



Installation Instructions

ControlNet Communication Interface Card (Catalog Numbers 1784-KTC and 1784-KTCX) Series B

To the Installer

Use this document to install and use the 1784-KTC and 1784-KTCX Communication Interface cards. In this document, we refer to both the 1784-KTC and 1784-KTCX cards collectively as 'KTC card'. When one card is different from the other, this document individually calls out the cards by name.

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If you are connecting a KTCX card directly to a ControlNet network you also need this documentation:

- ControlNet Tap Installation Instructions, publication 1786-2.3
- ControlNet Cable Planning and Installation Manual, publication 1786-6.2.1

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this document we use notes to make you aware of safety considerations:



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss.

Attention statements help you to:

- identify a hazard
- avoid the hazard
- recognize the consequences

Important: Identifies information that is critical for successful application and understanding of the product.

Introducing the 1784-KTC and -KTCX Communication Interface Cards

The KTC Communication Interface cards let a 16-bit ISA- or 32-bit EISA-compatible computer communicate directly with Allen-Bradley ControlNet products.

Compliance to European Union Directives

This product has the CE mark (on its packaging) and is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

EMC Directive

This product is tested to meet Council Directive 89/336/EEC Electromagnetic Compatibility (EMC) and the following standards, in whole or in part, documented in a technical construction file:

- EN 50081-2EMC – Generic Emission Standard, Part 2 – Industrial Environment
- EN 50082-2EMC – Generic Immunity Standard, Part 2 – Industrial Environment

This product is intended for use in an industrial environment.

Low Voltage Directive

This product is tested to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131-2 Programmable Controllers, Part 2 – Equipment Requirements and Tests.

For specific information required by EN 61131-2, see the appropriate sections in this publication, as well as the following Allen-Bradley publications:

- Industrial Automation Wiring and Grounding Guidelines For Noise Immunity, publication 1770-4.1
- Guidelines for Handling Lithium Batteries, publication AG-5.4
- Automation Systems Catalog, publication B111



ATTENTION: This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Handling the Card



ATTENTION: The KTc uses CMOS technology, which is highly sensitive to electrostatic discharge (ESD). ESD may be present whenever you are handling the KTc. Handling a card without any ESD protection can cause internal circuit damage that may not be apparent during installation or initial use. A grounding wrist strap has been shipped with the KTc to be worn during the installation procedure. Instructions for use of the strap are found on the back of its package.



wrist-strap
grounding
device

Take these precautions to guard against ESD damage:

- **Before handling the card, be sure to wear the provided static strap and touch a grounded object to discharge any built-up static charge.**
- **Avoid touching the backplane connector or interface connector pins located on the KTc card.**
- **If the card is not in use, store it in the anti-static clamshell that the card was shipped in.**

Important: Remember, a computer with ac power disconnected is *not* a grounded object.

You are now ready to configure your KTc card.

Configuring the KTC Card Hardware

Before you install the KTC card inside your computer, you must set the card's physical addresses for the:

- ROM I/O expansion area of the host processor's system memory—so the KTC card and the host computer can exchange data through the dual-port interface. This is the **base memory address**.
- host processor's I/O map—so the KTC card's I/O devices can receive commands from the host computer. This is the **base I/O space address**.

You can have as many as 4 KTC cards in one computer as long as each has different base memory and base I/O space addresses.

To configure these addresses, you set switches on the KTC card. The KTC card comes factory-set with these addresses:

Address Type	Address Setting (hex)
base memory	D000:0000
base I/O space memory	220

Important: When deciding which addresses to use, remember that:

- each card in your computer must have unique addresses

If another card in the host computer is using one or both of the factory-set addresses, you must change a card's switch settings to an available address.

- the card must have a unique base memory address

If you are	go to
changing addresses on the KTC card	"Selecting the Base Memory Address Location" on page 6
using the factory-set addresses	"Installing the Card Inside the Computer" on page 16

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Selecting the Base Memory Address Location

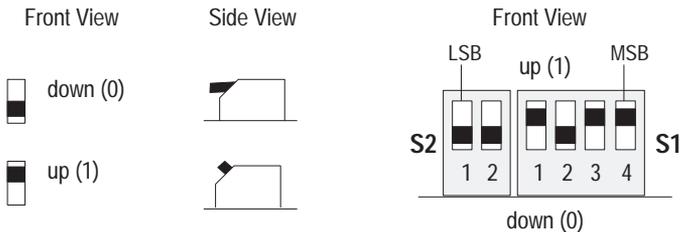
The host computer and the KTC card exchange data via a dual-port interface. The dual-port interface is 16 Kbytes long and it begins at the specified base memory address location.

