Loop Limits

This section provides the maximum loop lengths for connection of telephones, lines, peripheral equipment, and power supplies. The following information applies to only the Strata DK40i system (see Table 3-10). Diagrams that are applicable to all systems, including the DK40i, can be found in Chapter 8 – DK40i/DK424 Universal PCB Wiring.

Table 3-10 Digital Telephone/DIU/DDSS Console/ADM/Loop Limits

Mode	DK40i KSU or Battery Backup ¹	Maximum line length (24 AWG)						
		1 Pair		2 Pair ²		1 Pair plus external power ³		
		feet	meters	feet	meters			
DKT or Cordless base Ringing (Volume Max)	DK40i KSU	1000	303	1000	303	1000 feet 303 meters		
	Battery Backup	675	204					
DKT with DVSU (OCA)	DK40i KSU	1000	303					
	Battery Backup	495	150					
DKT with HHEU or Carbon Handset	DK40i KSU	1000	303					
	Battery Backup	330	100					
DKT with PDIU-DI/ PDIU-DI2/RPCI-DI	DK40i KSU	495	150				675	200
	Battery Backup	165	50					
PDIU-DS	DK40i KSU	1000	303				1000	303
	Battery Backup	675	204				1000	303
DKT with HHEU and RPCI-DI/PDIU-DI/PDIU-DI2	DK40i KSU	495	150	1000	303			
	Battery Backup	33	10	330	100			
DDSS2060A	DK40i KSU	1000	303	1000	303			
	Battery Backup	500	151					
DDCB	DK40i KSU	1000	303					
	Battery Backup	500	151					
DKT with DVSU and HHEU	DK40i KSU	1000	303					
	Battery Backup	165	50					
DKT with ADM	DK40i KSU	675	204					
	Battery Backup	165	50					

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- Battery backup applies to instances when the system is being powered by batteries exclusively.
- Digital telephones and other digital devices can operate at maximum lengths with two pair wiring or an external power source.
- Digital cable runs must *not* have the following:
 - Cable splits (single or double)
 - Cable bridges (of any length)
 - High resistance or faulty cable splices

DK40i Secondary Protection

The following diagram (see Figure 3-24) shows where secondary protectors must be installed for outside wiring.

