

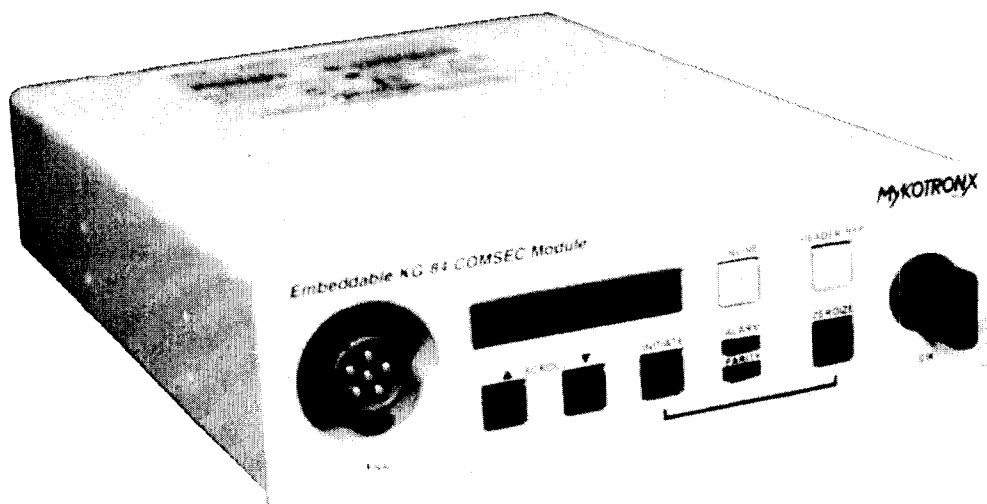
FOR OFFICIAL USE ONLY

# KIV-7

## EMBEDDABLE KG-84 COMSEC MODULE

### USER'S MANUAL

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Mykotronx, Inc.  
Torrance, CA 90501  
A Rainbow Technologies Company

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FOR OFFICIAL USE ONLY



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## Introduction

Telecommunication and automated information processing systems are highly susceptible to interception, unauthorized electronic access, and related forms of technical exploitation. Within the Government, these systems process and communicate classified national security information and other sensitive data. The compromise of this information, especially to hostile intelligence services, does serious damage to national security interests. To counter this threat, the *KIV-7*, with its embeddable KG-84 COMSEC Module, was developed.

This manual provides instructions for the installation, operation, and maintenance of your *KIV-7*. In addition, this manual also provides security guidelines for its proper handling and secure operation. Please take the time to read this manual in its entirety before installing and operating your *KIV-7*.

## 1.1 Equipment Description

The Embeddable KG-84 COMSEC Module (*KIV-7*) is a compact, economical, high-performance, user-friendly COMMUNICATIONS SECURITY (COMSEC) device. It is specifically designed to meet the growing demand for secure data communication links among users of personal computers (PCs), workstations, and facsimile equipment. The *KIV-7* protects classified and sensitive digital data transmissions (Type 1) at data rates up to 512 kbps (or 1.544 Mbps for the *KIV-7HS*). The *KIV-7* is ideal for complying with Government directives NACSI 6002 and DoD Instruction 5210.74.

The *KIV-7* is interoperable with the Government standard KG-84, KG-84A, and KG-84C data encryption equipment in both secure data and over-the-air rekey (OTAR) modes. This capability allows the *KIV-7* to interoperate with any KG-84 equipment which has already been installed.



Figure 1-1: Embeddable KG-84 COMSEC Module (*KIV-7*)

The *KIV-7* offers operational capabilities that support a wide range of user applications. With its extended data rates, protection is available for a broad spectrum of point-to-point, netted, and broadcast data links. Plaintext header bypass allows initial modem setup prior to secure traffic operation, without the need for system reconfiguration. An integrated remote control interface permits the management of up to 30 remote units by a single *KIV-7* via an independent secure link. The user-friendly menu-based operator interface simplifies access to all operational features.

Advanced key management features support both the current key distribution system and the emerging Electronic Key Management System (EKMS), while providing the added flexibility necessary for managing operational keys. The *KIV-7* fill interface is compatible with both DS-101 (AN/CYZ-10 DTD) and DS-102 (KXK-13, KXX-15, KOI-18) electronic keying devices. Storage for up to ten traffic encryption keys simplifies multi-net communication. A removable Crypto-Ignition Key (CIK) prevents unauthorized access and protects all of the internally stored keys.

Space efficiency, low cost, and high reliability are achieved through very large scale integration, surface-mount technology, and innovative packaging. As a result, the compact *KIV-7* provides the level of COMSEC equipment integration and miniaturization necessary for today's fixed, semi-fixed, and mobile office environments. Its universal half-height disk-drive form offers a practical solution for desktop, embedded, and multi-unit rack mount installations, and its standard EIA-530 and RS-232 data interfaces simplify system integration.

## 1.2 Features

- ◆ Commercial Off-the-Shelf (COTS) Type 1 data encryption
- ◆ KG-84/-84A/-84C interoperability (refer to Chapter 10)
- ◆ Compact universal half-height computer peripheral configuration
- ◆ User-friendly menu-based operator interface (refer to Chapter 11)
- ◆ Non-volatile storage of multiple user-defined configurations
- ◆ Extended synchronous data rates to 512 kbps (*KIV-7*)/1.544 Mbps (*KIV-7HS*) and asynchronous data rates to 288 kbps
- ◆ Standard D-type rear-panel interface connectors (refer to Chapter 12)
- ◆ Flexible key management interface, including DS-101 and DS-102
- ◆ Crypto-Ignition Key (CIK) protection of internally stored keys
- ◆ Cryptographic remote command and status interface
- ◆ Plaintext header bypass mode for initial modem setup/dialing
- ◆ Low-power 5 V dc operation
- ◆ Compliant with NSA COMSEC and TEMPEST requirements



## 2 Security Considerations and Procedures

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### Introduction

This chapter provides information related to secure handling and operation of the *KIV-7*. The guidance is provided as supplemental information only. Consult your cognizant security official and the security procedures and directives of your organization for specific security information.

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### 2.1 Classification

The *KIV-7* is endorsed by the National Security Agency (NSA) to provide high-grade (Type 1) security for the protection of classified and sensitive digital data transmissions.

The following classification guidelines apply to the *KIV-7* and its associated Crypto-Ignition Key (CIK):

- ◆ When unkeyed, or when the CIK is removed and not collocated, the *KIV-7* is an UNCLASSIFIED Controlled Cryptographic Item (CCI). The *KIV-7* must be controlled in a manner that affords protection at least equal to that normally provided other high-value equipment, such as a personal computer.
- ◆ When keyed and the CIK is engaged or collocated, the *KIV-7* is classified to the level of the highest classification of stored key. The authorized user must ensure that the *KIV-7* is attended and operated by properly cleared personnel in accordance with prescribed procedures.
- ◆ Electronic and hard-copy keys for the *KIV-7* must be stored in a manner appropriate for their classification level in accordance with prescribed procedures.

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### 2.2 Crypto-Ignition Key (CIK)

The CIK is a small key-shaped memory device that is automatically initialized and managed by the *KIV-7*. Only one CIK may be associated with a given *KIV-7*; once initialized, the CIK is unique to that *KIV-7*. The CIK permits the *KIV-7* to be treated as an UNCLASSIFIED CCI when the two are NOT collocated (that is, in the same room). Only authorized users who possess a valid CIK may access the operational features of the *KIV-7*.

The following guidelines apply to handling of the CIK:

- ◆ **If the CIK is removed from the *KIV-7***, you can keep it with you (perhaps on a key chain), so long as the *KIV-7* and its associated CIK are never left unattended in the same area.

- ◆ **If the CIK is removed but collocated with the *KIV-7*, you must store the CIK in a manner appropriate for the highest classification level of the key material that is being protected (such as in a classified safe).**
- ◆ **If there is a CIK failure, ensure that the correct CIK is being inserted into the *KIV-7*. If correct and the failure persists, then immediately zeroize the *KIV-7* by pressing the front panel ZEROIZE and INITIATE pushbuttons. Report the malfunction to your cognizant security official. Obtain a new CIK and insert it in the *KIV-7*. Reload all operational keys.**
- ◆ **If the CIK is lost or stolen, immediately zeroize the *KIV-7* by pressing the front panel ZEROIZE and INITIATE pushbuttons. Report the occurrence to your cognizant security official.**

## 2.3 Keys and Crypto-Periods

The *KIV-7* uses both Traffic Encryption Keys (TEKS) and Key Encryption Keys (KEKs):

### 2.3.1 TEKS

Operational TEKS are used to encrypt and decrypt the serial digital data traffic in point-to-point, netted, and broadcast applications. Each TEK is classified according to the level of traffic it is authorized to protect. The *KIV-7* can simultaneously store up to ten operational TEKS (labeled X01 - X10), as well as one temporary future TEK (labeled V).

The Remote Control TEK (labeled XRC) is used to encrypt and decrypt the command and status information communicated between a remote control master and remote *KIV-7* slaves. This key is required only when remote operation is desired.

### 2.3.2 KEKS

The Terminal Unique KEK (labeled U) is used for over-the-air rekeying operations.

The Remote Control KEK (labeled W) is used for keying of remote *KIV-7* slaves by a remote control master. This key is required only when remote operation is desired.

The Terminal Unique Local KEK (labeled Z) is used to manage the CIK and the internally stored keys associated with an individual *KIV-7*. This key is automatically generated and managed by the *KIV-7*. The Z-key cannot be loaded by externally means; however, it can be replaced via the front panel menus (refer to the [-VU/cnt] menu in paragraph 5.4.4).

### 2.3.3 Key Formats and Crypto Periods

The Operational TEKS and Terminal Unique KEK are supplied in either standard (128-bit) format or in DS-74 tagged (256-bit) format. The Remote Control TEK and KEK are supplied in tagged format only. Refer to Chapters 5 and 11 for instructions on selecting *KIV-7* key format options.

The following table summarizes recommended crypto-periods for the TEKS and KEKs used by the *KIV-7*. Please consult your cognizant security official for complete crypto-period information.

KEY TYPE	CRYPTO-PERIOD
Operational TEKS	
Point-to-point	3 months (with daily updates)
Crypto-netted point-to-point	Daily
Netted and broadcast	Daily
Terminal Unique KEK	3 Months
Remote Control TEK and KEK	1 Month
Terminal Unique Local KEK	Indefinite

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## 2.4 Security Concerns

If classified or CCI material is lost, stolen, or subjected to possible compromise, report the occurrence immediately to your cognizant security official.



**Introduction**

The *KIV-7* may be installed in fixed, semi-fixed, and mobile environments that meet the environmental characteristics specified in Chapter 9 of this manual. This chapter provides unpacking and installation instructions for desktop, embedded, and rack configurations. A listing of *KIV-7* accessories is also provided.

Consult your cognizant security official and appropriate security procedures and directives of your organization for complete installation guidance. Proper installation of the *KIV-7* is essential and must be performed by authorized and qualified personnel before operating the unit.

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**3.1 Unpacking**

Carefully unpack the *KIV-7*. Figure 3-1 (page 3-2) shows the *KIV-7* and its accessories that are supplied in the shipping carton. Save the shipping carton and packing materials so that the unit may be properly repacked if subsequent shipping or service is required. Verify that the shipping carton contains the following items:

- ◆ Embeddable KG-84 COMSEC Module (illustrated in Figure 3-1).
- ◆ Blank Crypto-Ignition Key (CIK) (illustrated in Figure 3-1).
- ◆ 3.6 V Lithium Battery (illustrated in Figure 3-1).
- ◆ Standard PC Mounting Rails (with attaching hardware; illustrated in Figure 3-1).
- ◆ User's Manual (not illustrated).
- ◆ Front Panel Label (not illustrated).

If any of the above items are missing or damaged, contact Mykotronx *KIV-7* Customer Service immediately.

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**3.2 Pre-Installation Setup**

Before installing your *KIV-7*, perform the following steps:

- ◆ Install the battery by following steps in paragraph 6.3 of this manual. If the unit is to be stored, or will remain unused for a long period of time, do not install the battery until it is needed.
- ◆ The *KIV-7* may be installed in an embedded or rack configuration where the main equipment label is concealed. In this case, you may attach the optional label (included in the equipment package) to the *KIV-7* front panel to aid in identifying the unit serial number.

Figure 3-2 provides useful mechanical information. Contact Mykotronx KIV-7 Product Support for further information or assistance.

- ◆ Identify all of the accessories necessary for your installation configuration. In some applications, special cables or mounting hardware may be required to complete the installation. Refer to paragraph 3.7 for a complete listing of KIV-7 accessories.

Figure 3-1: KIV-7 and Accessories Supplied



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### 3.3 Before You Begin

Before operating your *KIV-7*, please read all chapters in this manual. The electrical interfaces of the data ports must be programmed prior to on-line operation. Operating the unit with incorrect settings can cause permanent damage to the *KIV-7*, an ancillary device, or both.

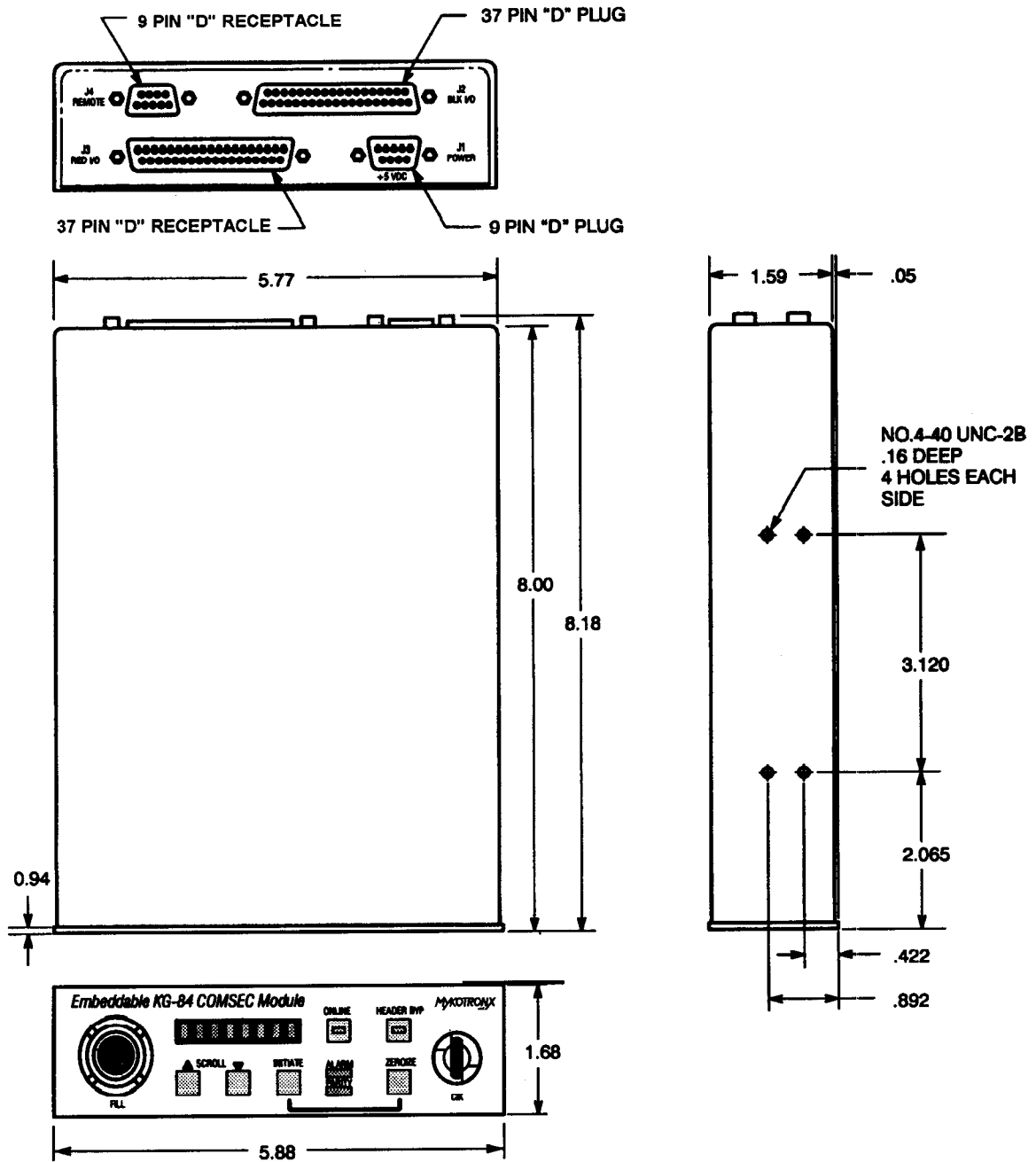
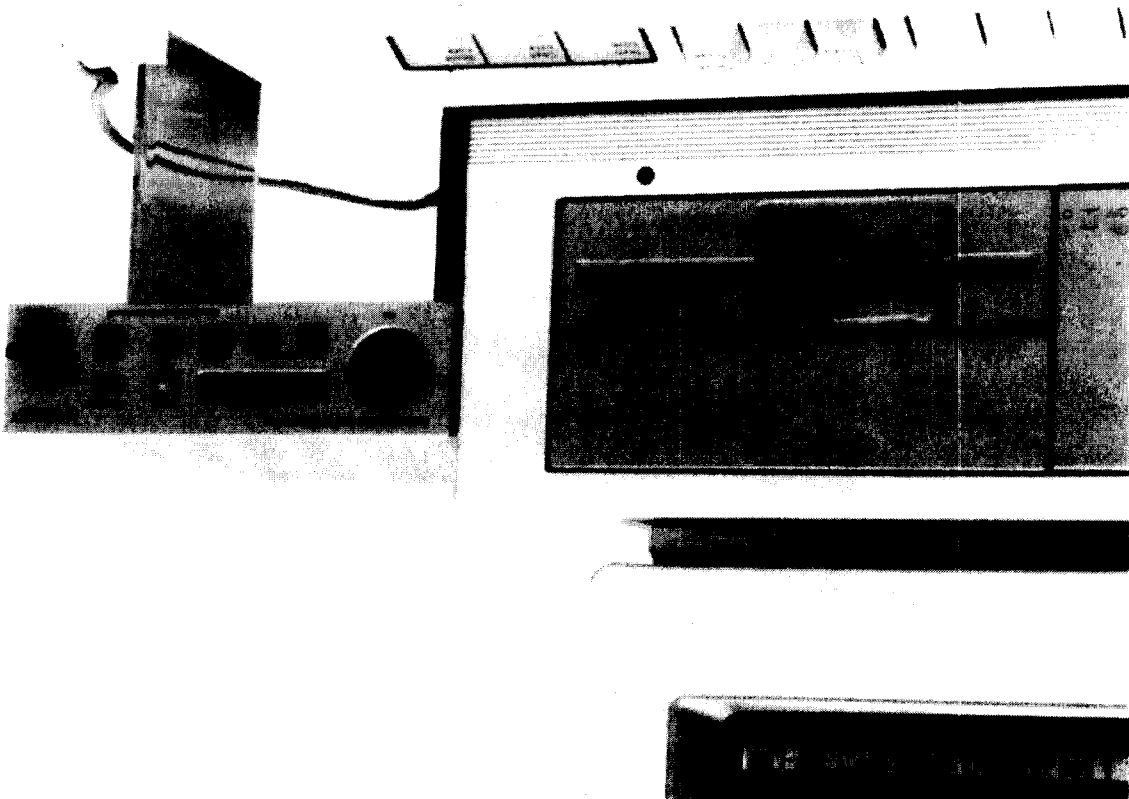