The KTC card comes set to memory address D000:0000. You may find that this selected memory address has been allocated to other interface cards or expansion memory cards you have installed in your computer system. If this occurs, change the switch settings to an available memory address.

To select a new base memory address:

1. Pick an available address from the ROM I/O adapters area of the host computer's memory. Be sure to choose a block that is 16 Kbytes long.
2. Use Worksheet A to select a new memory address for the KTC card.
3. Use Worksheet B to determine the proper switch settings.

Follow this guide to properly set your switches.



4. Fill in Worksheet C after you've determined your switch settings.
5. Follow the instructions that begin on page 11.

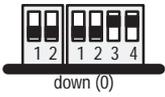
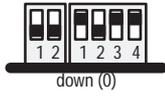
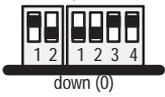
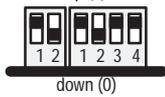
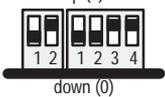
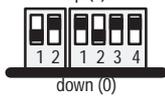
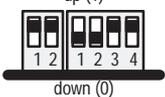
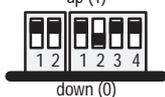
Worksheet A

Base memory allocation worksheet

Base Memory Address (hex)	Host Computer Assignments	Your System
0000:0000–7000:FFFF	512K Read/Write Memory on System Board	
8000:0000–9000:FFFF	128K Read/Write Memory Expansion in I/O Channel	
A000:0000–	Video Buffer	
A400:0000–		
A800:0000–		
AC00:0000–		
B000:0000–		
B400:0000–		
B800:0000–		
BC00:0000–		
C000:0000–		Expansion Card Area (area available for K7c memory addresses)
C400:0000–		
C800:0000–		
CC00:0000–		
D000:0000–		
D400:0000–		
D800:0000–		
DC00:0000–		
E000:0000–F000:FFFF	128K ROM Reserved on System Board	

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Worksheet B
KTc switch settings

Base Memory Addr (hex)	Switch Settings	Base Memory Addr (hex)	Switch Settings
C000:0000	up (1)  down (0)	D000:0000 factory set address & recommended setting	up (1)  down (0)
C400:0000	up (1)  down (0)	D400:0000	up (1)  down (0)
C800:0000	up (1)  down (0)	D800:0000	up (1)  down (0)
CC00:0000	up (1)  down (0)	DC00:0000	up (1)  down (0)

Worksheet C
Your base memory address

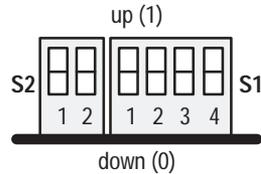
Record the base memory address for the KTc card:

Card: _____

Slot number: _____

Using default address: yes no

If no, new memory address: _____



Selecting the Base I/O Space Address Location

The host addresses I/O devices on the KTe card by using their I/O space address. The host addresses individual devices through registers that have addresses based on the I/O space base address. The registers are 2 bytes long.

The KTe card comes set to base I/O space address 220. You may find that this selected address has been allocated to other interface cards or expansion memory cards you have installed in your computer system. If this occurs, change the switch settings to an open address.

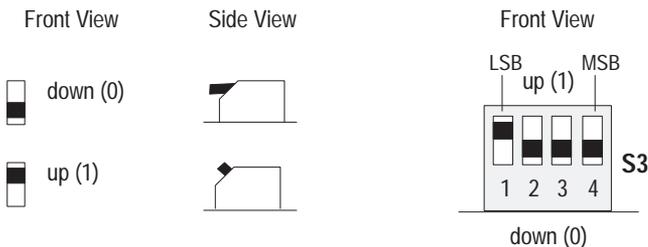
To select a new base I/O space address:

1. Pick an available address from the I/O map area of the host computer's memory. Be sure to choose a block that is 2 bytes long.

Important: Each KTe card requires 2 bytes of I/O space.

2. Use Worksheet D to select a new base I/O space address for the KTe card (i.e., to determine the switch settings for the new address).

Follow this guide to properly set your switches:



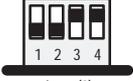
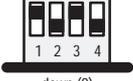
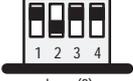
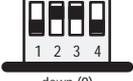
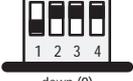
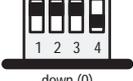
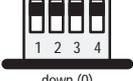
3. Fill in Worksheet E after you've determined your switch settings.
4. Follow the instructions that begin on page 11.

Important: When selecting configuration settings, check for conflicts with other interface cards and system memory. If there is a conflict, the system will not operate properly.