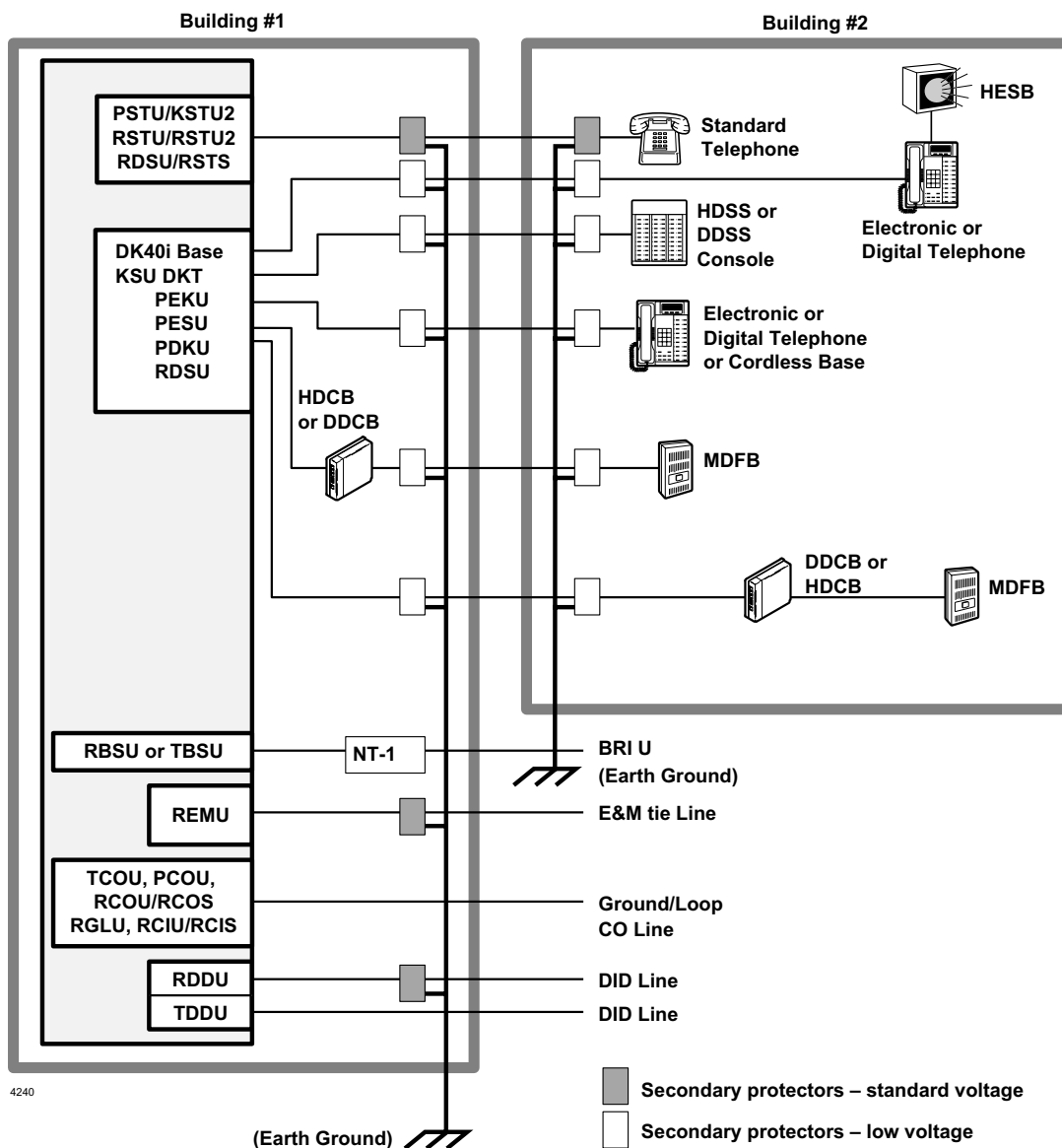


Figure 3-24 DK40i Secondary Protector Diagram

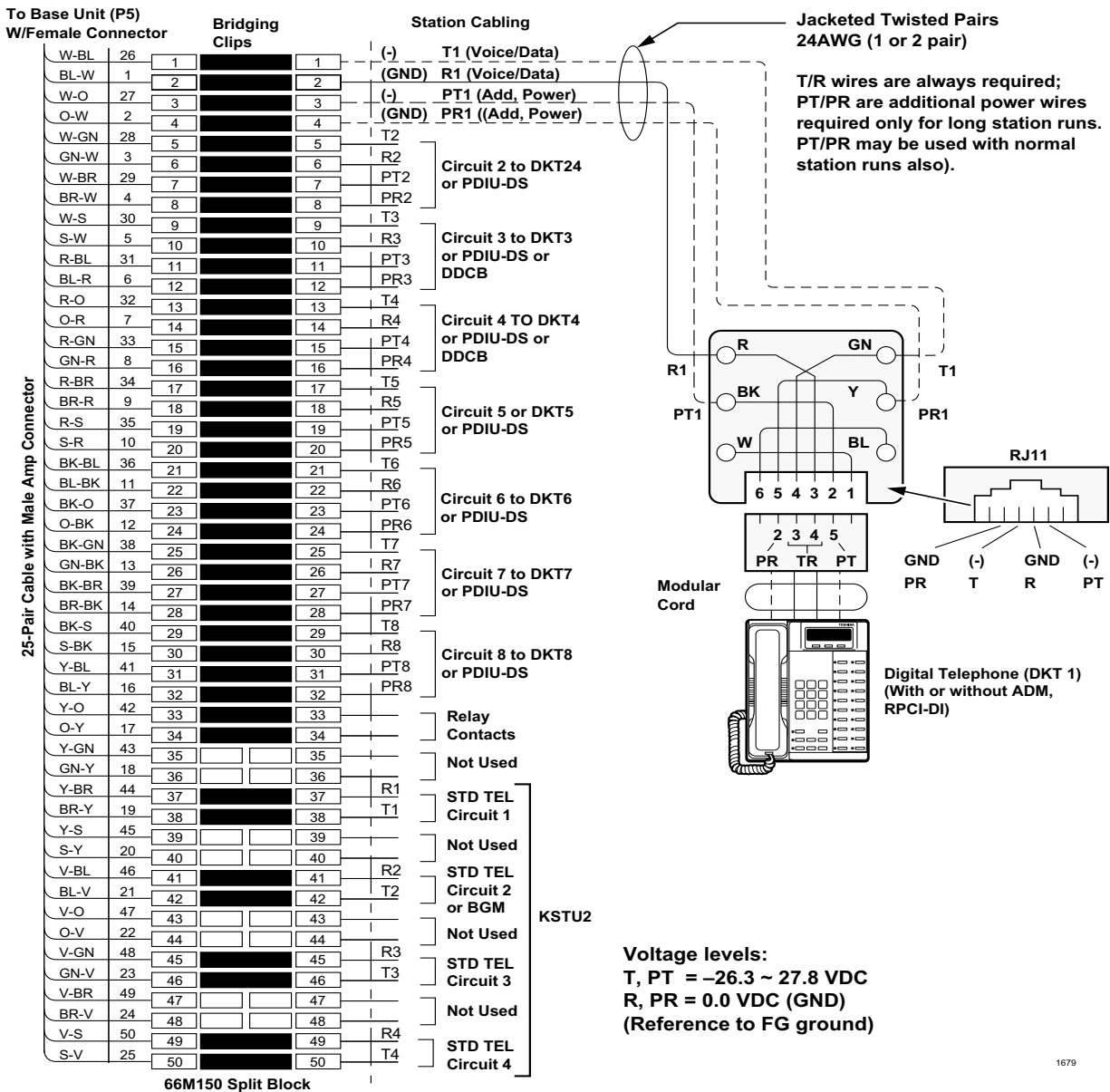
Important! To protect against transient voltages and currents, solid state secondary protectors must be installed if there is outside wiring, and on all DID and E&M Tie lines. These protectors, which contain fast semiconductors in addition to fuses, shall comply with the requirements for secondary protectors for communication circuits, UL 497A. Care must be taken to ensure that they are very well grounded to a reliable earth ground. Recommended protectors are available in the fast Series 6 line from ONEAC Corp., Libertyville, Illinois 60048, (800) 327-8801. Install and test the secondary protectors precisely to the installation instructions of the manufacturer.

MDF Wiring Diagrams

Wiring diagrams for the DK40i (listed below) are shown in Figures 3-25~3-27.

- ◆ MDF Wiring to KSU & Amphenol Station and Relay Connectors (KSTU2)
- ◆ MDF Wiring to CO Lines and Digital Telephones (KCDU)
- ◆ MDF Wiring to CO Lines (TCOU and TDDU)