Figure 3-2: *KIV-7* Mechanical Outline Drawing

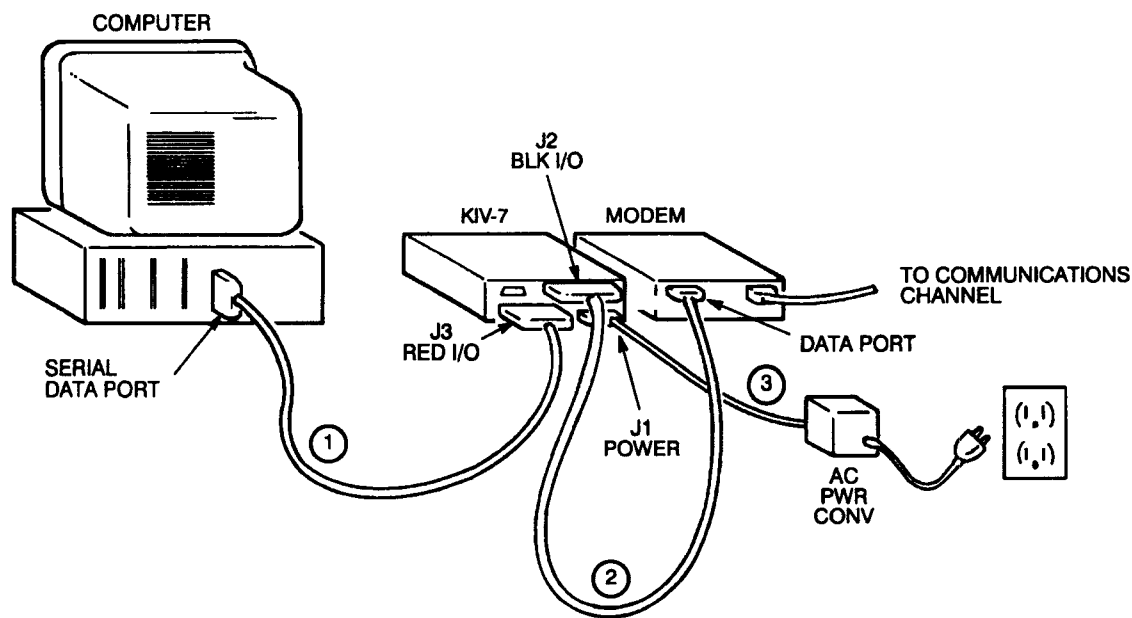
### 3.4 Desktop Configuration

- In a desktop configuration, the KIV-7 is a standalone unit which is connected between a data terminal device (such as a personal computer) and a data communications device (such as a modem). For this configuration, the AC Power Converter is necessary to convert 120/220V AC, 50-60 Hz, to 5V for the KIV-7.
- To install the KIV-7 in a desktop configuration:
- ◆ Turn off power switches and circuit breakers to all ancillary devices.
  - ◆ Connect a 37-pin D-connector cable (①) from the KIV-7 plaintext port (J3, RED I/O) to the serial data port on the terminal device. Securely attach the cable at both ends using jack screws. (Refer to Chapter 12 for KIV-7 connector descriptions.)

Figure 3-3: KIV-7 in Desktop Configuration







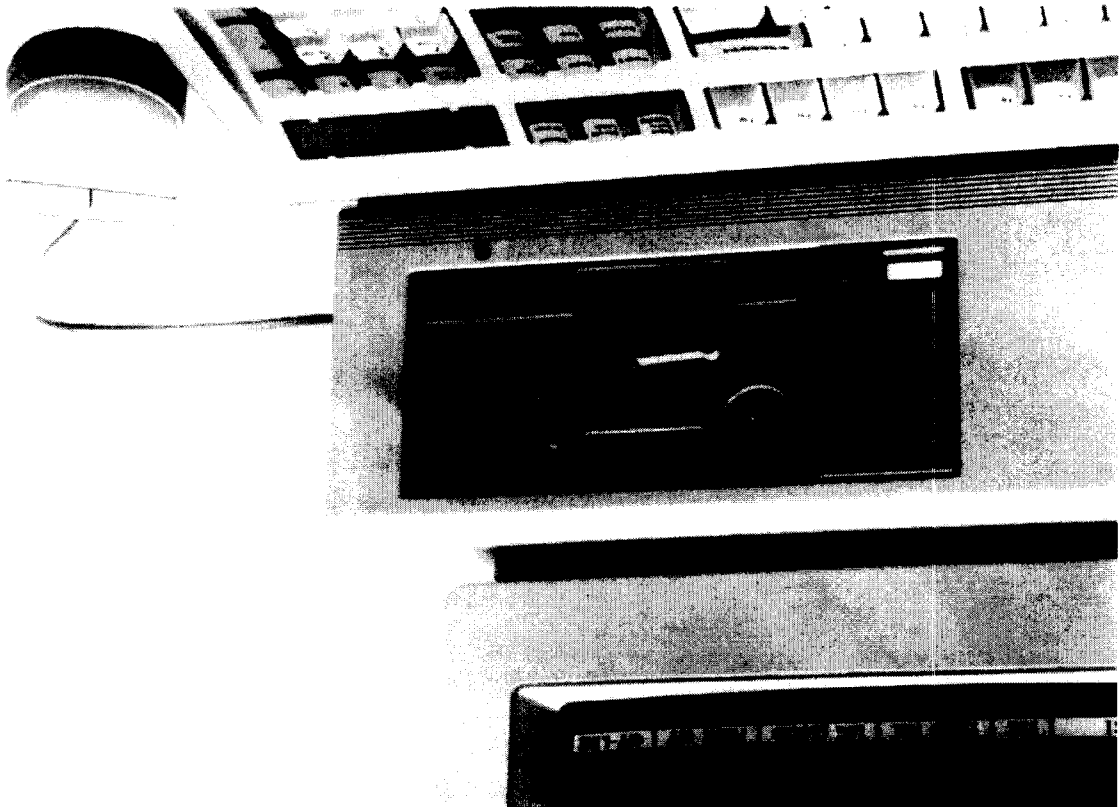
**Figure 3-4: KIV-7 Cable Connections**

- ◆ Connect a 37-pin D-connector cable (②) from the *KIV-7* ciphertext port (J2, BLK I/O) to the data port on the communications device. Securely attach the cable at both ends using jack screws. (Refer to Chapter 12 for *KIV-7* connector descriptions.)
- ◆ Connect the 9-pin D-connector cable (③) from the AC Power Converter to the *KIV-7* power port (J1, POWER) and securely attach the cable using jack screws. Plug the power converter AC cord into a grounded three-prong electrical outlet. (Refer to Chapter 12 for *KIV-7* connector descriptions.)

### 3.5 Embedded Configuration

In an embedded configuration, the *K/V-7* is installed in a personal computer, workstation, or other terminal device that accommodates universal half-height computer peripherals. The Personal Computer Interface Card, an accessory kit available for PC/XT and PC/AT compatible computers, is necessary to interface the *K/V-7* with the host bus, DC power source, and rear connector panel. Specific installation instructions are supplied with the Personal Computer Interface Card. For further information or for assistance with special embedded applications, contact Mykotronx *K/V-7* Product Support.

Figure 3-5: *K/V-7* in Embedded Configuration



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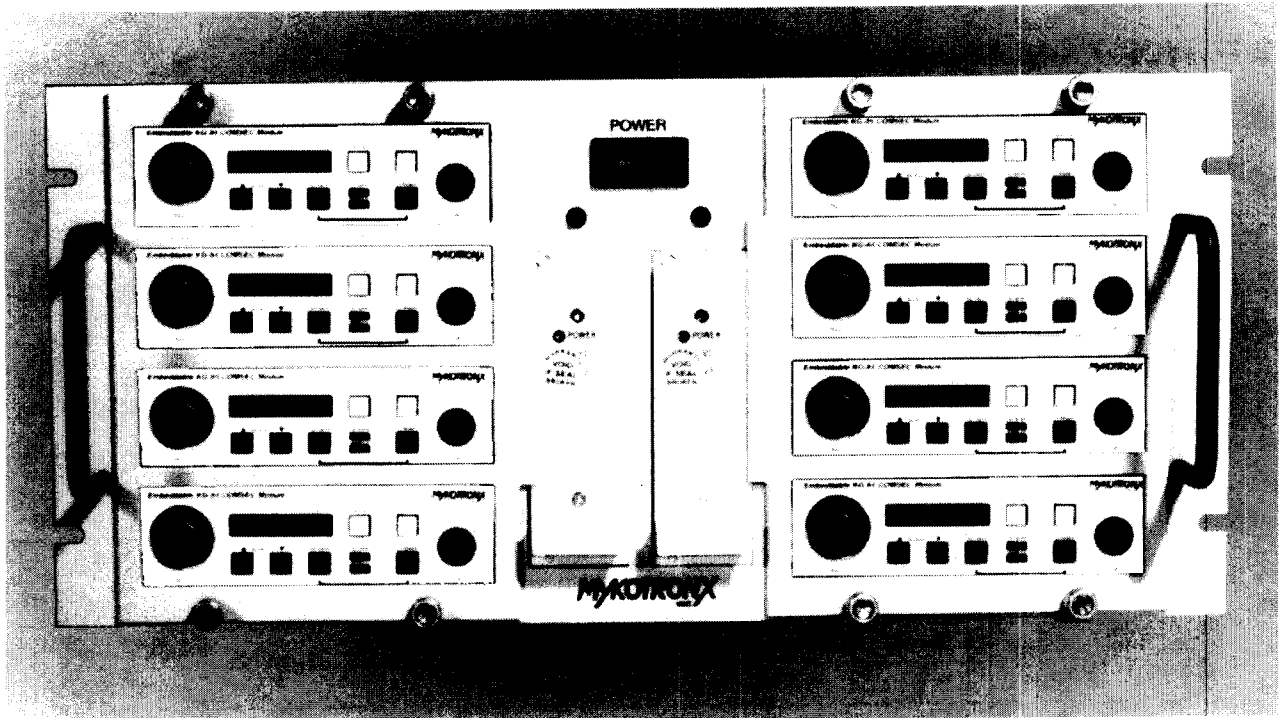


Figure 3-6: *KIV-7* in Rack Configuration

### 3.6 Rack Configuration

In a rack configuration (see Figure 3-6), up to eight *KIV-7* units may be housed in a 19-inch rack accessory. The rack, which is 8.72 inches high and 12.13 inches deep, contains pre-wired power connectors and redundant power supplies with automatic switchover circuitry.

Specific installation instructions are supplied with the rack. For further information or for assistance with special multi-unit applications, contact Mykotronx Product Support.

**3.7 KIV-7 and Accessories**

The following table lists part numbers for the *KIV-7* and its accessories. Please contact Mykotronx *KIV-7* Customer Service for pricing and ordering assistance.

4061222-0504	<i>KIV-7</i> (including Clk, battery, mounting rails, and User's Manual) (National Stock Number 5810-01-414-6656)
4070580-0501	<i>KIV-7HS</i> (including Clk, battery, mounting rails, User's Manual) (National Stock Number 5810-01-431-8264)
4065536-0701	Crypto-Ignition Key (Clk)
4061244-0701	3.6 V Lithium Battery (National Stock Number 6135-01-301-8776)
4065543-0701	Mounting Rails (pair, for 19" rack and IBM PCs)
4067279-0701	Mounting Rails (pair, for HP Vectra PCs)
4067280-0701	Mounting Rails (pair, for Compaq PCs)
4065544-0201	<i>KIV-7</i> User's Manual
4065537-0501	6' RS-232 Cable Assembly (DTE) DB37P to DB25S
4065538-0501	6' RS-232 Cable Assembly (DCE) DB37S to DB25P
4065539-0701	AC Power Converter, 120 V AC
4065539-0702	AC Power Converter, 220 V AC
4065540-0501	Personal Computer Interface Card Assembly (PC/XT, PC/AT)
4065541-0501	Computer Power Cable Assembly
4061242-0501	19" Rack with Dual 5 V dc Power Supplies (National Stock Number 5975-01-413-0236)
4065542-0701	5 V dc Power Supply (for 19" rack)
4067380-0501	Wireline Interface Adapter Module
4073816-0501	High Speed Wireline Interface Adapter Module
4070531-0501	6' RS-449 Cable Assembly (DTE) DB37P to DB37P
4074281-0501	6' RS-449 Cable Assembly (DTE) DB37P to DB37S
4070532-0501	6' RS-449 Cable Assembly (DCE) DB37S to DB37P
4074249-0501	6' EIA-530 Cable Assembly (DTE) DB37P to DB25S
4074250-0501	6' EIA-530 Cable Assembly (DCE) DB37S to DB25P

## 4

## Controls and Indicators

**Introduction**

This chapter describes the *KIV-7*'s controls and indicators. All user controls and indicators appear in Figure 4-1. A menu-driven operator interface enables access to the *KIV-7*'s operational features, and for programming configurations settings.

**4.1 Controls**

Six momentary pushbutton switches on the face of the unit provide easy access to all *KIV-7* features:

- ◆ **SCROLL ▲**. Scrolls the message display to the previous message. Holding down the pushbutton causes the display to continuously scroll up through previous messages until the button is released.
- ◆ **SCROLL ▼**. Scrolls the message display to the next message. Holding down the pushbutton causes the display to continuously scroll down through next messages until the button is released.
- ◆ **INITIATE**. Initiates an action based on the operational state of the *KIV-7*.
  - ◇ **OFF-LINE**. Displayed function or configuration setting is selected.
  - ◇ **ON-LINE**. Cryptographic resynchronization is initiated (when the operational status message is displayed), or the displayed on-line function (such as transfer V-to-X) is selected. If the operational mode is SIMPLEX INTERNAL, the INITIATE pushbutton controls the channel direction, toggling between receive and transmit.
  - ◇ **REMOTE (slave)**. Toggles between local and remote operation.
  - ◇ **REMOTE (master)**. Requests status update from addressed slave.
  - ◇ **ANY STATE**. When depressed simultaneously with the ZEROIZE pushbutton, zeroizes ALL internally stored keys.

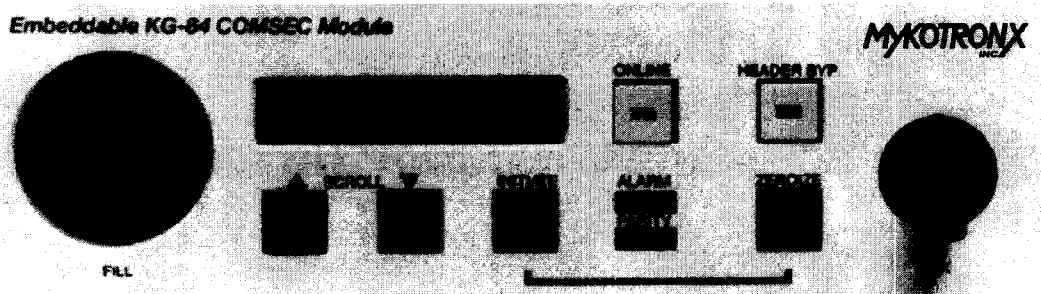


Figure 4-1: *KIV-7* Controls and Indicators

- ◆ **ONLINE.** Toggles the *KIV-7* between on-line secure data communication and off-line non-communicating state. If pressed during Header Bypass, pre-empts header bypass and initiates on-line secure data communication.
- ◆ **HEADER BYP.** Initiates Header Bypass from the off-line state; ignored otherwise. Header Bypass terminates when preempted using the **ONLINE** pushbutton, or automatically when the header bypass limit is reached.
- ◆ **ZEROIZE.** Zeroizes ALL internally stored keys when depressed simultaneously with the **INITIATE** pushbutton.

## 4.2 Indicators

Four LED indicators, an eight-character alphanumeric message display, and an audible alert provide prompts and status information. Display messages are defined in Chapter 11.

- ◆ **ALARM.** Red LED:
  - ◆ **ON:** A cryptographic alarm is present, the CIK is not valid or inserted properly, or all internally stored keys are zeroized.
  - ◆ **BLINK:** Alarm check is in progress.
- ◆ **PARITY.** Red LED:
  - ◆ **ON:** A key parity error is present, or one of the alarm conditions (above) is present.
  - ◆ **BLINK:** Key parity check is successful.
- ◆ **ONLINE.** Yellow LED:
  - ◆ **ON:** Synchronization is complete and the unit is in the secure data communication state.
  - ◆ **FLASHING:** Synchronization or resynchronization is in progress. At data rates greater than 1200 bps, flashing is not noticeable.
- ◆ **HEADER BYP.** Red LED:
  - ◆ **ON:** Header Bypass is in progress.
  - ◆ **BLINK:** Alarm check is in progress.
- ◆ **DISPLAY.** Yellow eight-character alphanumeric LED display which conveys operational prompts, configuration selections, status messages, and error messages. Message viewing and selection is accomplished using the **SCROLL** ▲, **SCROLL** ▼, and **INITIATE** pushbuttons. Display intensity—high, medium, and low—is selectable (refer to CONFIGURATION SETUP C menu in Chapter 11).

- ◆ **SPEAKER.** Audible alert:
  - ◇ **One Beep:** Inserted CIK is valid.
  - ◇ **Two Beeps:** Synchronization is achieved.
  - ◇ **Continuous Beeps:** Header bypass is in progress.
  - ◇ **Chirp:** Battery voltage is low.
  - ◇ **Click:** Front panel pushbutton switch is depressed.

Except for CIK validation, the speaker may be disabled (refer to CONFIGURATION SETUP C menu).

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### 4.3 Crypto-Ignition Key (CIK)

The CIK is a very important feature of the *KIV-7*. The CIK, like an automobile's ignition switch, permits access to the operational features of the *KIV-7*. When the CIK is removed, the unit is held reset and all front-panel controls and rear panel interfaces are locked out. In addition, the *KIV-7* may be treated as an UNCLASSIFIED CCI as long as the CIK is removed and not collocated with the *KIV-7*. When the CIK is inserted or collocated, the *KIV-7* is classified at the level of the highest stored key. Refer to Chapter 2 for specific security considerations and procedures.

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### 4.4 CIK Receptacle

The CIK receptacle, like a car's ignition switch, accepts the key-shaped CIK. To insert the CIK, slide its narrow end fully into the receptacle, and turn clockwise 90 degrees (until it stops). To remove the CIK, turn it 90 degrees counterclockwise and pull it straight out of the receptacle.

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### 4.5 Fill Connector

The FILL connector permits connection of the *KIV-7* with DS-101 and DS-102 (Common Fill) compatible key fill devices, including:

- ◆ **KOI-18.** General Purpose Tape Reader with a DS-102 compatible interface. Reads eight-level punched tapes for loading both standard and tagged keys into the *KIV-7*, or for loading standard keys into the KYK-13 and KYX-15.
- ◆ **KYK-13.** Electronic Transfer Device with a DS-102 compatible interface. Stores up to six standard keys that may be transferred into the *KIV-7* or another fill device.

- ◆ **KYX-15.** Net Control Device with a DS-102 compatible interface. Stores up to sixteen standard keys that may be transferred into the *KIV-7* or another fill device. Also performs over-the-air rekeying (OTAR) control functions.
- ◆ **AN/CYZ-10.** Data Transfer Device with both DS-101 and DS-102 compatible interfaces. Stores a database of standard and/or tagged keys that may be transferred into the *KIV-7* using either the DS-101 or DS-102 interface. Standard keys may be transferred into Common Fill devices using the DS-102 interface.

**NOTE:** Refer to CONFIGURATION SETUP C in Chapter 11 for selecting DS-101 or DS-102 and for selecting standard or tagged key formats.