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Worksheet D

KTc switch settings

Base I/O Address (hex)	Switch Settings	Base I/O Address (hex)	Switch Settings
200 <i>potential device conflict: game port</i>	up (1)  down (0)	300 <i>potential device conflict: prototype cards</i>	up (1)  down (0)
220 factory-set address & recommended setting	up (1)  down (0)	320 <i>potential device conflict: HDD</i>	up (1)  down (0)
240	up (1)  down (0)	340	up (1)  down (0)
260	up (1)  down (0)	360	up (1)  down (0)
280	up (1)  down (0)	380 <i>potential device conflict: SDLC</i>	up (1)  down (0)
2A0	up (1)  down (0)	3A0 <i>potential device conflict: SDLC</i>	up (1)  down (0)
2C0 <i>potential device conflict: EGA</i>	up (1)  down (0)	3C0 <i>potential device conflict: EGA</i>	up (1)  down (0)
2E0 <i>potential device conflict: GPIB</i>	up (1)  down (0)	3E0	up (1)  down (0)

Worksheet E

Your base I/O space address

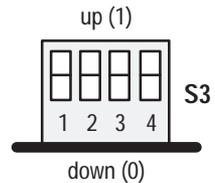
Record the base I/O space address for the KTC card:

Card: _____

Slot number: _____

Using default address: yes no

If no, new I/O space address: _____



Setting the Card's Switches



ATTENTION: When setting the switches, be sure to avoid touching other components on the card.

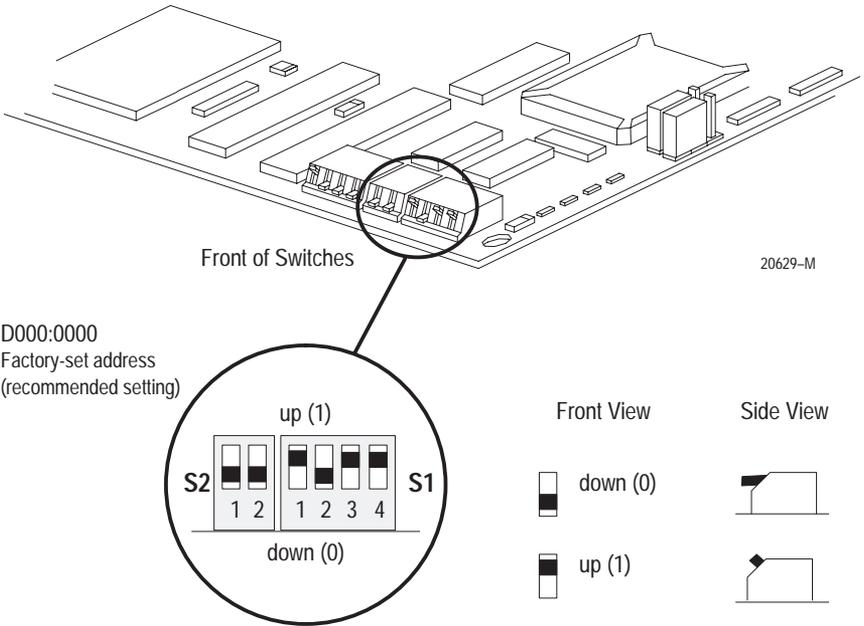
1. Follow the card handling instructions on page 4.
2. Remove the KTC card from the anti-static clamshell.

Important: When selecting configuration settings, check for conflicts with other interface cards and system memory. If there is a conflict, the host computer will not operate properly.

If you have a 386, 486, or Pentium host computer, you must find a way to disable caching and shadow memory for at least the 16K of memory space occupied by each KTC. This can usually be accomplished through your CMOS setup program or memory manager, and must be done *before* running applications with the KTC cards.

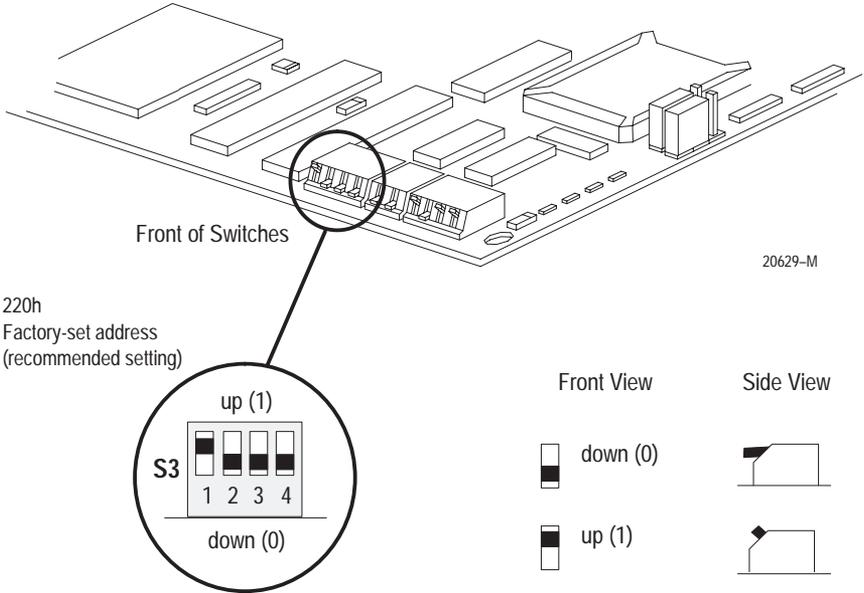
3. If you are using the card's **default memory address setting**, go to step 4.