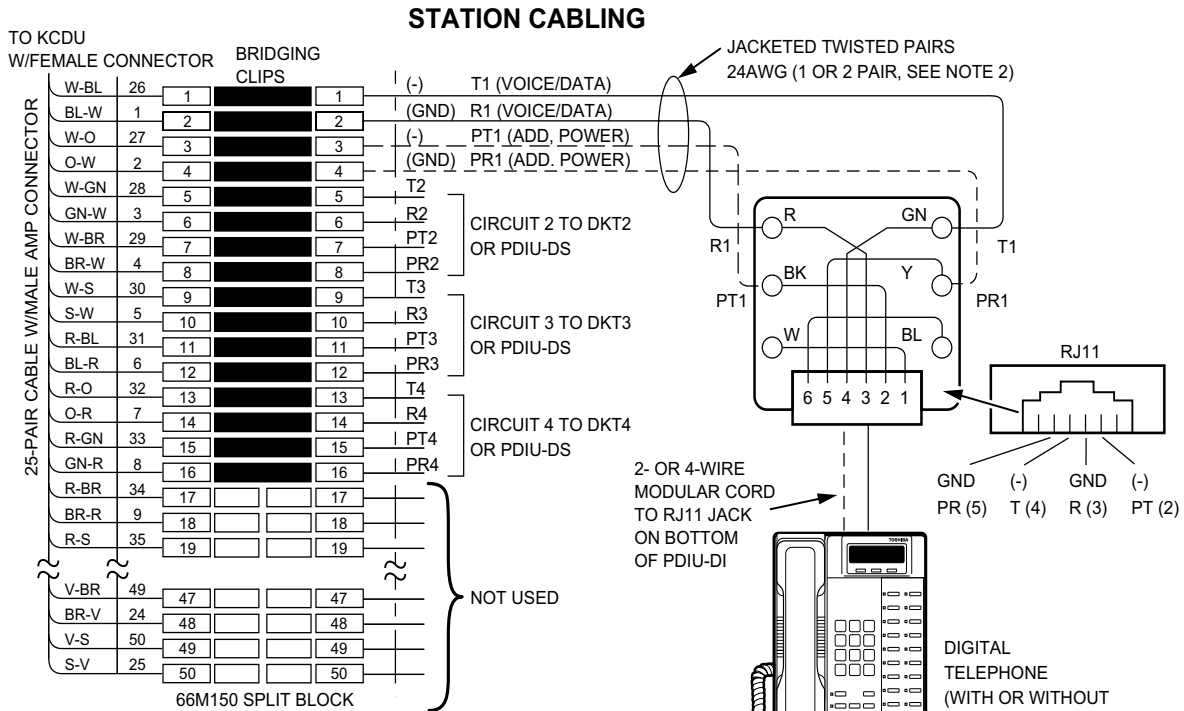
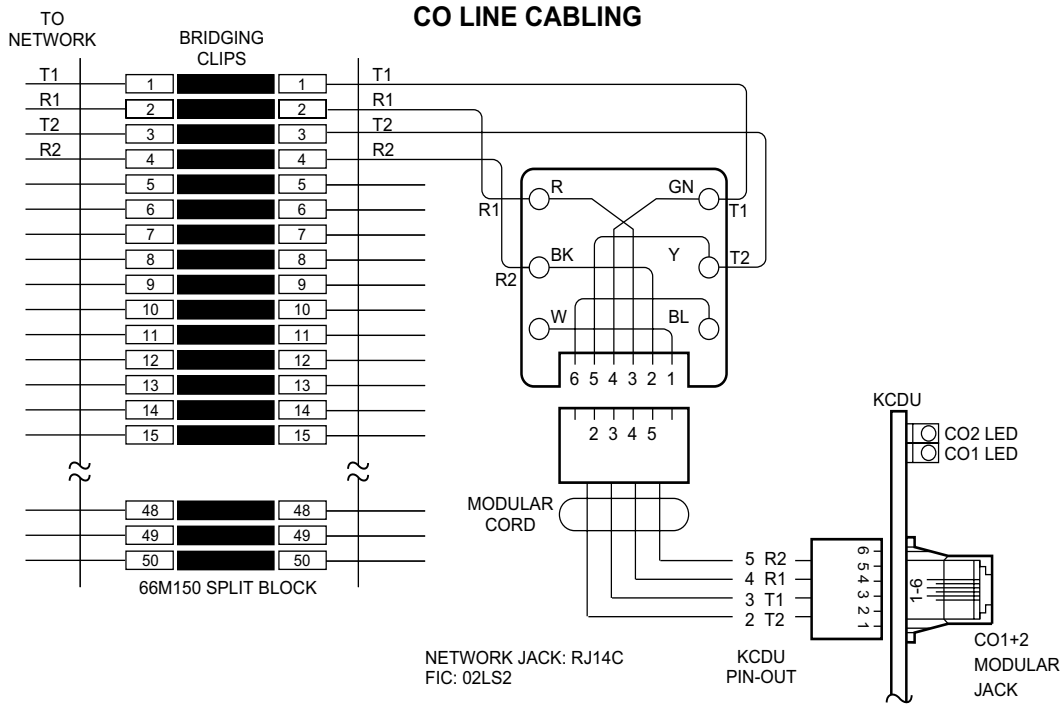
See Chapter 8 – DK40i/DK424 Universal Wiring Diagrams for more information.



DK40i Installation

Note See Table 3-10 on Page 3-39 for loop limits.