An appropriate interface cable must be used when connecting a fill device to the recessed FILL connector on the *KIV-7* front panel. To attach the cable, align the flat portion of the cable connector with the red dot (top) of the panel connector, push the cable into the connector, and rotate clockwise until it locks.



**Introduction**

The *KIV-7* offers the versatility to operate with a wide variety of data terminal devices and data communication systems. This chapter provides easy-to-follow instructions for configuring and operating your *KIV-7*. Familiarity with the *KIV-7* controls and indicators (Chapter 4) and display messages (Chapter 11) is necessary. Review these chapters before proceeding.

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**5.1 Getting Started**

After unpacking, initial setup, and installation of your *KIV-7*, follow these instructions to get started:

**1. Apply Power.**

Turn on the external power source (desktop configuration), host computer (embedded configuration), or rack power source (rack configuration).

**2. Insert CIK.**

At cold start or after zeroization, the *KIV-7* automatically initializes the inserted CIK. Thereafter, it checks for a valid CIK and prompts for a valid CIK if one is not inserted.

**3. Observe Self-Test.**

Each time the unit is powered on and the CIK is inserted, a comprehensive series of self-tests is automatically performed. Observe the test identifier and test result messages. If self-test is unsuccessful, zeroize the *KIV-7* by depressing the front panel INITIATE and ZEROIZE pushbuttons simultaneously. Return the unit for factory service (refer to Chapter 8, Warranty and Service).

**4. Configure Settings.**

The *KIV-7* is pre-programmed with default configuration settings, which may be changed to accommodate user-specific requirements. Up to three user-defined settings may be stored and recalled. For configuration programming instructions, refer to paragraph 5.3.

**5. Load and manage keys.**

At cold start, after zeroization, or at crypto-period expiration, operational TEKs and KEKs must be loaded in order to perform secure communication functions. Once loaded, keys may be selected for on-line operation, updated, and zeroized upon operator command. For key management instructions, refer to paragraph 5.4.

**6. Communicate data securely.**

After the *KIV-7* is configured and keys have been loaded, initiate secure communication by pressing the ONLINE pushbutton. For specific instructions and special on-line features, refer to paragraph 5.5.

**7. When you're done...**

When you finish communicating with the *KIV-7*, remove the CIK and turn

off the primary power. Remember, to retain the loaded keys, the battery must be good (see Chapter 6.3 for battery replacement instructions). To protect the loaded keys, never leave the CIK engaged or collocated with the *KIV-7*. Refer to Chapter 2 for CIK handling and general security guidance.

## 5.2 Self-Test

In addition to the tests automatically performed at power-up, the *KIV-7* provides the following self-test functions that may be initiated by the operator when the unit is off-line.

- [=TestAll]** Test All is equivalent to the tests performed when primary power is applied. It includes Alarm, Battery, Lamp, Memory and Internal Loop tests.
- [=AlarmTst]** Alarm Test performs a comprehensive check of all internal alarm monitors. The operator must verify that the ALARM and HEADER BYP indicators light (blink) during this test.
- [=Battst]** Battery Test checks the key retention battery. If the [Low Batt] message is displayed, replace the battery as described in paragraph 6.3.
- [=LampTst]** Lamp Test checks the message display circuitry. During the test, the message display, and the PARITY and ONLINE indicators (if good) will light momentarily. (The Alarm Test verifies the HEADER BYP and ALARM indicators.)
- [=Mem Tst]** Memory Test performs a comprehensive and non-destructive test of all internal memory devices, including RAM, ROM, and EEPROM.
- [=IntLoop]** Internal Loop test performs a comprehensive test of internal data paths, including the key generator. The currently selected key must be loaded and valid to perform this test. Refer to paragraph 5.4 for instructions on loading and selecting keys.
- [=ExtLoop]** External Loop may be used to troubleshoot external connections. When selected, the ciphertext input (RXDCT) is looped back through the *KIV-7* modulator/demodulator to the ciphertext output (TXDCT), and the plaintext input (TXDPT) is looped back through the *KIV-7* key generator to the plaintext output (RXDPT). Input signal CTDM (J2-6,22) must be held in the ON condition, and the currently selected key must be loaded and valid to perform this test. Refer to paragraph 0 for instructions on loading and selecting keys.

### 5.2.1 Test Procedure

Use the following basic procedure to initiate the tests described above:

1. The *KIV-7* must be off-line
2. SCROLL to [-TEST ] and press INITIATE

3. SCROLL to the desired test and press INITIATE
4. Observe the test status message. For External Loop only, press INITIATE to exit loopback mode
5. Repeat steps 3-4 to perform other tests
6. SCROLL to [=Return ] and press INITIATE to exit test menu

**NOTE:** Except for [=BattTst] and [=ExtLoop], a test failure results in an alarm condition; the ALARM indicator is lit and an appropriate error message is displayed.

### 5.3 Configuration Programming

The various configuration options are programmed via the SETUP A, SETUP B, and SETUP C menus (refer to Chapter 11). Options must be carefully selected to satisfy system requirements in terms of overhead, communication channel characteristics, and external interface requirements. In addition, the selected configuration must be operator coordinated with the distant ends of each link on which the *KIV-7* communicates. Important operating guidelines are summarized in paragraph 5.7.

The following is a summary of functions available for programming and managing the configuration of your *KIV-7*:

- [-SETUP A]** Use this menu to select Data Clock Options, Synchronization Mode, Communication Mode, Data Modulation, Data Length, Transmit and Receive Data Rates, Teletype Mode, and Interface Control.
- [-SETUP B]** Use this menu to select Plaintext and Ciphertext Data Inversion, Transmit and Receive Clock Gating, Synchronous Out-of-Sync Detection, Idle Options, Autophasing Options, and Update Options.
- [-SETUP C]** Use this menu to select the Plaintext and Ciphertext Electrical Interfaces, Fill Interface and Key Format, DS-101 Fill Address, Remote Control Address, Display Intensity, and Speaker Operation.  
 △ **WARNING:** The electrical interfaces must be compatible with attached devices and must be programmed prior to on-line operation. Operating the unit with incorrect settings can cause permanent damage to the *KIV-7*, an ancillary device, or both.
- [-SETmgmt]** Use this menu to manage user-defined configurations. Up to three different configurations may be stored and later recalled. At power up, the *KIV-7* is configured using the settings last stored or recalled prior to power off.

The following paragraphs provide step-by-step instructions for programming and managing the *KIV-7* configuration options. See Table 11-1 on page 11-1 (Slave) and Table 11-2 on page 11-5 (Master) and Chapter 13 for programming options.

### 5.3.1 Programming Setups

Use the following procedures to program configuration options:

1. The *KIV-7* must be off-line

2. SCROLL to [-SETUP A], [-SETUP B], or [-SETUP C] and press INITIATE

3. SCROLL to the desired setup sub-menu and press INITIATE

4. SCROLL to the desired option and press INITIATE to select. The currently selected option is highlighted on the display panel

5. SCROLL to [=Return] and press INITIATE to exit the sub-menu

6. Repeat steps 3-5 to select other options within the same setup menu

7. SCROLL to [=Return] and press INITIATE to exit setup menu

8. Repeat steps 2-7 for other setup menus

**NOTE:** The programmed configuration may be saved using the STORE function described in paragraph 5.3.2. If STORE is not used, programming is lost when primary power is removed.

### 5.3.2 Storing Setups

Use the following procedure to store programmed configuration options:

1. The *KIV-7* must be off-line

2. SCROLL to [-SETMgmt] and press INITIATE

3. SCROLL to [=STORE] and press INITIATE store menu

4. SCROLL to the desired storage location (1, 2, or 3) and press INITIATE

5. Observe the status message

6. SCROLL to [=Return] and press INITIATE to exit store menu

7. SCROLL to [=Return] and press INITIATE to exit setup management menu

**NOTE 1:** The selected storage location becomes the default until another STORE or RECALL operation is initiated.

**NOTE 2:** The currently selected TEK is stored along with the programmed configuration. Refer to paragraph 5.4.2 for instructions on selecting a TEK.

### 5.3.3 Recalling Setups

Use the following procedure to recall the factory default (location 0) or user-defined (locations 1-3) configuration options:

1. The *KIV-7* must be off-line

2. SCROLL to [-SETMgmt] and press INITIATE

3. SCROLL to [=RECALL] and press INITIATE

4. SCROLL to the desired storage location (0, 1, 2, or 3) and press INITIATE
5. Observe the status message
6. SCROLL to [=Return] and press INITIATE to exit recall menu
7. SCROLL to [=Return] and press INITIATE to exit setup management menu

**NOTE:** The recalled storage location becomes the default until another STORE or RECALL operation is initiated.

### 5.3.4 Viewing Setups

When the *KIV-7* is either off-line or on-line, use the following procedure to quickly review the current configuration options:

◆ **When the *KIV-7* is off-line:**

1. SCROLL to [-SETmgmt] and press INITIATE
2. SCROLL to [=VIEWset] and press INITIATE
3. SCROLL to desired configuration option and press INITIATE to view current setting, which is flashed momentarily on the display. The display then auto-increments to the next configuration option. Repeat this step to view other settings.
4. SCROLL to [»Return] and press INITIATE to exit View menu
5. SCROLL to [=Return] and press INITIATE to exit Setup Management menu

◆ **When the *KIV-7* is on-line:**

1. SCROLL to [-VIEWset] and press INITIATE
2. SCROLL to desired configuration option and press INITIATE to view current setting, which is flashed momentarily on the display. The display then auto-increments to the next configuration option. Repeat this step to view other settings.
3. SCROLL to [»Return] and press INITIATE to exit View menu

**NOTE:** When the *KIV-7* is on-line, secure communication is not interrupted when viewing the setup.

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## 5.4 Key Management

The *KIV-7* provides sophisticated functions for managing operational TEKs and KEKs. These functions must be used carefully to ensure continued communication capability. In addition, key management functions must be operator coordinated with distant ends of each link on which the *KIV-7* communicates.

Specific key management functions may be performed when the *KIV-7* is off-line and when on-line. The following paragraphs provide step-by-step instructions for each of the key management functions:

### 5.4.1 Loading Keys [—LOAD]

Before loading keys, refer to the user's manual associated with your fill device for specific instructions on the use and operation of the device. Use the following basic procedure to load TEKs and KEKs into the *KIV-7*:

1. The *KIV-7* must be off-line
2. Attach the fill device using an appropriate cable. Turn on the device
3. SCROLL to [—LOAD ] and press INITIATE
4. On the fill device, select the key to be transferred. If using a KOI-18, insert the paper tape leader into the reader
5. SCROLL to the desired key location and press INITIATE to perform the transfer. If using a KOI-18, pull the paper tape through the reader now
6. Observe the status message and PARITY indicator, as well as any indicators on the fill device
7. Repeat steps 4-6 if the load was unsuccessful or if additional key locations are to be loaded
8. SCROLL to [=Return ] and press INITIATE to exit

**NOTE 1:** The fill device and key format must be compatible with the *KIV-7* fill interface and key format options programmed via SETUP C. Refer to paragraph 5.3.1 for instructions on programming setups.

**NOTE 2:** The Remote Control TEK (XRC) and KEK (W) are supplied in tagged format only. When loading these keys, the *KIV-7* automatically adjusts for tagged format even if standard format is currently programmed via SETUP C.

In addition to the basic procedure above, the *KIV-7* also provides a simplified and automated load capability when using a Data Transfer Device (DTD) configured for DS-101 operation. This feature permits a TEK to be loaded into the *KIV-7*'s temporary V location without using the load menu. Use the following procedure to perform the auto-load:

1. The *KIV-7* must be off-line
2. Attach a DTD using an appropriate cable. Turn on the device
3. On the DTD, select the TEK to be transferred. The 16-character text identifier field of the selected TEK must conform to the following format:

KIV7 \_\_\_\_\_1A  
(10 spaces)

4. Transfer the TEK from the DTD and observe the transfer status on the DTD display

5. If the transfer is successful, the *KIV-7* automatically loads the TEK into its V location
6. On the *KIV-7*, transfer the TEK in V to an X location as appropriate (such as crypto-period rollover) using the transfer V→X function described in paragraph 5.4.3

**NOTE 1:** The fill device and key format must be compatible with the *KIV-7* fill interface and key format options programmed via SETUP C. Refer to paragraph 5.3.1 for instructions on programming setups.

**NOTE 2:** Only TEKs can be loaded using this procedure. The Terminal Unique KEK (U), Remote Control TEK (XRC), and Remote Control KEK (W) cannot be loaded using this procedure.

#### 5.4.2 Selecting Keys [-SEL KEY]

When the *KIV-7* is either off-line or on-line, use the following procedure to select a TEK for secure on-line operation:

◆ **When the *KIV-7* is off-line:**

1. SCROLL to [-SEL KEY] and press INITIATE
2. SCROLL to the desired TEK location and press INITIATE to select. The currently selected TEK is highlighted on the display panel
3. Observe the status message and PARITY indicator
4. If the selected TEK is not loaded or not valid, the PARITY indicator remains lit. Another TEK must be selected or a valid TEK must be loaded into the selected location prior to initiating on-line operation.
5. SCROLL to [=Return ] and press INITIATE to exit key select menu

◆ **When the *KIV-7* is on-line:**

1. SCROLL to [-SEL KEY] and press INITIATE
2. SCROLL to the desired TEK location and press INITIATE to select. The currently selected TEK is highlighted on the message display
3. Observe the status message and PARITY indicator
  - a. If the selected TEK is not loaded or not valid, the PARITY indicator remains lit and the *KIV-7* goes off-line. Another TEK must be selected or a valid TEK must be loaded into the selected location prior to re-initiating on-line operation.
  - b. If the selected TEK is loaded and valid, the *KIV-7* automatically attempts to synchronize in the new key
4. SCROLL to [=Return ] and press INITIATE to exit key select menu

**NOTE:** When storing setups, the currently selected TEK is stored along with the programmed configuration. Refer to paragraph 5.3.2 for instructions on storing setups.

### 5.4.3 Transfer V-to-X [-XFR V →X]

The temporary V location may contain a TEK as the result of a load or over-the-air rekey (OTAR) operation. When the *KIV-7* is either off-line or on-line, use the following procedure to transfer a TEK from the V location to an X location:

◆ **When the *KIV-7* is off-line:**

1. SCROLL to [-XFR V →X] and press INITIATE
2. SCROLL to the desired TEK location and press INITIATE to perform the transfer
3. Observe the status message and PARITY indicator
4. If the V location is not loaded or not valid, PARITY indicator remains lit. This operation cannot be performed
5. SCROLL to [=Return] and press INITIATE to exit transfer V →X menu

◆ **When the *KIV-7* is on-line:**

1. SCROLL to [-XFR V →X] and press INITIATE
2. SCROLL to the desired TEK location and press INITIATE to perform the transfer
3. Observe the status message and PARITY indicator
  - a. If the V location is not loaded or not valid, the *KIV-7* automatically attempts to resynchronize in the currently selected TEK location.
  - b. If the TEK in V is transferred to the currently selected TEK location, the *KIV-7* automatically attempts to synchronize in the transferred key.
  4. If the TEK in V is not transferred to the currently selected TEK location, then the *KIV-7* automatically attempts to resynchronize in the currently selected TEK. The transferred TEK may be selected using the select key function

**NOTE:** The V location is automatically zeroized after the transfer.

### 5.4.4 Updating Keys [-VU/cnt]

Use the following procedure to view the update count of keys and to update keys as prescribed:

1. The *KIV-7* must be off-line
2. SCROLL to [-VU/cnt] and press INITIATE
3. SCROLL to the desired key location (see Note 1 regarding Change Z)
4. Observe the current update count, which ranges from 00 to 99. If a key is not loaded or valid, ## is displayed



5. To update the displayed key location, press INITIATE. See Notes 2 and 3
6. SCROLL to [=ABORT ] and press INITIATE to cancel update **OR** SCROLL to [=CONFIRM] and press INITIATE to perform update
7. Observe the update count
8. Repeat steps 5-7 to update the same key again. Repeat steps 3-7 to update other keys
9. SCROLL to [=Return] and press INITIATE to exit update menu

**NOTE 1:** When instructed by your security official or local operating doctrine, use the [=CHANGE z] sub-menu to replace the Terminal Unique Local KEK (Z key). As with updating, the option to abort or confirm this operation is provided. Once initiated, do not cycle power or remove the CIK; otherwise all previously loaded keys will be lost.

**NOTE 2:** Update is an irreversible operation. Exercise caution and coordinate with the far-end operator when updating keys.

**NOTE 3:** The update count for the Terminal Unique KEK (U) and the Remote Control KEK (W) may be viewed; however, they cannot be updated using this procedure.

#### 5.4.5 Zeroizing Keys [-ZEROIZE]

**In the event of an emergency situation, CIK failure, or fatal error, use the following procedure to zeroize ALL keys loaded in the KIV-7:**

1. Simultaneously press the front panel ZEROIZE and INITIATE pushbuttons **OR** on the rear panel RED I/O connector (J3), connect the RMTZERO-N signal (J3-37) to SIG GND (J3-27) for a minimum of 20 microseconds
2. Observe the status message. ALARM and PARITY indicators are lit

**Use the following procedure to zeroize all keys in a non-emergency situation or to zeroize selective key locations:**

◆ **To zeroize all keys:**

1. The KIV-7 must be off-line
2. SCROLL to [-ZEROIZE ] and press INITIATE
3. SCROLL to [=ZeroAll] and press INITIATE
4. SCROLL to [= ABORT ] and press INITIATE to cancel zeroize **OR** SCROLL to [= CONFIRM] and press INITIATE to perform zeroize
  - a. If abort is selected, SCROLL TO [=Return] and press INITIATE to exit zeroize menu
  - b. If confirm is selected, observe the status message. ALARM and PARITY indicators are lit (see Note below)

◆ To zeroize selective keys:

1. The *KIV-7* must be off-line
  2. SCROLL to [-ZEROIZE ] and press INITIATE
  3. SCROLL to desired key location and press INITIATE to zeroize
  4. Observe status message
  5. Repeat steps 3-4 to zeroize other key locations
  6. SCROLL to [=Return ] and press INITIATE to exit zeroize menu
- NOTE:** To clear the alarm condition, cycle power or remove and re-insert the CIR. New TEKS and KEKS must be loaded prior to on-line operation.

### 5.4.6 Transmit Rekey [-TXrekey]

When the *KIV-7* is on-line, use the following procedure to transmit a TEK stored in the *KIV-7* to a distant unit:

**NOTE:** Over-the-air rekey operations are not possible when the *KIV-7* is programmed for ACT1, ACT2, HF, or EXTERNAL synchronization modes.)

1. The *KIV-7* must be on-line, in the Full Duplex (FDX) communication mode, and in sync with the distant unit
2. SCROLL to [-TXrekey] and press INITIATE
3. SCROLL to the desired key location and press INITIATE to send OR SCROLL to [=Return ] and press INITIATE to cancel
4. Observe the status message
5. When the operation is complete (either successfully or unsuccessfully), the *KIV-7* automatically attempts to resynchronize in the currently selected TEK (not the TEK sent)
6. If necessary to re-establish communication, use the key select function to select and resynchronize in the TEK sent. Refer to paragraph 5.4.2 for instructions on selecting a TEK

**NOTE 1:** To perform this operation, the Terminal Unique Key KEK (U) must be loaded, valid, and the same in both the local and distant units. If not loaded or not valid in either unit, the local unit indicates failure of the operation and attempts to resynchronize in its currently selected TEK.

**NOTE 2:** For cooperative rekey, the distant unit must first initiate the receive rekey function, as described in paragraph 5.4.7. For non-cooperative rekey, the locally selected TEK of the distant unit is overwritten with the TEK sent by the local unit.

Transmit rekey (AK and MK) operations may also be performed using a KYX-15 Net Control Device (NCD) or by using the NCD function of the Data Transfer Device (DTD). Please refer to the user's manuals of these devices for specific instructions on the use and operation of rekey modes.

### 5.4.7 Receive Rekey [-Rxrekey]

When the *KIV-7* is on-line, use the following procedure to cooperatively receive a TEK from a distant unit and store the TEK in a selected X location:

**NOTE:** Over-the-air rekey operations are not possible when the *KIV-7* is programmed for ACT1, ACT2, HF, or EXTERNAL synchronization modes.

1. The *KIV-7* must be on-line, in a receive mode, and in sync with the distant unit
2. SCROLL to [-RXrekey] and press INITIATE
3. SCROLL to the desired key location and press INITIATE to receive **OR** SCROLL to [=Return ] and press INITIATE to cancel
4. Observe the status message
5. When the key is received from the distant unit, the local *KIV-7* automatically enters the sync search state using the currently selected TEK
6. If necessary to re-establish communication, use the key select function to select the TEK received. Refer to paragraph 5.4.2 for instructions on selecting a TEK

**NOTE:** To perform this operation, the Terminal Unique Key KEK (U) must be loaded, valid, and the same in both the local and distant units. If not loaded or not valid in either unit, the local unit indicates failure of the operation and enters the sync search state using its currently selected TEK.

Receive Rekey (RV) operations may also be performed using a KYX-15 Net Control Device (NCD) or by using the NCD function of the Data Transfer Device (DTD). Please refer to the user's manuals of these devices for specific instructions on the use and operation of Rekey modes.

## 5.5 On-Line Operation

Once configuration programming is complete and operational keys are loaded, your *KIV-7* is ready for on-line operation. As described previously in Chapter 4, the ONLINE pushbutton initiates secure data communication, and the HEADER BYP pushbutton initiates the limited bypass of header information (that is, modem programming characters) prior to secure on-line operation.

When the *KIV-7* is on-line, operational status messages are displayed and on-line setup and key management functions may be initiated. The following is a summary of on-line status and function tests:

- [sssss TR]** This operational status message indicates the communication mode (sssss) and transmit/receive state.
- [Xmm:nnn]** This TEK status message indicates the currently selected TEK (Xmm) and its update count (nnn).
- [-SEL KEY]** Use this menu to select a new operational TEK and automatically resynchronize in the new key. Refer to paragraph 5.3.1 for step-

by-step instructions.

**[XFR V → X]**

If a future TEK is loaded into the temporary V location prior to going on-line, use this menu to transfer that key to an X location and automatically resynchronize. Refer to paragraph 5.4.3 for step-by-step instructions.

**[TXrekey]**

Use this menu to transmit a new TEK to a distant unit without using a KYX-15 NCD. Refer to paragraph 5.4.6 for step-by-step instructions.

**[RXrekey]**

Use this menu to receive a new TEK from a distant unit via cooperative over-the-air rekey and store it in a selected X location. Refer to paragraph 5.4.7 for step-by-step instructions.

**[VIEWset]**

Use this menu to view the current configuration programming. Refer to paragraph 5.3.4 for step-by-step instructions.

The following paragraphs provide step-by-step instructions for initiating secure on-line operation, header bypass operation, and resynchronization.

**5.5.1**

**Secure On-line Operation**

Secure on-line operation may be initiated using either the front panel ONLINE pushbutton or the rear panel remote operate (RMTOPEP-R) signal. Timing for the remote operate signal is illustrated in Figure 5-1. Upon power up, the *KIV-7* automatically attempts to re-initiate secure on-line operation if the unit was in the on-line state prior to power off. In the event of a power failure, this feature ensures that the *KIV-7* returns to the on-line state without operator intervention. Note that a good key retention battery must be installed.

Use the following procedure to initiate secure on-line operation:

1. Press ONLINE on the front panel **OR** Toggle the RMTOPEP-R signal (J3-35) on the rear panel (see Figure 5-1)
2. Observe the ALARM and PARITY indicators blink momentarily
3. Observe the ONLINE indicator flash, which indicates that synchronization is in progress. At data rates greater than 1200 bps, flashing may not be noticeable. See Notes 1 and 2
4. When synchronization is achieved, the ONLINE indicator remains lit, and the speaker (if enabled) beeps twice
5. Observe the operational status message, which indicates the communication mode and transmit/receive state. The "T" and/or "R" characters indicate that the *KIV-7* is ready to transmit and/or receive data, respectively. See Note 3
6. Communicate data securely. Use the SCROLL and INITIATE pushbuttons to view and select on-line status and functions.
7. To end secure data communication and return off-line, press ONLINE on the front panel **OR** toggle the RMTOPEP-R signal (J3-35) on the rear panel (see Figure 5-1)

**NOTE:** The *KIV-7*'s response depends upon the operation for which it is programmed:

- ◆ **If the *KIV-7* is programmed for full duplex operation,** the ONLINE indicator flashes until synchronization is received from the far-end unit. If synchronization is not received within 6400 baud rate periods plus 30 seconds, the *KIV-7* re-initiates the synchronization process.
- ◆ **If the *KIV-7* is programmed for receive-only or simplex operation,** the ONLINE indicator flashes until synchronization is received from the far-end unit.
- ◆ **If the *KIV-7* is programmed for simplex operation,** the initial on-line state is received. If simplex internal operation is selected, use the INITIATE pushbutton to toggle between receive and transmit. If simplex external operation is selected, use signal PTRS (J3-4, 19) to toggle between receive and transmit.

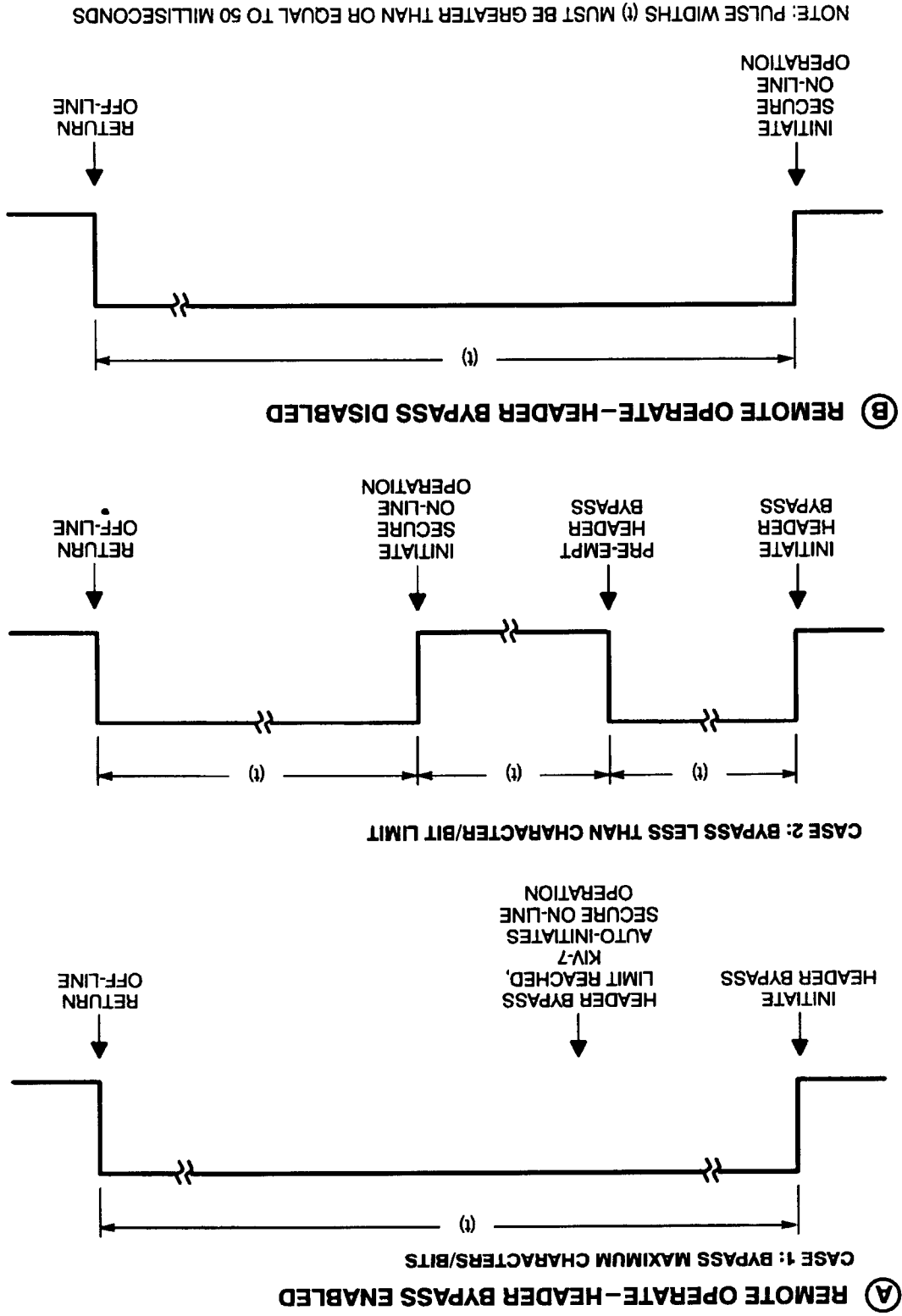
### 5.5.2 Header Bypass

Prior to secure on-line operation, a limited amount of plaintext header information may be bypassed through the *KIV-7* without encryption. This information may include configuration or setup parameters communicated between a terminal (a computer) and a communications device (modem). Table 5-1 summarizes the header bypass limits based on the data length programmed via SETUP A.

**NOTE:** The Header Bypass feature may be enabled or disabled via an internal hardware strap, which is preset at the factory and noted on the equipment label. Do not open the *KIV-7* to change this strap. Opening the *KIV-7* will void the warranty. Contact Mykotronx *KIV-7* Customer Service. Refer to Chapter 8 for additional information on warranty, shipping, and service.

DATA LENGTH (SETUP A)	HEADER BYPASS LIMIT
SYNCH/S	512 bits, synchronous
SYNCH/A	64 characters, asynchronous 10-bit
7-bit	64 characters, asynchronous 7-bit
8-bit	64 characters, asynchronous 8-bit
10-bit	64 characters, asynchronous 10-bit
11-bit	64 characters, asynchronous 11-bit

Figure 5-1: Remote Operate Signal Timing



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## FOR OFFICIAL USE ONLY

Header Bypass may be initiated using either the front panel HEADER BYP pushbutton or the rear panel remote operate (RMTOOPER-P) signal. Timing for the remote operate signal is shown in Figure 5-1.

Use the following procedure to initiate header bypass prior to secure on-line operation:

1. Press HEADER BYP on the front panel **OR** toggle the RMTOOPER-P signal (J3-35) on the rear panel (see Figure 5-1)
2. Observe the ALARM, PARITY, and HEADER BYP indicators blink momentarily
3. Observe the [\*Bypass\*] message. The HEADER BYP indicator remains on, which indicates that header bypass is in progress. The speaker, if enabled, beeps continuously
4. Transmit and/or receive plaintext header information in accordance with limits in Table 5-1
5. Compare plaintext header information transmitted to the header bypass limit.
  - a. If the plaintext header information transmitted equals the header bypass limit, the *KIV-7* automatically initiates secure on-line operation when the limit is reached.
  - b. If the plaintext header information transmitted is less than the header bypass limit, press ONLINE on the front panel **OR** Toggle the RMTOOPER-P signal (J3-35) on the rear panel to initiate secure on-line operation (see Figure 5-1)
6. Refer to paragraph 5.5.1, steps 2 to 7, for secure on-line operating instructions

**NOTE:** Header bypass may be initiated only from the off-line state and prior to secure on-line operation. Once secure on-line operation is initiated, header bypass cannot be re-initiated until the *KIV-7* returns to the off-line state.

### 5.5.3 Resynchronization

When the *KIV-7* is on-line, the transmit and/or receive channels may be resynchronized using either the front panel INITIATE pushbutton or the rear panel synchronize transmit (SYNCTX-P) and synchronize receive (SYNCRX-P) signals. Table 5-2 summarizes the resynchronization options based on the communication mode programmed via SETUP A.

Resynchronization of the *KIV-7* is identical to initial on-line synchronization. Refer to paragraph 5.5.1, steps 2 through 7, for step-by-step instructions to follow after initiating resynchronization.

## 5.6 Remote Operation

The KIV-7 may be controlled and monitored via its rear panel remote control interface (J4). This interface provides a dedicated port for secure communication of commands and status between a KIV-7 configured as a remote master and up to thirty KIV-7's configured as remote slaves. Alternatively, this port may be used for the communication of limited commands between a terminal and up to thirty KIV-7s configured as remote slaves.

**NOTE:** Internal strapping for master or slave configuration is preset at the factory and noted on the equipment label. Do not open the KIV-7 to change these straps. Opening the KIV-7 will void the warranty. Contact Mykotronx KIV-7 Systems Customer Service. Refer to Chapter 8 for additional information on warranty, shipping, and service.

The remote control interface meets the electrical specifications of RS-485 and operates at a fixed data rate of 9.6 kbps. The interface may be connected to a local multi-point bus or to a communications channel via a compatible modem.

The following paragraphs provide step-by-step instructions for remote KIV-7 operation.

Table 5-2: Resynchronization Options

Communication Mode (SETUP A)	Front Panel INITIALIZE	Rear Panel SYNCX-P (J3-31)	Rear Panel SYNCRX-P (J3-33)
Full Duplex	End-around synchronization of both transmit and receive channels	End-around synchronization of both transmit and received channels	Not Valid
Full Duplex Independent	Transmit channel sends synchronization	Transmit channel sends synchronization	Receive channel waits for synchronization from far-end unit
Transmit-only	Receive channel waits for synchronization	Transmit channel sends synchronization	Not Valid
Receive-only	Receive channel waits for synchronization from far-end unit	Not Valid	Receive channel waits for synchronization from far-end unit
Simplex 2-wire or Simplex 4-wire (Internal)	If in transmit, toggle to receive and wait for synchronization If in receive, toggle to transmit and send synchronization	If in transmit, transmit channel sends a synchronization If in receive, Not Valid	If in transmit, Not Valid If in receive, receive channel waits for synchronization from far-end unit
Simplex2-wire or Simplex 4-wire (External)	If in transmit, transmit channel sends a synchronization If in receive, receive channel waits for synchronization from far-end unit	If in transmit, transmit channel sends a synchronization If in receive, Not Valid	If in transmit, Not Valid If in receive, receive channel waits for synchronization from far-end unit

Note: The minimum pulse width for SYNCX-P and SYNCRX-P is 20 microseconds.



### 5.6.1 Remote Master

When configured as a remote master, the *KIV-7* plaintext and ciphertext data interfaces (J2 and J3) are disabled and only the remote control interface is operational. The master *KIV-7* functions only as a secure remote control unit and cannot be used to encrypt or decrypt data.

All slave *KIV-7*s associated with the master must be configured for Standard remote operation as described in paragraph 5.6.2. The communication of commands and status between the master and slave is encrypted, and most off-line functions as well as secure on-line operation may be controlled by the master.

The Remote Control TEK (XRC) must be loaded into the master *KIV-7* prior to initiating remote operation. The Remote Control KEK (W) must also be loaded if remote key loading is desired. Refer to paragraph 5.4.1 for key loading instructions.

Use the following procedure to enable remote master operation:

1. The master *KIV-7* must be off-line initially
2. SCROLL to[-SETUP C] and press INITIATE
3. SCROLL to [=RCUaddr] and press INITIATE
4. SCROLL to desired slave address (1-30) or to all-points broadcast address (31) and press INITIATE to select. The currently selected address is highlighted on the message display
5. SCROLL to[ = Return] and press INITIATE to exit RCU address menu
6. SCROLL to [ = Return ] and press INITIATE to exit setup menu
7. SCROLL to [ - REMOTE ] and press INITIATE to establish communication with the addressed slave(s)
8. Consider whether individual slaves are addressed and in remote.
  - a. If an individual slave is addressed but it is not in remote, the master displays the [NoRemote] message and returns off-line. Go to step 2 to select another slave address
  - b. If an individual slave is addressed and in remote, it's current configuration is sent to the master
  - c. If all slaves are addressed (broadcast), the current configuration is the factory default
9. Control the slave(s) by initiating off-line functions, including configuration programming and key management. Refer to paragraphs 5.3 and 5.4 for step-by-step instructions
10. SCROLL to [-Remote ] and press INITIATE to terminate remote communication with the addressed slave(s) **OR**  
Press ONLINE to initiate secure on-line operation at the addressed slave(s) and then terminate remote communication

**NOTE 1:** If an individual slave is addressed, functions initiated at the master are performed only by the addressed slave; the resulting status is received from the slave and displayed. If the broadcast address is selected, functions initiated at the master are performed by all slaves; the resulting status is local-only confirmation that the master transmitted the remote command.

**NOTE 2:** If the master addresses a slave that is on-line, the slave automatically goes off-line to process the remote command. The master may re-initiate on-line operation.

## 5.6.2 Remote Slave

When configured as a remote slave, the *KIV-7* plaintext and ciphertext data interfaces (J2 and J3) function normally. The slave *KIV-7* is controlled locally via its front panel operator interface until the remote control interface is enabled by selecting either standard or limited remote operation.

The Standard selection is used to enable secure remote control by a master *KIV-7* as described in paragraph 5.6.1. In this mode, the communication of commands and status between the master and slave is encrypted, and most off-line functions as well as secure on-line operation may be controlled by the master. The Remote Control TEK (XRC) must be loaded into the slave *KIV-7* prior to initiating remote operation. The Remote Control KEK (W) must also be loaded if remote key loading is desired. Refer to paragraph 5.4.2 for key loading instructions.

The Limited selection enables remote control by a terminal device. In this mode, control of the slave *KIV-7* is limited to recalling either its factory default configuration or one of its three user-defined configurations. The limited remote message format is shown in Figure 5-2.

Use the following procedure to enable and disable remote slave operation:

1. The slave *KIV-7* must be off-line initially
2. SCROLL to [-SETUP C] and press INITIATE
3. SCROLL to [=RCUaddr] and press INITIATE
4. SCROLL to desired slave address (1-30) and press INITIATE to select. The currently selected address is highlighted on the display panel
5. SCROLL to [=Return ] and press INITIATE to exit RCU address menu
6. SCROLL to [=Return ] to exit setup menu
7. SCROLL to [-REMOTE] and press INITIATE
8. SCROLL to [=Standard] and press INITIATE to enable secure remote control by a master *KIV-7* **OR**  
SCROLL to [=Limited] and press INITIATE to enable limited control by a terminal device
9. The slave *KIV-7* is now under remote control
10. To exit remote operation and return to local control: press INITIATE (see Note 4)

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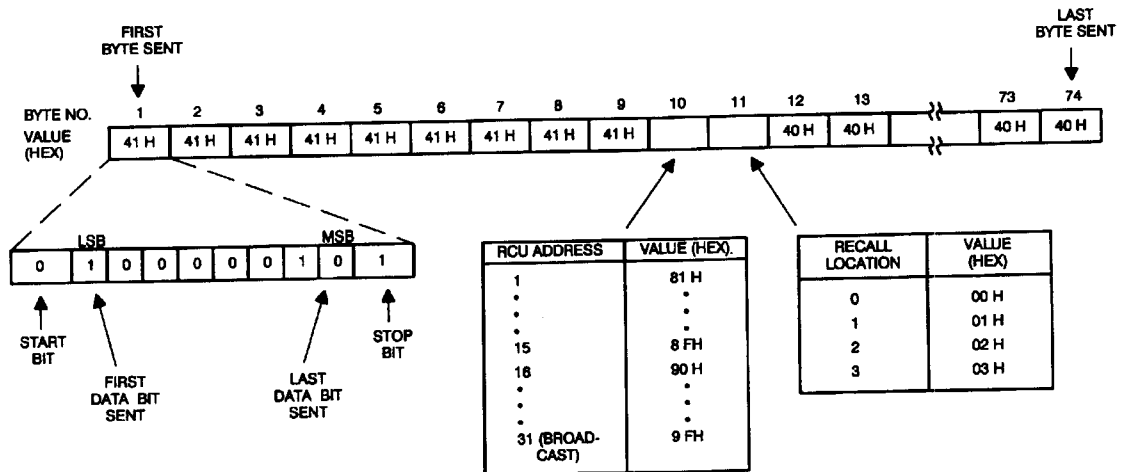
**NOTE 1:** Each slave *KIV-7* must have a unique address.