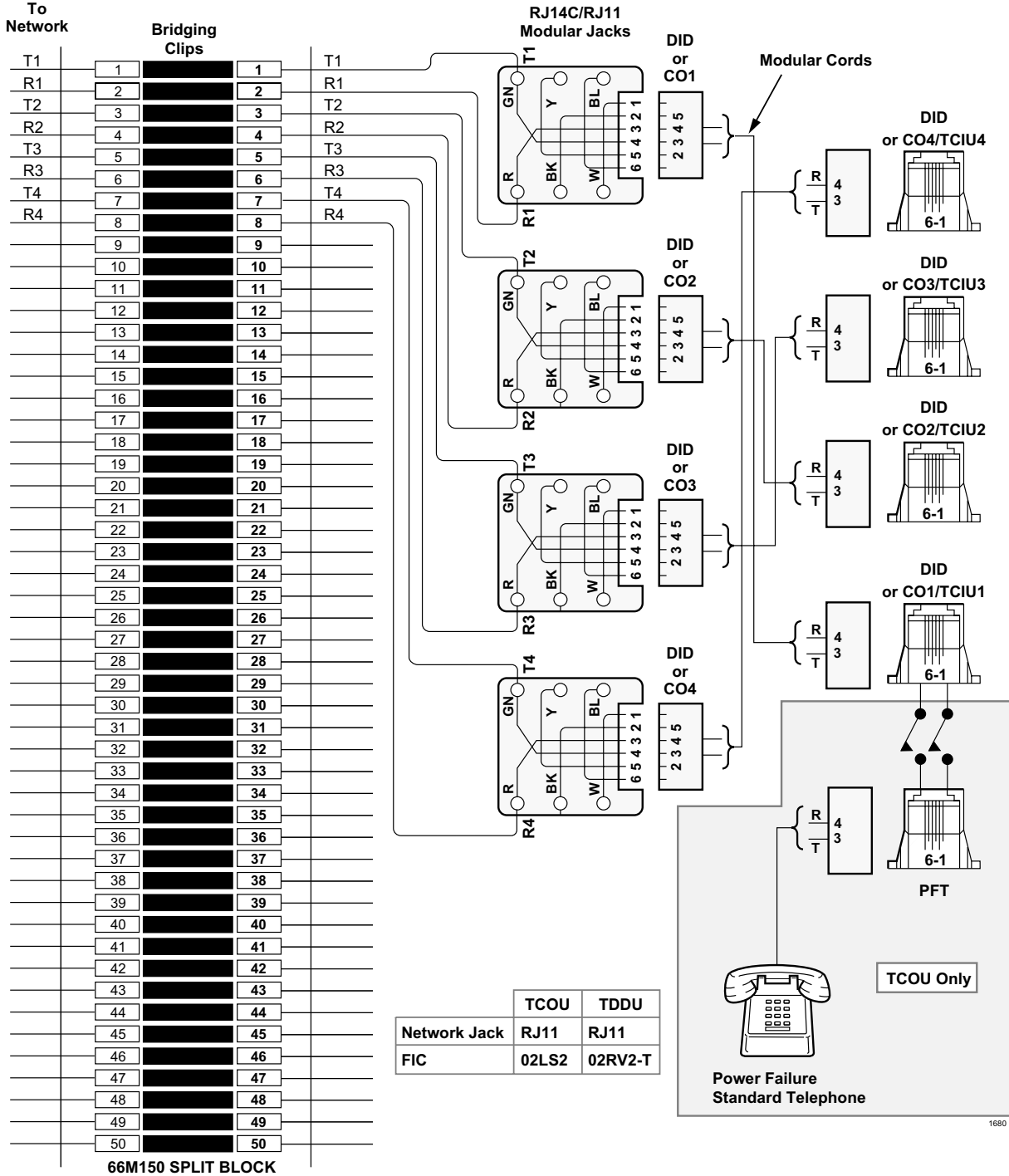
Figure 3-25 MDF Wiring to KSU & Amphenol Station and Relay Connectors (KSTU2)



Notes

1. Voltage levels:
T, PT = -26.3 ~ 27.8 VDC
R, RP = 0.0 VDC (GND) (Reference to SG ground)
2. T/R wires are always required; PT/PR are additional power wires required only for long station runs or when operating on reserve power per Table 3-10. PT/PR may be used with normal station runs also.

Figure 3-26 MDF Wiring to CO Lines and Digital Telephones (KCDU)



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Figure 3-27 MDF Wiring to CO Lines (TCOU and TDDU)