**NOTE 2:** If Standard remote operation is selected and the master *KIV-7* addresses a slave *KIV-7* that is on-line, the slave automatically goes off-line to process the remote command. The master may re-initiate on-line operation.

**NOTE 3:** If Limited remote operation is selected and the terminal addresses a slave *KIV-7* that is on-line, the slave ignores the command and remains on-line.

**NOTE 4:** Remote operation cannot be terminated if the slave *KIV-7* is currently addressed by the master *KIV-7*.

**GENERAL NOTE:** When a slave *KIV-7* is powered up, remote operation is automatically enabled or disabled based on the setting prior to power off. In the event of a power failure, this feature ensures that a slave *KIV-7* automatically returns to the remote state without operator intervention.



**NOTE 1:** All byte values are in hexadecimal

**NOTE 2:** Bytes 1-9 = Preamble characters which must contain 41 H  
 Byte 10 = RCU address as shown in the table above  
 Byte 11 = Recall location as shown in the table above  
 Bytes 12-74 = Postamble characters which must contain 40 H

**NOTE 3:** All 74 bytes must be transmitted to the slave

**Figure 5-2: Limited Remote Message Format**

## 5.7 Operating Guidelines

The following guidelines must be observed when configuring and operating the KIV-7:

### 5.7.1 Clock Modes (SETUP A)

Slave	Not recommended for Full Duplex Independent communication modes
Station	Not recommended for Full Duplex Independent communication modes The station clock source must be equal to one of the KIV-7 internal data rates
Terminal Timing 1	The terminal timing source must be equal to one of the KIV-7 internal data rates and accurate to within 117.5 ppm A receive clock must be provided via the ciphertext (BLACK) interface from an external clock source
Terminal Timing 2	A receive clock must be provided via the ciphertext (BLACK) interface from an external clock source (optional; MOD 4 required)
	(Contact Mykotronx for MOD4 customization.)

### 5.7.2 Synchronization Modes (SETUP A)

ACT1 and ACT2	Not recommended for Full Duplex communication modes In-band Over-the-Air Rekey (OTAR) is not supported
HF	In-band Over-the-Air Rekey (OTAR) is not supported
External	In-band Over-the-Air Rekey (OTAR) is not supported Communications device (modem) is responsible for clock recovery and frame synchronization

### 5.7.3 Communication Modes (SETUP A)

Full Duplex	Transmit and receive data rates must be equal
Full Duplex Indep	The receive plaintext output (RXDPT) is held in the MARK condition whenever the transmit channel is resynchronized
Simplex 2W and 4W	During simplex external operation, input signal PTRS must be held in the OFF condition until the KIV-7 is placed on-line

### 5.7.4 Transmit/Receive Data Rates (SETUP A)

External Clocks	If a 1-times data rate clock is supplied, only synchronous baseband data may be processed
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**5.7.5 Autophasing (SETUP B)**

Enabled Option	Autophasing is valid only when processing asynchronous data and simplex internal operation is selected
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**5.7.6 External Signals**

Remote Operate (J3-35)	Minimum pulse width is 50 milliseconds
Remote Zeroize (J3-37)	Minimum pulse width is 20 microseconds
Sync Receive (J3-33)	Minimum pulse width is 20 microseconds
Sync Transmit (J3-31)	Minimum pulse width is 20 microseconds



# 6

# Maintenance

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## Introduction

The *KIV-7* requires minimal care and maintenance. This chapter provides guidelines for general care, preventive maintenance, and battery replacement. Should problems arise with your *KIV-7*, consult the Troubleshooting Guide in Chapter 7.

---

## 6.1 General Care

The *KIV-7* should be treated with the care normally afforded any valuable piece of computer equipment.

- ◆ **Do** keep all surfaces clean using a damp, soft cloth. Exercise care when cleaning the message display lens.
  - ◆ **Do not** use abrasives or solvents, as these may mar surfaces.
  - ◆ **Do not** subject the unit to excessive temperature extremes.
  - ◆ **Do not** subject the unit to excessive moisture or spilled liquids.
  - ◆ **Do not** subject the unit to sudden and severe shocks.
  - ◆ **Never** operate the *KIV-7* with any of the covers removed or if the housing is damaged in any way.
- 

## 6.2 Preventive Maintenance

The following preventive maintenance actions should be performed periodically to keep your *KIV-7* in good working order:

- ◆ Check the operation of the unit by performing self-test.
  - ◆ Check the battery for leakage or swelling. If the battery needs to be replaced, refer to procedures in paragraph 6.3.
  - ◆ Check that all cables are correctly inserted and securely attached.
  - ◆ Check that all covers and connectors are securely attached to the housing.
- 

## 6.3 Battery Replacement

△ **WARNING:** Primary power must be applied during battery replacement in order to avoid loss of operational keys loaded in the *KIV-7*. If the battery is removed when primary power is turned off, all keys must be re-loaded and updated before communication can be re-established.

The *KIV-7* uses one 3.6 V lithium battery for key retention when primary power is removed. The battery is located in a compartment in the bottom cover of the

KIV-7, as shown in Figure 6-1. Replace the battery yearly using the following procedure:

1. Remove the KIV-7 unit to access the bottom cover. (To retain settings, keep the primary power on.)
2. Remove the two screws that hold the battery cover in place and remove the battery cover. DO NOT remove any other screws
3. Remove the old battery. Discard the battery in accordance with local disposal guidelines, in order to comply with environmental concerns. Do not short circuit, compact, mutilate, incinerate or otherwise damage the physical integrity of the battery
4. Clean the battery contacts inside the unit with a soft cloth and, if necessary, isotropic alcohol.
5. Install a fresh 3.6 V lithium battery (Saft LS-6 or equivalent), observing the polarity markings inside the KIV-7 battery compartment,
6. Re-install the battery cover using the two retaining screws
7. Re-install the KIV-7 unit in its original configuration

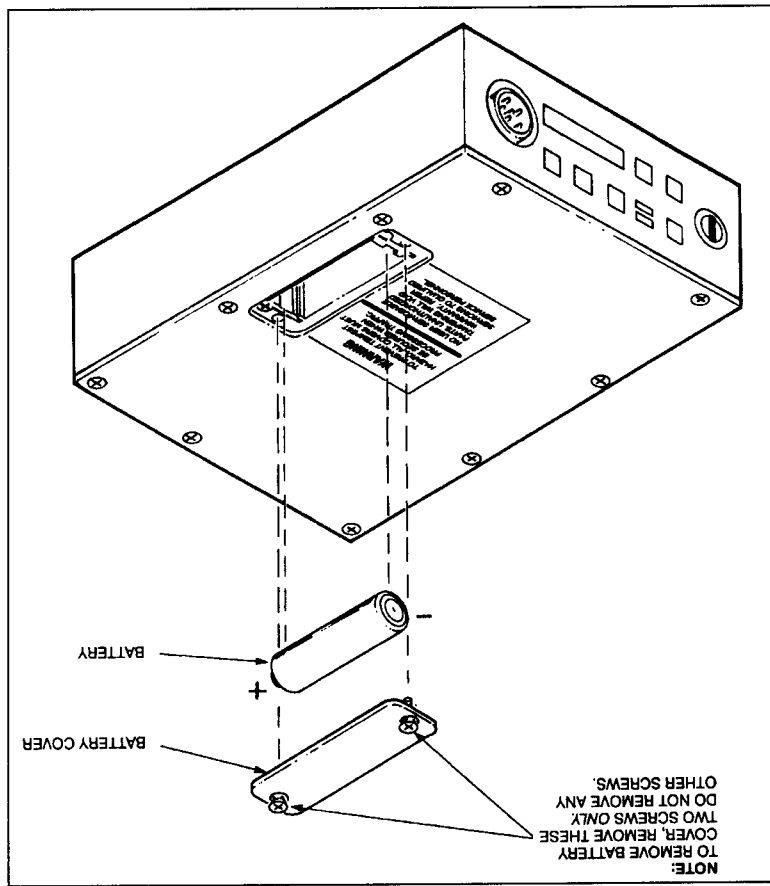


Figure 6-1: KIV-7 Battery Replacement



## Introduction

In general, problems encountered with the *KIV-7* result from:

- ◆ Faulty or improper interface connections,
- ◆ Incorrect configuration settings,
- ◆ Incorrect CIKs, or
- ◆ Operator error.

This chapter provides basic guidelines for identifying and resolving these problems.

If problems persist and the *KIV-7* does not operate exactly as described in this manual, the unit must be replaced. Servicing of the defective unit must be referred to qualified and authorized Mykotronx personnel. Any tampering or unauthorized modifications automatically void the warranty as well as the security integrity of the unit.

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## 7.1 General Guide

If a problem is encountered with the *KIV-7*, verify that all installation and operating steps have been performed in accordance with this manual. Then, use the following general guide to determine whether the fault can be corrected using simple measures:

- ◆ Check that primary 5 V dc power is applied and the power cable is firmly attached. If an external power supply is used, check that its connections are made properly.
- ◆ Check that the key retention battery is installed and is good.
- ◆ Check that all rear cables are firmly attached and correctly wired.
- ◆ Check that a valid CIK is inserted into the front panel receptacle.
- ◆ Initiate built-in test and check that all tests pass successfully.
- ◆ Check the operational settings of SETUP A, SETUP B, and SETUP C.
- ◆ Check that the selected fill interface and key format is appropriate for the fill device being used and for the keys being loaded.
- ◆ Check that operational TEKs and KEKs are loaded and valid. For remotely operated units, check that the remote control TEK and KEK are loaded and valid.
- ◆ Check that all keys are properly updated.
- ◆ Check that the data interfaces are configured to be compatible with the ancillary data terminal and data communications devices.

- ◆ Check that the ancillary data terminal and data communications devices are functioning properly and configured correctly (for example, modem programming).
- ◆ For remotely controlled units, check that the rear-panel remote control connector is firmly attached and correctly wired.
- ◆ For remotely controlled units, check to ensure that the proper *KIV-7*s are being used as the master and slaves. Master/slave strapping is preset at the factory and cannot be changed by the user without voiding the warranty.

## 7.2 Specific Guide

If a problem cannot be resolved using the general guide, the following guide identifies specific symptoms, offers possible causes, and suggests corrective actions:

### 7.2.1 No Power/Display and Indicators Not Lit

<b>POSSIBLE CAUSES</b>		<b>SUGGESTED CORRECTIVE ACTION</b>	
Power cable is not connected	Connect power cable		
Host power is not applied	Turn on power switch or circuit breaker		
DC voltage is out of range	Adjust voltage or replace power source		
CIK is not properly inserted	Properly insert valid CIK		
KIV-7 internal fuse is blown	Factory service required		

### 7.2.2 Parity and Alarm Indicators Always Lit

<b>POSSIBLE CAUSES</b>		<b>SUGGESTED CORRECTIVE ACTION</b>	
CIK not valid or properly inserted	Properly insert valid CIK		
Unit is zeroized	Cycle power or remove and re-insert CIK, then load operational keys.		
Unit is in alarm	Cycle power or remove and re-insert CIK; if alarm does not clear, notify cognizant security official		

### 7.2.3 Pushbuttons Do Not Respond

<b>POSSIBLE CAUSES</b>		<b>SUGGESTED CORRECTIVE ACTION</b>	
CIK not valid or properly inserted	Properly insert valid CIK		
Unit is zeroized	Cycle power or remove and re-insert CIK, then load operational keys.		
Unit is in alarm	Cycle power or remove and re-insert CIK; if alarm does not clear, notify cognizant security official		
Unit is in remote	Press INITIATE to return to local operation		

**7.2.4 Keys Zeroize when Power is Cycled**

<i>POSSIBLE CAUSES</i>	<i>SUGGESTED CORRECTIVE ACTION</i>
A chemical insulative layer internal to the battery may have formed while in storage	Install fresh battery or break down the insulative layer by placing a load on the battery for one or two minutes. This can be done by placing the battery in a 2 or 3 AA cell flashlight along with the other AA cells and turning on the flashlight. DO NOT directly short the battery.
Battery weak or not in place	Install a fresh battery.

**7.2.5 Key Cannot be Loaded from a DS-101 Fill Device (DTD)**

<i>POSSIBLE CAUSES</i>	<i>SUGGESTED CORRECTIVE ACTION</i>
DTD not connected properly	Connect fill cable
DTD batteries weak	Replace DTD batteries
Incorrect fill interface selected	Select correct interface using SETUP C
Incorrect fill address selected	Select correct address using SETUP C
DS-101 interface option not installed	Factory retrofit required

**7.2.6 Key Cannot be Loaded from a DS-102 Fill Device (DTD)**

<i>POSSIBLE CAUSES</i>	<i>SUGGESTED CORRECTIVE ACTION</i>
Fill device not connected properly	Connect fill cable
Fill device batteries weak	Replace fill device batteries
Incorrect fill interface selected	Select correct interface using SETUP C
IF KOI-18, tape not pulled completely	Re-initiate load and pull tape correctly

**7.2.7 Key Cannot be Updated**

<i>POSSIBLE CAUSES</i>	<i>SUGGESTED CORRECTIVE ACTION</i>
Maximum update count reached	Load new operational key
Attempt to update U-key	U-key cannot be updated by the operator

7.2.8 Error Message [ERROR n]

<b>POSSIBLE CAUSES</b>	Severe internal hardware error
<b>SUGGESTED CORRECTIVE ACTION</b>	Cycle power or remove and re-insert Clk. Turn off K/V-7 by turning Clk counterclockwise. Hold down both scroll buttons and turn Clk to the "on" position. Release buttons when "INIT EEP" message is displayed. Load operational keys and reconfigure settings. Turn off power to K/V-7 by disconnecting power cable and remove battery. Wait 30 seconds, then re-install battery and reconnect power cable. Load operational keys. Record error number, zeroize unit by pressing front panel ZEROIZE and INITIATE pushbuttons, and notify cognizant security official. Factory service required.

7.2.9 Warning Message [WARN n]

<b>POSSIBLE CAUSES</b>	Non-critical hardware error
<b>SUGGESTED CORRECTIVE ACTION</b>	Record warning number and notify cognizant security official Mykotronx Customer Service should be notified for advice

7.2.10 On-Line Operation Cannot be Initiated

<b>POSSIBLE CAUSES</b>	Selected TEK is not valid or loaded
<b>SUGGESTED CORRECTIVE ACTION</b>	Load a valid operational TEK

7.2.11 Online Indicator Flashes Continuously

<b>POSSIBLE CAUSES</b>	Setup is not compatible with far end alarm
<b>SUGGESTED CORRECTIVE ACTION</b>	Coordinate setup with far end operator
<b>POSSIBLE CAUSES</b>	Far end unit is not keyed or is in alarm
<b>SUGGESTED CORRECTIVE ACTION</b>	Coordinate with far end operator
<b>POSSIBLE CAUSES</b>	In receive mode, waiting for sync from far end
<b>SUGGESTED CORRECTIVE ACTION</b>	Coordinate sync-up with far end operator
<b>POSSIBLE CAUSES</b>	Interface cable not connected
<b>SUGGESTED CORRECTIVE ACTION</b>	Properly connect interface cables
<b>POSSIBLE CAUSES</b>	Interface controls not satisfied
<b>SUGGESTED CORRECTIVE ACTION</b>	Tie off control signals
<b>POSSIBLE CAUSES</b>	External clock selected but not supplied
<b>SUGGESTED CORRECTIVE ACTION</b>	Supply external clock or select internal clock

7.2.12 Online Indicator Lit But Random Data Output

<b>POSSIBLE CAUSES</b>	Setup is not compatible with far end
<b>SUGGESTED CORRECTIVE ACTION</b>	Coordinate setup with far end operator
<b>POSSIBLE CAUSES</b>	Wrong traffic key selected or loaded
<b>SUGGESTED CORRECTIVE ACTION</b>	Select correct location or load correct key
<b>POSSIBLE CAUSES</b>	Out-of-sync condition
<b>SUGGESTED CORRECTIVE ACTION</b>	Resynchronize units

### 7.2.13 Header Bypass Cannot be Initiated

<i>POSSIBLE CAUSES</i>	<i>SUGGESTED CORRECTIVE ACTION</i>
Bypass disabled by internal strap	Strapping is preset at factory. Factory service is required

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## 7.3 Assistance

For further assistance, or if factory service appears necessary, contact Mykotronx *KIV-7* Systems Customer Service. Refer to Chapter 8 for additional information on warranty, service, and shipping.



**Introduction**

This chapter contains the *KIV-7* warranty and instructions for product assistance and service.

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**8.1 Warranty**

Mykotronx Inc. (Seller) warrants that the articles delivered hereunder will be free of defects in material and workmanship and will conform with applicable specifications, drawings and descriptions agreed in writing to be applicable. The Seller's responsibility, and the Buyer's sole and exclusive remedy, under these warranties is limited to either correcting or replacing, at the Seller's election, any article that is not in accordance with these warranties and that is returned to the Seller's service facility within TWELVE (12) MONTHS after its delivery to the Buyer. Repaired or replaced articles are warranted for either ninety (90) days or the remainder of the original warranty period, whichever is longer. All replaced articles become the property of the Seller.

The Seller shall not be responsible under these warranties, however, unless given written notice, with pertinent details, of any defect or non-conformity within the applicable warranty period and within thirty (30) days after the date first discovered. The article must be returned to the Seller within thirty (30) days after written notification, and the defect or non-conformity is subject to verification by the Seller. Seller shall not be responsible for the costs of removal and reinstallation.

Seller agrees to assume round-trip surface transportation costs (not to exceed an amount equal to Seller's usual commercial method between the Seller's facility and the Buyer's designated destination point) for articles which are defective or non-conforming; provided, however, that if the Seller's inspection discloses that articles returned to the Seller are not defective or non-conforming, then charges to the Buyer for inspection, testing, and round-trip transportation will be applicable.

These warranties do not cover installation and maintenance; externally exposed parts and surfaces that are damaged or scratched due to normal use; failure of the product to operate with equipment not supplied by the Seller; damage to the product caused by the use of accessories not supplied by the Seller.

These warranties will automatically terminate if the product has been subjected to any installation, overhaul, maintenance, storage, use, operation, handling, or environment that is improper or not in accordance with the Seller's instructions; the product has been subjected to misuse, accident, neglect, or negligence; the product has been subjected to tampering, alterations, modifications, or repairs by anyone other than the Seller or its authorized representative.

As may be necessary to comply with these warranties, the Seller reserves the right to make changes in its products without any obligation to incorporate such changes into any product manufactured theretofore.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED, OR STATUTORY, SUCH AS WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREWITHTH EXPRESSLY EXCLUDED AND DISCLAIMED, OR STATUTORY, SUCH AS WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREWITHTH EXPRESSLY EXCLUDED AND DISCLAIMED, TO THE EXTENT THAT THEY EXCEED THE WARRANTIES GRANTED HEREIN. IN NO EVENT SHALL THE SELLER BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL, OR OTHER TYPES OF DAMAGE AND EXPRESSLY EXCLUDES AND DISCLAIMS SUCH DAMAGES RESULTING FROM, OR CAUSED BY, THE USE, OPERATION, FAILURE, MALFUNCTION OR DEFECT OF ANY ARTICLES DELIVERED HEREUNDER.

## 8.2 Service

Customer service, technical assistance, extended warranties, and repair service are available from Mykotronx Communications Systems at the facility listed below. Servicing of the *KIV-7* and accessories is limited to authorized and trained personnel at Mykotronx Communications Systems and its authorized repair facilities. Before requesting warranty or repair service, please be sure that all installation, operating, and troubleshooting procedures have been performed in accordance with this manual.

If assistance or service is required, contact:

Mykotronx, Inc,

9861 Broken Land Parkway, Suite 258

Columbia, MD 21046

Telephone (Toll-Free): 1-800-KIV-SEVEN (1-800-548-7383)

FAX Number: 410-337-7485

When requesting service, please be prepared to identify your unit serial number, designated point of contact, and COMSEC account number. The Customer Service representative will provide an Authorization Code as well as detailed shipping and handling instructions. The following shipping and handling guidelines should be observed:

- ◆ **Do notify your cognizant security official of the failure and comply with all security regulations.**
- ◆ **Do zeroize your unit using the front panel INITIATE and ZEROIZE push-buttons.**
- ◆ **Do clear your user-defined configuration programming, if possible, by recalling the factory default settings and storing them to each of the three user-definable locations.**
- ◆ **Do remove the battery before shipping (refer to paragraph 6.3 for instructions).**
- ◆ **Do provide a detailed description of the failure and the conditions under which it occurred.**
- ◆ **Do package the unit in its original packing material and shipping carton, if possible.**
- ◆ **Do not return the CIK or any fill devices.**



## Introduction

This chapter contains technical specifications pertaining to the *KIV-7*'s:

- ◆ Interoperability
- ◆ Operational Capabilities
- ◆ Communications Capabilities
- ◆ Electrical Interfaces
- ◆ Power Requirements

**NOTE:**

**Specifications are subject to change without notice.**

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## 9.1 Interoperability

Traffic and rekey interoperable with the Government KG-84, KG-84A, and KG-84C Data Encryption Equipment at synchronous data rates to 64 kbps and asynchronous data rates to 9.6 kbps. (Refer to Chapter 10, Interoperability Matrix.)

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## 9.2 Operational Capabilities

<b>Key Management</b>	Load, Transfer V-to-X, Variable Update, Display Variable Update Count, Zeroize, Change Z-key, Transmit/Receive Rekey
<b>Key Storage Memory</b>	Ten Operational TEKs (X01-X10) Temporary TEK (V) Terminal Unique KEK (U) Remote Control TEK and KEK (XRC and W) Terminal Unique Local KEK (Z)
<b>Configuration Memory</b>	Three user-programmable plus one factory default
<b>Built-in Test</b>	Off-line, On-line, Local Loopback, Remote Loopback
<b>Header Bypass</b>	Up to 64 characters (asynchronous) or 512 bits(synchronous) with automatic secure mode switchover
<b>Remote Control</b>	Master, Slave (cryptographic multi-point bus)

### 9.3 Communications Capabilities

<b>Communication Modes</b>	Full Duplex, Full Duplex Independent, Transmit Only, Receive Only, 2-Wire Simplex, 4-Wire Simplex
<b>Synchronization Modes</b>	Redundant, Non-Redundant, OP2, ACT1, ACT2, HF, External
<b>Out-of-Sync Detection</b>	Synchronous and Asynchronous (automatic or manual resync)
<b>Data Modulation Modes</b>	Baseband, Conditioned Baseband, Diphasse, Conditioned Diphasse
<b>Data Formats</b>	Synchronous or Asynchronous (7, 8, 10, and 11 bit lengths)
<b>Data Framing Modes</b>	Automatic, Manual, Unframed
<b>Simplex Channel Control</b>	Internal (front panel), External (DTE interface)
<b>Data Clock Modes</b>	Master, Slave, Station, Terminal Timing
<b>Internal Data Rates (bps)</b>	50, 75, 100, 110, 150, 200, 220, 300, 600, 1.2K, 2.4K, 4.8K, 8.0K, 9.6K, 14.4K, 16K, 19.2K, 28.8K, 32K, 38.4K, 57.6K, 64K, 115.2K, 128K, 192K, 288—Synchronous or Asynchronous
<b>External Data Rates (bps)</b>	Data Rate Clock:DC-512K/1.544 Mbps – Synchronous only 32-times Clock: DC-32K---Synchronous or Asynchronous

## 9.4 Electrical Interfaces

<b>Plaintext (DTE) Interface</b>	<p>Selected via operator interface</p> <ul style="list-style-type: none"> <li>• EIA-530 (RS-449)--balanced data, clock, and controls</li> <li>• RS-232 --unbalanced data, clock, and controls</li> <li>• RS-422/423--balanced data and clock; unbalanced controls</li> </ul>
<b>Ciphertext (DCE) Interface</b>	<p>Selected via operator interface</p> <ul style="list-style-type: none"> <li>• EIA-530 (RS-449)---balanced data, clock, and controls</li> <li>• RS-232---unbalanced data, clock, and controls</li> <li>• RS-422/423--balanced data and clock; unbalanced controls</li> </ul>
<b>Fill Interface</b>	<p>Selected via operator interface</p> <p>DS-102, compatible with KOI-18, KYX-13, and KYK-15 Common Fill devices and AN/CYZ-10 Data Transfer Device (in DS-102 mode)</p> <p>DS-101, compatible with AN/CYZ-10 Data Transfer Device (in DS-101 mode)</p>
<b>Remote Control Interface</b>	RS-485 multi-point bus (up to 30 devices)
<b>CIK Interface</b>	Datakey DK1024, or equivalent, Serial EEPROM Key

**NOTE:** For interoperability with the RS-449 interface standard, an adapter cable assembly is needed on the Black (J2) or the Red(J3) I/O port of the *KIV-7/-7HS*. Please refer to page 3-8 for the proper cable assembly part number.

## 9.5 Power Requirements

<b>Primary Voltage</b>	5 V dc, + 5%
<b>Power Consumption</b>	3 Watts typical, 5 Watts maximum
<b>Battery</b>	3.6 V dc lithium battery, Saft LS-6 or equivalent
<b>Battery Life</b>	1 year minimum

**9.6 Physical Characteristics**

Height	1.68 inches (42.7 mm)
Width	5.88 inches (149.4 mm)
Depth (excluding connectors)	8.0 inches (203.2 mm)
Depth (including connectors)	8.18 inches (207.8 mm)
Weight	3 pounds (1.4kg)
Mounting	Universal Half-Height Computer Peripheral mounting holes

**9.7 Environmental Characteristics**

Operating Temperature	0° C to +55° C
Storage Temperature	-40° C to +85° C
Thermal Shock	±5° C per minute over storage temperature range (per MIL-STD-810D, Method 503.2)
Humidity	10 to 90%, non-condensing (per MIL-STD-810D, Method 507.2, Procedure I, Cycle I)
Mechanical Shock—Unit On	10g, 6 milliseconds half-sine pulse (per MIL-STD-810D, Method 516.3, Procedure I)
Mechanical Shock—Unit Off	Bench Handling (per MIL-STD-810D, Method 516.3, Procedure VI)
Vibration	2g rms, 50 to 2000 Hertz random, 10 minutes per axis (per MIL-STD-202F, Method 214A, Procedure I)
TEMPEST	NACSIMI 5100A and KAG-30A
EMI	MIL-STD-461C (meets FCC requirements for a Class B computing device)

**9.8 Product Assurance Characteristics**

MTBF	>77,000 hours at +25°C, Ground Benign environment
MTRR	> 17,000 hours at +25°C, Naval Sheltered environment (calculated per MIL-HDBK-217E, Notice I)
	15 minutes (the time necessary to replace a failed unit)

Introduction This chapter summarizes the *KIV-7*'s interoperability with the Government KG-84, KG-84A, and KG-84C data encryption equipment

LEGEND	
Blank	= Mode or function not available.
✓	= Selectable mode or function (via the front panel menus for the <i>KIV-7</i> ).
✓-	= Selected or accessed via rear panel connectors.
✓=	= Selected or accessed via internal hardware strap.
●	= Both -P and -N polarities are available.
■	= KG-84/-84A step pulse characteristics are selected via a front panel switch and an internal strap. KG-84C and <i>KIV-7</i> step pulse characteristics are a function of the DATA FORMAT.
▲	= The KG-84C PTT control is a dry contact relay closure. The <i>KIV-7</i> PTT control is an open collector output that may be used to control an external relay.
*	= An optional Wireline Interface Adapter Unit provides the <i>KIV-7</i> with this capability.
◆	= An optional AC Power Converter Unit provides the <i>KIV-7</i> with this capability.

EXTERNAL INTERFACES	KG-84	KG-84A	KG-84C	KIV-7
<b>PLAINTEXT ELECTRICAL INTERFACE</b>				
EIA-530 (RS-449) (Balanced Data, Clock, and Controls)	✓	✓		✓
RS-422/RS-423 (Balanced Data/Clock, Unbalanced Controls)	✓	✓	✓	✓
RS-232 (RS-423) (Unbalanced Data, Clock, and Controls)	✓=	✓=	✓-	✓
MIL-STD-188/114	✓	✓	✓	✓
<b>PLAINTEXT INTERFACE OPTIONS</b>				
Gated/Continuous Transmit Clock	✓=	✓=	✓	✓
Gated/Continuous Receive Clock			✓	✓
Step Pulse	■	■	■	■
Invert Data	●	●	✓-	✓●
Invert Controls	●	●	✓-	✓●
<b>CIPHERTEXT ELECTRICAL INTERFACE</b>				
EIA-530 (RS-449) (Balanced Data, Clock, and Controls)	✓	✓		✓
RS-422/RS-423 (Balanced Data/Clock, Unbalanced Controls)	✓	✓	✓	✓
RS-232 (RS-423) (Unbalanced Data, Clock, and Controls)	✓=	✓=	✓-	✓
MIL-STD-188/114	✓	✓	✓	✓
Wireline	✓	✓	✓	*
<b>CIPHERTEXT INTERFACE OPTIONS</b>				
Invert Data	●	●	✓-	✓●
Invert Controls	●	●	✓-	✓●
Push-To-Talk Control			▲	▲
<b>FILL INTERFACE</b>				
DS-102 Common Fill	✓	✓	✓	✓
DS-101 Electronic Fill				✓
<b>REMOTE CONTROL INTERFACE</b>				
Multiplexed/Discrete Controls	✓-	✓-	✓-	
Cryptographic Multi-point Bus				✓-
<b>POWER INTERFACE</b>				
5 VDC				✓-
28 VDC	✓-	✓-	✓-	
120 VAC	✓-	✓-	✓-	◆
220 VAC	✓-	✓-	✓-	◆

COMMUNICATIONS CAPABILITIES					KG-84	KG-84A	KG-84C	KIV-7
<b>COMMUNICATIONS MODES</b>					✓	✓	✓	✓
Full Duplex					✓	✓	✓	✓
Duplex Initiator					✓	✓	✓	✓
Full Duplex Independent					✓	✓	✓	✓
Transmit Only					✓	✓	✓	✓
Receive Only					✓	✓	✓	✓
Simplex 2-Wire					✓	✓	✓	✓
Simplex 4-Wire					✓	✓	✓	✓
<b>SYNCHRONIZATION MODES</b>					✓	✓	✓	✓
Redundant					✓	✓	✓	✓
Non-Redundant					✓	✓	✓	✓
OP2					✓	✓	✓	✓
TDM 1&2 (Asynchronous Cipher Text to 9.6 kbps)					✓	✓	✓	✓
ACT 1&2 (Asynchronous Cipher Text to 288 kbps)					✓	✓	✓	✓
HF					✓	✓	✓	✓
OP3					✓	✓	✓	✓
OP4					✓	✓	✓	✓
External					✓	✓	✓	✓
<b>OUT-OF-SYNC DETECTION</b>					✓	✓	✓	✓
Asynchronous					✓	✓	✓	✓
Synchronous					✓	✓	✓	✓
<b>DATA MODULATION MODES</b>					✓	✓	✓	✓
Baseband, Conditioned					✓	✓	✓	✓
Baseband, Non-conditioned					✓	✓	✓	✓
Diphase, conditioned					✓	✓	✓	✓
Diphase, Non-conditioned					✓	✓	✓	✓
Diphase, conditioned (Wireline)					✓	✓	✓	✓
Diphase, Non-conditioned (Wireline)					✓	✓	✓	✓
Asynchronous, 7 bits					✓	✓	✓	✓
Asynchronous, 8 bits					✓	✓	✓	✓
Asynchronous, 7.5 bits					✓	✓	✓	✓
Asynchronous, 10 bits					✓	✓	✓	✓
Asynchronous, 11 bits					✓	✓	✓	✓
<b>DATA CLOCK MODES</b>					✓	✓	✓	✓
Master					✓	✓	✓	✓
Slave					✓	✓	✓	✓
Station					✓	✓	✓	✓
Terminal Timing (phased locked to an internal data rate)					✓	✓	✓	✓
Terminal Timing (any external data rate to 512 kbps)					✓	✓	✓	✓
<b>DATA FRAMING/SIMPLEX CONTROL MODES</b>					✓	✓	✓	✓
Automatic					✓	✓	✓	✓
Manual					✓	✓	✓	✓
Unframed					✓	✓	✓	✓
Simplex Internal					✓	✓	✓	✓
Simplex External					✓	✓	✓	✓
<b>INTERFACE CONTROL</b>					✓	✓	✓	✓
Override PTRS					✓	✓	✓	✓
Override PTRS and PTCS					✓	✓	✓	✓
Override PTCS					✓	✓	✓	✓

**FOR OFFICIAL USE ONLY**

<b>COMMUNICATIONS CAPABILITIES</b>	<b>KG-84</b>		<b>KG-84A</b>		<b>KG-84C</b>		<b>KIV-7</b>	
<b>INTERNAL DATA RATES</b> (a=Asynchronous; s=Synchronous)	a	s	a	s	a	s	a	s
50 bps	✓	✓	✓	✓	✓	✓	✓	✓
75 bps	✓	✓	✓	✓	✓	✓	✓	✓
100 bps	✓	✓	✓	✓	✓	✓	✓	✓
110 bps	✓	✓	✓	✓	✓	✓	✓	✓
150 bps	✓	✓	✓	✓	✓	✓	✓	✓
200 bps					✓	✓	✓	✓
220 bps					✓	✓	✓	✓
300 bps	✓	✓	✓	✓	✓	✓	✓	✓
600 bps	✓	✓	✓	✓	✓	✓	✓	✓
1.2 kbps	✓	✓	✓	✓	✓	✓	✓	✓
2.4 kbps	✓	✓	✓	✓	✓	✓	✓	✓
4.8 kbps	✓	✓	✓	✓	✓	✓	✓	✓
8.0 kbps	✓	✓	✓	✓	✓	✓	✓	✓
9.6 kbps	✓	✓	✓	✓	✓	✓	✓	✓
14.4 kbps							✓	✓
16 kbps		✓		✓		✓	✓	✓
19.2 kbps							✓	✓
28.8 kbps							✓	✓
32 kbps		✓		✓		✓	✓	✓
38.4 kbps							✓	✓
57.6 kbps							✓	✓
64 kbps							✓	✓
115.2 kbps							✓	✓
128 kbps							✓	✓
192 kbps							✓	✓
288 kbps							✓	✓
<b>EXTERNAL DATA RATES (bps)</b>								
1x Data Rate                      Synchronous Only	DC-64k		DC-64k		DC-64k		DC-512 k/ 1.544Mbps (KIV-7HS)	
32 x Data Rate                      Synchronous Asynchronous	DC-32k		DC-32k		DC-32k		DC-32k DC-32k	
<b>KEY MANAGEMENT</b>								
Load	✓		✓		✓		✓	
Transfer V → X	✓		✓		✓		✓	
Variable Update	✓		✓		✓		✓ <sup>1</sup>	
Variable Update Count (Integral Display)							✓	
Variable Update Count (Remote Display)	✓-		✓-		✓-		✓-	
Zeroize	✓		✓		✓		✓	
Transmit/Receive Rekey	✓		✓		✓		✓	
CIK protected Internal Encrypted Key Storage							✓	
<b>KEY STORAGE MEMORY</b>								
Operational Traffic Encryption Keys (X)	✓(1)		✓(4)		✓(4)		✓(10)	
Temporary Traffic Encryption Key (V)	✓		✓		✓		✓	
Terminal Unique Key Encryption Key (U)	✓		✓		✓		✓	
Terminal Unique Local Key Encryption Key (Z)							✓	
Remote Control Traffic Encryption Key (XRC)							✓	
Remote Control Key Encryption Key (W)							✓	

<sup>1</sup> TEK Only





**Introduction**

This chapter summarizes the *KIV-7* display messages. Throughout this chapter, the displayed message text is shown enclosed in square brackets; for example [OFF-LINE]. The consistent message formats enable rapid identification of the information displayed:

- ◆ Off-line and on-line commands, which may be up to three levels deep, are seven-character text messages with a leading level identifier: a one-bar character (-) for Level 1, a two-bar character (=) for Level 2, and a three-bar character (≡) for Level 3. As described in Chapter 4, the SCROLL push-buttons are used to review selections at each level, and the INITIATE push-button is used to enter sub-level menus and to make selections. At Levels 2 and 3, a “Return” message is used to exit to the previous level.
- ◆ Status and error messages are eight-character text messages. Typically, these messages are flashed on the display for several seconds to indicate status or a non-fatal error condition. Fatal error messages remain on the display until power is cycled.

**11.1 Off-Line Messages**

When the *KIV-7* is off-line, functions such as key loading and configuration settings may be selected. The status message [OFF-LINE] is displayed until the operator scrolls through the available off-line functions. If the SCROLL ▲, SCROLL ▼, or INITIATE pushbuttons are not pressed again within 60 seconds, the display automatically returns to the off-line status message.

**Table 11-1: Off-Line Messages—Standard Strapping (RCU Slave)**

**NOTE:** Factory default settings are indicated by a pointer (◄).

Shaded areas indicate functions that cannot be initiated by a remote master.

Level 1	Level 2	Level 3	Description	Status Messages
[-SEL KEY]	[=Key x01] thru [=Key X10] [=Return ]		<b>SELECT AN OPERATIONAL TEK</b> Select the TEK in location X01 thru Select the TEK in location X10 Return to Level 1	[Key Good] [Key Fail] [Key Good] [Key Fail]
[-LOAD ]	[=LD U ] [=LD V ] [=LD X01 ] thru [=LD X10 ] [=LD XRC ] [=LD W ] [=Return ]		<b>LOAD TEKS AND KEKS</b> Load Terminal Unique KEK Load Temporary Operational TEK Load Operational TEK into location X01 thru Load Operational TEK into location X10 Load Remote Control TEK Load Remote Control KEK Return to Level 1	[LoadGood] [LoadFail] [LoadGood] [LoadFail] [LoadGood] [LoadFail] [LoadGood] [LoadFail] [LoadGood] [LoadFail] [LoadGood] [LoadFail]
[-XFR V→X]	[=V →X01] thru [=V →X10] [=Return]		<b>TRANSFER TEMPORARY TEK TO AN X LOCATION</b> Transfer temporary TEK to location X01 thru Transfer temporary TEK to location X10 Return to Level 1	[V→X Good] [V→X Fail] [V→X Good] [V→X Fail]

**Table 11-1 (Continued): Off-Line Messages—Standard Strapping (RCU Slave)**

**NOTE:** Factory default settings are indicated by a pointer (▶).  
 Shaded areas indicate functions that cannot be initiated by a remote master.

Level 1	Level 2	Level 3	Description	Status Messages
[-VU /cnt]	[=U :nmm] thru [=X10 :nmm] [=ABORT ] [=CONFIRM ] [=XRC :nmm] [=W :nmm] [=CHANGZ] [=Return]	[=ABORT ] [=CONFIRM ] thru [=X10 :nmm] [=CONFIRM ] [=ABORT ] [=CONFIRM ] [=XRC :nmm] [=ABORT ] [=CONFIRM ] [=W :nmm] [=CHANGZ] [=Return]	<b>VARIABLE UPDATE AND UPDATE COUNT DISPLAY</b> Terminal Unique KEK update count X01 update count; INITIATE to update Perform X01 update operation thru X10 update count; INITIATE to update Abort X10 update, return to Level 2 Perform X10 update operation XRC update count; INITIATE to update Abort XRC update, return to Level 2 Perform XRC update operation Remote Control KEK update count Change Terminal Unique Local KEK Abort Change Z, return to Level 2 Perform Change Z operation Return to Level 1	[=X01 :nmm] [VU Fail] [=X01 :nmm] [VU Fail] [=X01 :nmm] [VU Fail] [=XRC :nmm] [VU Fail] [CHGZGood] [CHGZFail]
[-ZERUIZE ]	[=Zero U] [Zero V] [=ZeroX10] thru [=ZeroX01] [=ZeroXRC] [=Return]	[=ABORT ] [=CONFIRM ] Zeroize all TEKs and KEKs Abort Zeroize All, return to Level 2 Perform Zeroize All Zeroize Terminal unique KEK Zeroize Temporary Operational TEK Zeroize Operational TEK in location X01 thru Zeroize Operational TEK in location X10 Zeroize Remote Control TEK Zeroize Remote Control KEK Return to Level 1	<b>ZEROIZE TEKS AND KEKS</b> Zeroize all TEKs and KEKs Abort Zeroize All, return to Level 2 Perform Zeroize All Zeroize Terminal unique KEK Zeroize Temporary Operational TEK Zeroize Operational TEK in location X01 thru Zeroize Operational TEK in location X10 Zeroize Remote Control TEK Zeroize Remote Control KEK Return to Level 1	[=ZeroGood] [TestFail] [AlarmGood] [AlarmFail] [BatGood] [Low Bat] [LampGood] [LampFail] [MemGood] [Mem Fail] [LoopGood] [LoopFail] [ExtLoop*] [TestGood] [TestFail]
[-TEST]	[=TestAll] [AlarmTest] [BatTest] [LampTest] [Mem Test] [InLoop] [ExtLoop] [Return]	<b>SELF TEST FUNCTIONS</b> Complete self test Perform an alarm check Check the battery level Illuminate all front panel indicators Check internal RAM and ROM Perform internal loopback test Place unit in external loopback Return to Level 1	<b>SELF TEST FUNCTIONS</b> Complete self test Perform an alarm check Check the battery level Illuminate all front panel indicators Check internal RAM and ROM Perform internal loopback test Place unit in external loopback Return to Level 1	[TestGood] [TestFail] [AlarmGood] [AlarmFail] [BatGood] [Low Bat] [LampGood] [LampFail] [MemGood] [Mem Fail] [LoopGood] [LoopFail] [ExtLoop*] [TestGood] [TestFail]
[-SETUP A]	[=CLK Sel] [=MASTER] ▶ [=SLAVE] [=STAL CLK] [=T SBL 1] [=T SBL 2] [=Return]	<b>CONFIGURATION SETUP</b> Data clock options Master-independent TX/RX clocks Slave-TX clock slaved to RX clock Station-external station clock Terminal Timing-Internal PLL Terminal Timing-External Source (Optional; MOD 4 required) Return to Level 2	<b>CONFIGURATION SETUP</b> Data clock options Master-independent TX/RX clocks Slave-TX clock slaved to RX clock Station-external station clock Terminal Timing-Internal PLL Terminal Timing-External Source (Optional; MOD 4 required) Return to Level 2	[=Return]
	[=SyncSel]	[=RBD ] [=RBD-as ] ▶ [=NR ] [=NR-as ] [=OP2 ] [=ACT1 ] [=ACT2 ] [=HF ] [=HF-as ] [=EXT ] [=EXT-as ] [=Return ]	<b>Synchronization Options</b> Redundant Redundant, as Non-redundant Non-redundant, as OP2 Asynchronous Cipher Text, Char Asynchronous Cipher Text, TFS HF HF, as External External, as Return to Level 2	[=Return ] [ExtLoop] [InLoop] [Mem Test] [LampTest] [BatTest] [AlarmTest] [TestAll] [Zero U] [Zero V] [=ZeroX10] thru [=ZeroX01] [=ZeroXRC] [=Return]

**Table 11-1 (Continued): Off-Line Messages—Standard Strapping (RCU Slave)**

**NOTE:** Factory default settings are indicated by a pointer (◀).  
Shaded areas indicate functions that cannot be initiated by a remote master.

Level 1	Level 2	Level 3	Description	Status Messages
[-SETUP A] (continued)	[=CommSel]	[= FDX ] ◀ [= FDX Ind ] [= TX only ] [= RX only ] [= SPLX 2W ] [= SPLX 4W ] [=Return ]	<b>Communication Mode Options</b> Full Duplex with end-around sync Full Duplex, independent TX and RX Transmit only Receive only Simplex, 2-wire Simplex, 4-wire Return to Level 2	
	[=DataMod]	[= BE cond] [= BB ] ◀ [= DP cond ] [= DP ] [=Return ]	<b>Data Modulation Options</b> Baseband, conditioned Baseband Diphase, conditioned Diphase Return to Level 2	
	[=DataLen]	[= SYNCH/S] [= SYNCH/A] ◀ [= 7 bits ] [= 8 bits ] [= 10 bits] [= 11 bits] [=Return ]	<b>Data Length Options</b> Synchronous/Synchronous Header Byp Synchronous/Asynchronous (10-bit) Header Byp Asynchronous 7 bits Asynchronous 8 bits Asynchronous 10 bits Asynchronous 11 bits Return to Level 2	
	[=TX Rate]	[= 50 ] [= 75 ] [= 100 ] [= 110 ] [= 150 ] [= 200 ] [= 220 ] [= 300 ] [= 600 ] [= 1.2k ] [= 2.4k ] ◀ [= 4.8k ] [= 8.0k ] [= 9.6k ] [= 14.4k ] [= 16k ] [= 19.2k ] [=28.8k ] [=32k ] [=38.4k ] [=57.6 ] [=64k ] [=115.2k ] [=128k ] [=192k ] [=288k ] [=EXT 32x] [=EXT-DRC] [=Return ]	<b>Transmit Data Rate Options</b> 50 bps 75 bps 100 bps 110 bps 150 bps 200 bps 220 bps 300 bps 600 bps 1.2 kbps 2.4 kbps 4.8 kbps 8.0 kbps 9.6 kbps 14.4 kbps 16 kbps 19.2 kbps 28.8 kbps 32 kbps 38.4 kbps 57.6 kbps 64 kbps 115.2 kbps kbps 192 kbps 288 kbps External 32-times data rate clock External 1-times data rate clock Return to Level 2	
	[=RX Rate]	Same as TX		<b>Receive Data Rate Options</b>
	[=TTYMode]	[= AUTO ] ◀ [= MANUAL ] [= UNFRAMD ] [= SPLXint ] [= SPLXext ] [= Return ]	<b>Teletype Mode Options</b> Automatic resynchronization Frame transmit and receive data Frame transmit, but not receive data TX/RX channel control via INITIATE TX/RX channel control via signal PTRS Return to Level 2	

Table 11-1 (Continued): Off-Line Messages—Standard Strapping (RCU Slave)

**NOTE:** Factory default settings are indicated by a pointer (▶). Shaded areas indicate functions that cannot be initiated by a remote master.

Level 1	Level 2	Level 3	Description	Status Messages
[SETUP A] (continued)	[=I/Fctrl]	[=OFF] ▶ [=PRRS] [=RS&CS] [=CTCS]	Interface control options No interface signal affected Override terminal signal PRRS, CTCS Override terminal signals PRRS, CTCS Override terminal signal CTCS Return to Level 2	
[SETUP B]	[=Invert]	[=BLKdata] [=RBDdata] [=SYNCTX] [=SYNCRX]	CONFIGURATION SETUP B Signal Inversion Select Invert BLACK (Ciphertext) data Invert RBD (plaintext) data Invert SYNCTX control signal Invert SYNCRX control signal Return to Level 2	
	[TXClock]	[=conTXC] ▶ [=gateTXC]	Terminal Transmit Clock Gating Options Continuous transmit clock Receive clock gated with signal PRRS Return to Level 2	
	[RXClock]	[=conRXC] ▶ [=gateRXC]	Terminal Receive Clock Gating Options Continuous transmit clock Receive clock gated with signal PRRS Return to Level 2	
	[=SyncCos]	[=Enabled] ▶ [=Disabled]	Synchronous Out-Of-Sync Detect Select Enabled Disabled Return to Level 2	
	[=IdleSel]	[=Enabled] [=Disabled] ▶	Idle Select If HF SPLX4W, continuous idles in RX, otherwise, 256 additional idles Disabled, no added idles Return to Level 2	
	[=Autcphs]	[=OFF] ▶ [=ON 2s] [=ON 5s] [=ON 10s] [=ON 15s]	Autophasing Select (SPLX internal only) No autophasing, wait for PRRS Autophasing enabled, 2 sec timeout Autophasing enabled, 5 sec timeout Autophasing enabled, 10 sec timeout Autophasing enabled, 15 sec timeout Return to Level 2	
	[=UpdateU]	[=Enabled] ▶ [=Disabled]	Automatic U-key Update Enabled Disabled Return to Level 2	
[SETUP C]	[=RED I/F]	[=RS-232] ▶ [=BIA-530] [=422/423]	CONFIGURATION SETUP C RBD (plaintext) Interface Select RS-232 electrical interface BIA-530 (RS-449) electrical interface RS-422/423 electrical interface Return to Level 2	
	[=BLK I/F]	[=RS-232] ▶ [=BIA-530] [=422/423]	BLACK (Ciphertext) Interface Select RS-232 electrical interface BIA-530 (RS-449) electrical interface RS-422/423 electrical interface Return to Level 2	
	[=FIL I/F]	[=102/Std] ▶ [=101/Std] [=101/Tag] [=Return]	F111 Interface Select DS-102 (Common F111), standard keys DS-101, standard keys DS-101, tagged keys Return to Level 2	

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**Table 11-1 (Continued): Off-Line Messages—Standard Strapping (RCU Slave)**

**NOTE:** Factory default settings are indicated by a pointer (◀).  
Shaded areas indicate functions that cannot be initiated by a remote master.

Level 1	Level 2	Level 3	Description	Status Messages
[-SETUP C] (continued)	[=FILaddr ]	[= 1 ] thru [= 254] ◀ [=Return ]	<b>DS-101 Fill Address Select</b> Address 1 thru Address 254 Return to Level 2	
	[=RCUaddr]	[= 1 ] thru [= 31] ◀ [=Return ]	<b>Remote Control Address Select</b> Address 1 thru Address 31 (broadcast address) Return to Level 2	
	[=Display]	[=High ] [=Medium] ◀ [=Low ] [=Return ]	<b>Display Brightness Select</b> High intensity Medium intensity Low intensity Return to Level 2	
	[=Speaker]	[=Enabled] ◀ [=Disabled] [=Return ]	<b>Speaker Select</b> Enabled Disabled Return to Level 2	
	[=Return ]		Return to Level 1	
[-SETmgmt]	[=STORE ]	[=STO 1 ] [=STO 2 ] [=STO 3 ] [=Return ]	<b>SETUP A/B/C MANAGEMENT</b> Store Configuration Setting Store settings into location 1 Store settings into location 2 Store settings into location 3 Return to Level 2	[STO GOOD] [STO GOOD] [STO GOOD]
	[=RECALL]	[=RCL 0 ] [=RCL 1 ] [=RCL 2 ] [=RCL 3 ] [=Return ]	<b>Recall Configuration Setting</b> Recall factory default setting Recall settings in location 1 Recall settings in location 2 Recall settings in location 3 Return to Level 2	[RCL Good] [RCL Good] [RCL Good] [RCL Good]
	[=VIEWSET]		View Current Configuration Settings	
	[=Return ]		Return to Level 1	
[-REMOTE]	[=Standrd] [=Limited] [=Return ]		<b>REMOTE MODE SELECT</b> Standard Master/Slave remote operation Limited operation recall setups only Return to Level 1	[MASTERnn] [REMOTEnn] [REMOTEnn]

**Table 11-2: Off-line Messages—Optional Strapping (RCU Master)**

**NOTE:** Factory default settings are indicated by a pointer (◀).

Level 1	Level 2	Level 3	Description	Status Messages
[-LOAD ]	[=LD XRC ] [=LD W ] [=Return ]		<b>LOAD TEKs AND KEKs</b> Load Remote Control TEK Load Remote Control KEK Return to Level 1	[LoadGood] [LoadFail] [LoadGood] [LoadFail]
	[XRC:nnn]  [=W :nnn] [=Return]	[= ABORT ] [= CONFIRM ]	<b>VARIABLE UPDATE AND UPDATE COUNT DISPLAY</b> XRC update count; INITIATE to update Abort XRC update, return to Level 2 Perform XRC update operation Remote Control KEK update count Return to Level 1	[=XRC:nnn] [VU Fail]

Table 11-2 (Continued): Off-line Messages—Optional Strapping (RCU Master)

NOTE: Factory default settings are indicated by a pointer (▶).

Level 1	Level 2	Level 3	Description	Status Messages
[ZERIZE ]	[ZERALL] [ZERO W ] [ZEROXRC] [Return ]	[= ABORT ] [= CONFIRM ]	Zerize all TRKs and KRKs Abort Zerize All, return to Level 2 Perform Zerize All Zerize Remote Control TEK Zerize Remote Control KRK Return to Level 1	[Zerized] [Zerized] [Zerized]
[TEST ]	[TestAL] [AlrmTst] [BatTst] [LampTst] [Mem Tst] [IntLoop] [Return ]		SELF TEST FUNCTIONS Complete self test Perform an alarm check Check the battery level Illuminate all front panel indicator Check internal RAM and ROM Perform internal loopback test Return to Level 1	[TestGood] [TestFail] [AlrmGood] [AlrmFail] [BatGood] [Low Bat] [LampGood] [LampFail] [Mem Good] [Mem Fail] [LoopGood] [LoopFail]
[SETUP C ]	[FIL I/F ] [=102/Std] ▶ [=102/Tag] [=101/Std] [=101/Tag] [Return ]	[Return ]	CONFIGURATION SETUP C FIL Interface Select DS-102 (Common FIL), standard keys DS-102 (Common FIL), tagged keys DS-101, standard keys DS-101, tagged keys Return to Level 2	
[FILaddr ]	[= 1] thru [= 254] ▶ [Return ]	[Return ]	DS-101 FIL Address Select Address 1 thru Address 254 Return to Level 2	
[RCUaddr ]	[= 1] thru [= 31] ▶ [Return ]	[Return ]	Remote Control Address Select Address 1 thru Address 31 (broadcast address) Return to Level 2	
[Display]	[=High ] [=Medium ] ▶ [=Low ] [Return ]	[Return ]	Display Brightness Select High intensity Medium intensity Low intensity Return to Level 2	
[Speaker]	[=Enabled] ▶ [=Disabled] [Return ]	[Return ]	Speaker Select Enabled Disabled Return to Level 2	
[SETmgmt]	[=STORE] [=STO 1] [=STO 2] [=STO 3] [Return ]	[Return ]	SETUP A/B/C MANAGEMENT Store settings into location 1 Store settings into location 2 Store settings into location 3 Return to Level 2	[STO GOOD] [STO GOOD] [STO GOOD]
[RECALL]	[=RCL 0 ] [=RCL 1 ] [=RCL 2 ] [=RCL 3 ] [Return ]	[Return ]	Recall Configuration Setting Recall factory default setting Recall settings in location 1 Recall settings in location 2 Recall settings in location 3 Return to Level 2	[RCL Good] [RCL Good] [RCL Good] [RCL Good]
[=VIBWSEt]	[Return ]	[Return ]	View Current Configuration Settings Return to Level 1	
[REMOTr]	[Return ]	[Return ]	REMOTE MODE SELECT Return to Level 1	[MASTERm]

## 11.2 On-Line Messages

When the *KIV-7* is on-line, an operational status message is displayed until the operator scrolls to other on-line status and functions. If the SCROLL ▲, SCROLL ▼, or INITIATE pushbuttons are not pressed again within 60 seconds, the display automatically returns to the operational status message.

Table 11-3: On-line Messages				
Level 1	Level 2	Level 3	Description	Status Messages
[sssss TR]			<b>OPERATIONAL STATUS MESSAGE</b> Based on the communications mode: Full Duplex Full Duplex Independent Transmit Only Receive Only Simplex 2-wire, external Simplex 2-wire, internal Simplex 4-wire, external Simplex 4-wire, internal where, "T" and/or "R" are present when sync is established and traffic is being transmitted and/or received.	[FDX TR] [INDEP TR] [TXonly T] {RxONLY R} [SPLX2e T] [SPLX2e R] [SPLX2i T] [SPLX2i R] [SPLX4e T] [SPLX4e R] [SPLX4i T] [SPLX4i R]
[Xmm: nnn]			<b>SELECTED KEY STATUS MESSAGE</b> Selected key Xmm with update count nnn	
[-SEL KEY]	[=Key X01] thru [=Key X10] [=Return ]		<b>SELECT AN OPERATIONAL TEK</b> Select the TEK in location X01 thru Select the TEK in location X10 Return to Level 1	[Key Good] [Key Fail] [Key Good] [Key Fail]
[-XFR V→X]	[=V →X01] thru [=V → X10] [=Return ]		<b>TRANSFER TEMPORARY TEK TO AN X LOCATION</b> Transfer temporary TEK to location X01 thru Transfer temporary TEK to location X10 Return to Level 1	[V→X Good] [V→X Fail] [V→X Good] [V→X Fail]
[-Txrekey]	[=Key X01] thru [=Key X10] [=Return ]		<b>TRANSMIT REKEY</b> Send TEK stored in location X01 thru Send TEK stored in location X10 Return to Level 1	[Snd Good] [Snd Fail] [Snd Good] [Snd Fail]
[-Rxrekey]	[=Key X01] thru [=Key X10] [=Return ]		<b>RECEIVE REKEY</b> Receive TEK and store in location X01 thru Receive TEK and store in location X10 Return to Level 1	[Rcv Good] [Rcv Fail] [Rcv Good] [Rcv Fail]
[-VIEWset]			VIEW CURRENT CONFIGURATION SETUP	

### 11.3 General Status Messages

The following general status messages indicate fatal and non-fatal conditions that may occur while the *KIV-7* is off-line or on-line.

<p><b>NON-FATAL STATUS MESSAGE; ON-LINE</b>                  [*Bypass*]                  Upon initiation of header bypass, this message flashes until header bypass is completed, either automatically by reaching the character/bit limit or manually using the ONLINE pushbutton.                  After insertion of a CIK, this message is flashed momentarily to indicate that the inserted CIK is incorrect or inoperative.                  During power-up, this message is displayed continuously to indicate that power-up initialization was unsuccessful. Cycle power off then on, or remove and re-insert the Crypt ignition Key (CIK) to re-initiate the power-up initialization sequence.</p>	<p>[CIK Fail]</p> <p>[CyclePwr]</p>
<p><b>FATAL STATUS MESSAGE; OFF-LINE or ON-LINE</b>                  During any operation, this message is displayed continuously to indicate that an internal error has been detected. Refer to paragraph 7.2 for suggested corrective action.</p>	<p>[Low Batt]</p>
<p><b>NON-FATAL STATUS MESSAGE; OFF-LINE or ON-LINE</b>                  This message flashes once each minute when the battery has reached a low voltage threshold. The battery should be replaced immediately (refer to paragraph 6.3) since all loaded keys may be zeroized if primary power is removed.</p>	<p>[MaxVcntr]</p>
<p><b>NON-FATAL STATUS MESSAGE; OFF-LINE</b>                  During variable update operations, this message is flashed momentarily to indicate that the maximum update limit has been reached, and no further updates are permitted.</p>	<p>[NCDioOFF]</p>
<p><b>NON-FATAL STATUS MESSAGE; ON-LINE</b>                  During transmit rekey operations, this message is flashed momentarily to indicate that the KYX-15 Net Control Device (NCD) must be turned off in order to complete the operation.</p>	<p>[Need CFD]</p>
<p><b>NON-FATAL STATUS MESSAGE; OFF-LINE</b>                  During LOAD operations, this message is flashed momentarily to indicate that a DTD, configured for DS-101 operation, must be attached to the front panel FILL port in order to complete the operation.</p>	<p>[Need DTD]</p>
<p><b>NON-FATAL STATUS MESSAGE; OFF-LINE</b>                  When attempting to go on-line, this message is flashed momentarily to indicate that the selected operational TEK is not loaded. When attempting to initiate REMOTE operation, this message is flashed momentarily to indicate that the remote control TEK or KEK is not loaded.</p>	<p>[Need Key]</p>



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[No101opt]	<b>NON-FATAL STATUS MESSAGE; OFF-LINE.</b> When attempting to select the DS-101 fill interface (Setup C), this message is flashed momentarily to indicate that the optional Interface Conversion Module (ICM) is not installed in the KIV-7. One of the available DS-102 fill interface options must be selected, or the KIV-7 must be returned to Mykotronx for installation of the ICM.
[NoBypass]	<b>NON-FATAL STATUS MESSAGE; OFF-LINE.</b> When attempting to initiate header bypass, this message is flashed momentarily to indicate that header bypass is not enabled (internal hardware strap). Consult your cognizant security officer if this capability is desired.
[NoRemote]	<b>NON-FATAL STATUS MESSAGE; OFF-LINE.</b> When a KIV-7 is strapped as an RCU Master, this message is flashed momentarily to indicate that the addressed remote KIV-7 did not acknowledge a command or is not configured for remote operation.
[NOTinFDX]	<b>NON-FATAL STATUS MESSAGE; ON-LINE.</b> During on-line operation, this message is flashed momentarily to indicate that the selected function cannot be performed when the KIV-7 is not configured for Full Duplex (FDX) operation.
[Rekeying]	<b>NON-FATAL STATUS MESSAGE; ON-LINE.</b> During on-line operation, this message is displayed while a transmit or receive over-the-air rekey operation is in progress.
[Testing*]	<b>NON-FATAL STATUS MESSAGE; OFF-LINE.</b> This message is displayed during power-on self-test and operator initiated self-test until the test function is complete. The asterisk (*) represents a cursor that rotates while the operation is in progress..
[WARN nn]	<b>NON-FATAL STATUS MESSAGE; OFF-LINE or ON-LINE.</b> During any operation, this message flashes momentarily to indicate that a non-critical internal error has been detected. Record the warning number "nn" and notify your cognizant security officer. Also notify Mykotronx KIV-7 Customer Service for advice.
[Zeroized]	<b>FATAL STATUS MESSAGE; OFF-LINE or ON-LINE.</b> Upon complete zeroization, either via the front panel ZEROIZE and INITIATE pushbuttons, the rear panel zeroize signal, or the "ZeroALL" menu selection, this message is displayed continuously until power is cycled off then on or until the CIK is removed and reinserted.



Introduction

This chapter summarizes pin assignments and signal definitions for the *KIV-7* rear panel interface connectors. Typical circuit connections are shown in Figure 12-1.

12.1 Ciphertext Data (DCE) Interface Connector (J2)



PANEL CONNECTOR: DB-37P (37-pin plug)

MATING CONNECTOR: DB-37R (37-pin receptacle)

**NOTE:** For interoperability with the RS-449 interface standard, an adapter cable assembly is needed on the Black (J2) or the Red (J3) I/O port of the *KIV-7/7HS*. Please refer to page 3-8 for the proper cable assembly part number.

Pin [1]	Signal Name [2]	I/O [3]	Signal Type [4]	Description	J2 Equivalent		EIA Interchange Circuits		
					KG-84/ KG-84A	KG-84C	EIA-530	RS-449	RS-232
1	CHS GND	G	GROUND	Chassis Ground	-2,3	-2,3			AA
2	TXDCT-P	O	BAL/UNB	Transmit Digital Cipher Text	-14	-14	BA-a	DS-a	BA
3	RXDCT-P	I	BAL/UNB	Receive Digital Cipher Text	-12	-12	BB-a	RD-a	BB
4	CTRS-P	O	BAL/UNB	Cipher Text Request-to-Send	-29	-29	CA-a	RS-a	CA
5	CTCS-P	I	BAL/UNB	Cipher Text Clear-to-Send	-27	-27	CB-a	CS-a	CB
6	CTDM-P	I	BAL/UNB	Cipher Text Data Mode	-51	-51	CC-a	DM-a	CC
7	SIG GND	G	GROUND	Signal Ground	-1	-1	AB	SG	AB
8	CTRR-P	I	BAL/UNB	Cipher Text Receiver Ready	-34	-34	CF-a	RR-a	CF
9	ERCLK-N	I	BAL/GND	External Receive Clock	-20	-20	DD-b	RT-b	-
10	CTRR-N	I	BAL/GND	Cipher Text Receiver Ready	-35	N/A	CF-b	RR-b	-
11	CTTT-N	O	BAL/NC	Cipher Text Terminal Timing	-33	-33	DA-b	TT-b	-
12	ETCLK-N	I	BAL/GND	External Transmit Clock	-22	-22	DB-b	ST-b	-
13	CTCS-N	I	BAL/GND	Cipher Text Clear-to-Send	-28	N/A	CB-b	CS-b	-
14	TXDCT-N	O	BAL/NC	Transmit Digital Cipher Text	-15	-15	BA-b	DS-b	-
15	ETCLK-P	I	BAL/UNB	External Transmit Clock	-21	-21	DB-a	ST-a	DB
16	RXDCT-N	I	BAL/GND	Receive Digital Cipher Text	-13	-13	BB-b	RD-b	-
17	ERCLK-P	I	BAL/UNB	External Receive Clock	-19	-19	DD-a	RT-a	DD
18	CTLL-P	O	UNB	Cipher Text Local Loopback	N/A	N/A	LL	LL	-
19	CTRS-N	O	BAL/NC	Cipher Text Request-to-Send	-46	N/A	CA-b	RS-b	-
20	CTTR-P	O	BAL/UNB	Cipher Text Terminal Ready	-17	-17	CD-a	TR-a	CD
21	CTRL-P	O	UNB	Cipher Text Remote Loopback	N/A	N/A	RL	RL	-
22	CTDM-N	I	BAL/GND	Cipher Text Data Mode	-53	N/A	CC-b	DM-b	-
23	CTTR-N	O	BAL/NC	Cipher Text Terminal Ready	-47	N/A	CD-b	TR-b	-
24	CTTT-P	O	BAL/UNB	Cipher Text Terminal Timing	-32	-32	DA-a	TT-a	DA
25	CTTM-P	I [7]	UNB	Cipher Text Test Mode	-36	-36	TM	TM	-
26	nc	-	-	spare	-	-	-	-	-
27	SIG GND	G	GROUND	Signal Ground	N/A	N/A	-	-	-
28	+5V BLACK	O	VOLTAGE	+5V Tie-off (BLACK only)	-6	-6	-	-	-
29	BALMIND-P	O	UNB	BLACK Alarm Indicator	-43	-43	-	-	-
30	nc	-	-	spare	-	-	-	-	-
31	nc	-	-	spare	-	-	-	-	-
32	nc	-	-	spare	-	-	-	-	-
33	SPLX2W-P	O	CMOS	Simplex 2-Wire Status	[6]	[6]	-	-	-
34	PTTCTRL-N	O	OC	Push-To-Talk Control	[5]	[5]	-	-	-
35	EX2WEN-N	I	CMOS	External 2-Wire Enable	[6]	[6]	-	-	-
36	-6V BLACK	O	VOLTAGE	-6V Tie-off (BLACK only)	-11	-11	-	-	-
37	nc	-	-	spare	-	-	-	-	-

NOTES:

1. Pins 1 through 25 conform to EIA-530.
2. Signals with -P are active at the more positive voltage and signals with -N are active at the more negative voltage, where the voltage levels are defined by the signal type.
3. Input/Output direction is with respect to the *KIV-7*.
4. See Paragraph 12.5, Electrical Signal Characteristics.

5. The KG-84/A/C provide a dry contact relay closure for this signal. The *KIV-7* provides an open collector signal which can be used to actuate an EXTERNAL dry contact relay.
6. These signals interface only with the optional Wireline Interface Adapter; leave unconnected otherwise.
7. Output PTTM-P (J3-25) is always in the OFF condition regardless of the state of input CNM-P (J2-25).

### 12.2 Plaintext Data (DTE) Interface Connector (J3)

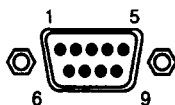
PANEL CONNECTOR: DB-37R (37-pin receptacle)  
 MATING CONNECTOR: DB-37P (37-pin plug)



**NOTE:** For interoperability with the RS-449 interface standard, an adapter cable assembly is needed on the Black (J2) or the Red(J3) I/O port of the KIV-7/7HS. Please refer to page 3-8 for the proper cable assembly part number.

Pin [1]	Signal Name [2]	I/O [3]	Signal Type [4]	Description	J2 Equivalent		EIA Interchange Circuits	
					KG-84/ KG-84A	KG-84C	EIA-530	RS-449
1	CHS GND	G	GROUND	Chassis Ground	-2	-2	—	AA
2	XDP1-P	I	BAL/UNB	Transmit Digital Plain Text	-18	-7	BA-a	BA
3	RXD1-P	O	BAL/UNB	Receive Digital Plain Text	-7	-18	BB-a	BB
4	PTRS-P	I	BAL/UNB	Plain Text Request-to-Send	-11	-11	CA-a	CA
5	PTCS-P	O	BAL/UNB	Plain Text Clear-to-Send	-19	-19	CB-a	CB
6	PTDM-P	O	BAL/UNB	Plain Text Data Mode	-51	-51	CC-a	CC
7	SIG GND	G	GROUND	Signal Ground	-1	-1	AB	AB
8	PTRR-P	O	BAL/UNB	Plain Text Receiver Ready	-40	-40	CF-a	CF
9	RXC1-K-N	O	BAL/NC	Receive Clock	-20	-20	DD-b	RT-b
10	PTRR-N	O	BAL/NC	Plain Text Receiver Ready	-41	-41	RR-b	—
11	PTT-N	I	BAL/GND	Plain Text Terminal Timing	-43	-43	DA-b	TT-b
12	TXCL-K-N	O	BAL/NC	Transmit Clock	-15	-15	DB-b	ST-b
13	PTCS-N	O	BAL/NC	Plain Text Clear-to-Send	-22	-22	CS-b	—
14	TXCL-P	O	BAL/UNB	Transmit Digital Plain Text	-17	-17	BA-b	SD-b
15	TXCL-K-P	O	BAL/UNB	Transmit Clock	-16	-16	DB-a	ST-a
16	RXD1-N	O	BAL/NC	Receive Digital Plain Text	-6	-6	BB-b	RD-b
17	RXC1-K-P	O	BAL/UNB	Receive Clock	-21	-21	DD-a	RT-a
18	PTLL-P	I	UNB	Plain Text Local Loopback	N/A	N/A	LL	—
19	PTRS-N	I	BAL/GND	Plain Text Request-to-Send	-9	-9	CA-b	RS-b
20	PTR-P	I	BAL/UNB	Plain Text Terminal Ready	-38	-38	CD-a	TR-a
21	PTRL-P	I	UNB	Plain Text Remote Loopback	N/A	N/A	RL	—
22	PTDM-N	I	BAL/NC	Plain Text Data Mode	-53	-53	CC-b	DM-b
23	PTTR-N	I	BAL/GND	Plain Text Terminal Ready	-46	-46	CD-b	TR-b
24	PTT-P	I	BAL/UNB	Plain Text Terminal Timing	-42	-42	DA-a	TT-a
25	PTM-P	O [5]	UNB	Plain Text Test Mode	-44	-44	TM	TM
26	nc	—	—	spare	—	—	—	—
27	SIG GND	G	GROUND	Signal Ground	N/A	N/A	—	—
28	+5V RED	O	VOLTAGE	+5V Tie-off (RED only)	-29	-29	—	—
29	RALMIND-P	O	UNB	RED Alarm Indicator	-23	-23	—	—
30	STP PUL-P	O	UNB	Step Pulse	-13	-13	—	—
31	SYNCTX-P	I	UNB	Sync Command Transmit	-12	-12	—	—
32	PTMON-P	O	BAL/UNB	Plain Text Monitor	-10	-10	—	—
33	SYNCRX-P	I	UNB	Sync Command Receive	-8	-8	—	—
34	PTMON-N	O	BAL/NC	Plain Text Monitor	N/A	N/A	—	—
35	RMTOPER-P	I	CMOS	Remote Operate	N/A	N/A	—	—
36	-6V RED	O	VOLTAGE	-6V Tie-off (RED only)	-4	-4	—	—
37	RMTZER0-N	I	CMOS	Remote Zeroize	-5	-5	—	—

## 12.3 Power Interface Connector (J1)



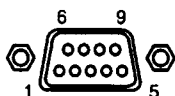
PANEL CONNECTOR: DB-9P (9-pin plug)  
 MATING CONNECTOR: DB-9R (9-pin receptacle)

**NOTE:** For interoperability with the RS-449 interface standard, an adapter cable assembly is needed on the Black (J2) or the Red(J3) I/O port of the KIV-7/-7HS. Please refer to page 3-8 for the proper cable assembly part number.

Pin	Signal Name	I/O [1]	Signal Type	Description
1	nc	—	—	Spare
2	+5V	I	VOLTAGE	Primary +5 Volt Input
3	+5V	I	VOLTAGE	Primary +5 Volt Input
4	+5V	I	VOLTAGE	Primary +5 Volt Input
5	+5V	I	VOLTAGE	Primary +5 Volt Input
6	GND	G	GROUND	Primary +5 Volt Return
7	GND	G	GROUND	Primary +5 Volt Return
8	GND	G	GROUND	Primary +5 Volt Return
9	GND	G	GROUND	Primary +5 Volt Return

**NOTES:**  
 1. Input/Output direction is with respect to the KIV-7.

## 12.4 Remote Control Interface Connector (J4)



PANEL CONNECTOR: DB-9R (9-pin receptacle)

MATING CONNECTOR: DB-9P (9-pin plug)

Pin	Signal Name [1]	I/O [2]	Signal Type [3]	Description
1	RCURETURN	G	GROUND	RCU Data Common Mode Return
2	RCUDATA-P	I/O	BAL	RCU DATA
3	RCUTX	O	CMOS	RCU In Transmit Status
4	ALMIND-N	O	CMOS	Alarm Indicator
5	PARIND-N	O	CMOS	Parity Indicator
6	RCUDATA-N	I/O	BAL	RCU Data
7	SIG GND	G	GROUND	Signal Ground
8	HBPIND-N	O	CMOS	Header Bypass Indicator
9	ONLIND-N	O	CMOS	Online Indicator

**NOTES:**  
 1. Signals with a -P are active at the more positive voltage and signals with -N are active at the more negative voltage, where the voltage levels are defined by the signal type.  
 2. Input/Output direction is with respect to the KIV-7.  
 3. See Paragraph 12.5, Electrical Signal Characteristics

## 12.5 Electrical Signal Characteristics

### 12.5.1 Signal Type Definitions

**GENERAL NOTE:** The term “receivers” refers to input signals, and the term “drivers” refers to output signals, where input and output direction is with respect to the KIV-7.

**BAL/UNB** Corresponds to the -P polarity of drivers and receivers that are selectable (see configuration SETUP C) as BALanced, which conforms to the electrical specifications of RS-422 and RS-485, or UNBAlanced, which conforms to the electrical specifications of RS-232 and RS-423. (See Note 1 below.)

**BAL/GND** Corresponds to the -N polarity of balanced receivers, which must be tied to signal ground when unbalanced operation is selected. (See Note 1 below.)

**BAL/NC** Corresponds to the -N polarity of balanced drivers, which should not be connected when unbalanced operation is selected.

**BAL** BALanced only, which meets the electrical specifications of RS-422 and RS-485. (See Note 1 below.)

**UNB** UNBAlanced only, which meets the electrical specifications of RS-232 and RS-423. (See Note 2 below.)

**CMOS** Meets the electrical specifications of CMOS logic devices.

**OC** Open Collector, provides a path to ground and is capable of sinking a maximum of 150 milliamps at a maximum external source voltage of 24 volts.

**NOTES:**

1. For balanced receivers, if both the -P and -N polarities are left unconnected, the input defaults to the failsafe OFF condition.
2. For unbalanced receivers, if the -P input is left unconnected, the input defaults to the failsafe OFF condition.

### 12.5.2 Electrical Characteristics

T(ambient)=+25°C, VCC=5.0 Volts

SYMBOL	PARAMETER		Balanced		Unbalanced		CMOS
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	
V(h)	+0.2 V	+15.0 V	+0.2 V	+15.0 V	+3.8 V	+6.0 V	
V(ii)	-15.0 V	-0.2 V	-15.0 V	-0.2 V	-0.2 V	+1.5 V	
Z(in)	6 kΩ	14 kΩ	3 kΩ	7 kΩ	10 kΩ	0.1 μF	
	Input Impedance, Resistive		Shunted by				
V(oh)	+2.0 V	+6.0V	+5.0V	+6.0V	+4.5V	+5.5V	
V(oI)	-6.0V	-2.0V	-6.0V	-2.0V	0.0V	+0.2V	
Z(load)	100 Ω	∞	450 Ω	∞	100 kΩ	∞	
t(τ)			[1]	[2]	10 ns	400 ns	

**NOTES:**

1. t(τ) = 20 ns for t(bit) ≤ 200 ns  
= 0.1 x t(bit) for t(bit) > 200ns
2. T(τ) = 300μs for t(bit) ≤ 1ms  
= 0.3 x t(bit) for t(bit) > 1ms