If you are setting a **new base memory address**, set the switches to either up or down to reflect the selected address from Worksheet C.



4. If you are using the card's **default base I/O space address setting**, go to the next section, Installing the Card Inside the Computer.

If you are setting a **new base I/O space address**, set the switches to either up or down to reflect the selected address from Worksheet E.

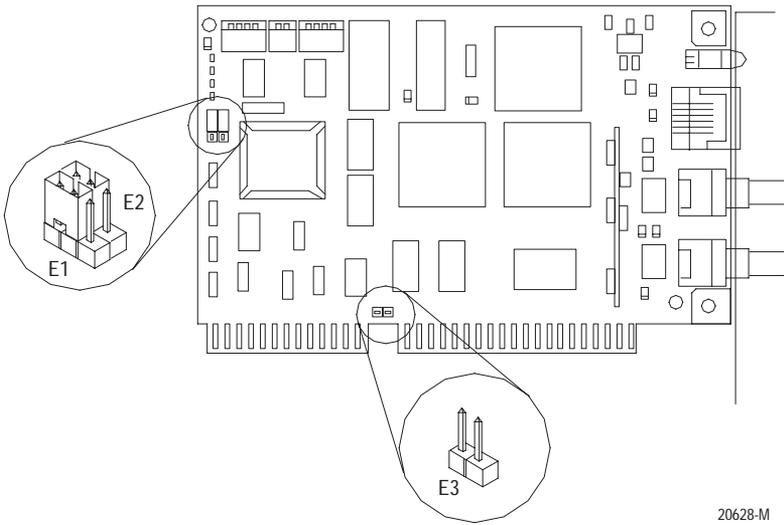


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About the Jumpers

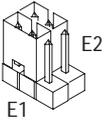
Important: When you receive your KTC card, the jumpers are in the default positions, as shown in Figure 1. Do **not** alter these positions. See Figure 2 for an explanation of these jumpers.

Figure 1
Series B KTC/KTCX jumpers



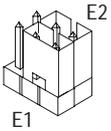
20628-M

Figure 2
Series B Jumper Explanations



Use these jumper positions for:

- Normal card operation
- Field flash upgrade of card's main code



Use these jumper positions for:

- Field flash upgrade of card's boot code

IMPORTANT: All other E1 and E2 jumper combinations are illegal. Unknown card operation will result.



When installed, use this jumper to latch certain address lines that some 286 machines and older may not latch.

If you have this computer	then
286-based or older	you may need to install this jumper
386-based or newer	these address lines are <i>usually</i> latched in the computer and, thus, the jumper is not required

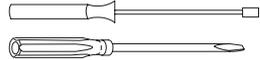
Installing the Card Inside the Computer

Important: Make sure you know how to:

- install hardware in your computer
- configure the computer's options before you install the KTC

Consult your computer's documentation for specific information.

You need a Phillips-head or a flat-head screwdriver, depending on your system.



To install the card:

- gain access to the computer's expansion slots
- insert the card into the computer

Important: The Series B KTC card is 4.2" high (by 6.25" long) and meets the ISA 8-bit add-on card height requirement. The Series A KTC card is 4.7" high and will not fit in all computers.

Accessing the Computer's Expansion Slots

To install the KTC, you must access the computer's expansion slots. Refer to your computer's user guide for instructions on how to:

1. Power down the host computer by turning off the power switch.
2. Remove the computer's cover.
3. Select a vacant 16- or 32-bit expansion slot.

Important: The KTC will function only in a 16- or 32-bit ISA/EISA expansion slot.

4. Remove the slot's expansion cover by loosening the screw on the back (rear bracket) of the computer.

Inserting the Card

To insert the card inside the computer:

1. Follow the card handling instructions on page 4.
2. Make sure you have correctly set all of the switches on the card.
3. Insert the KTC into the edge connector and tighten the expansion slot screw.
4. Turn on the computer to make sure it comes up correctly.

If the computer	then
powers up	go to step 5
hangs up	<p>you probably have a memory or I/O conflict</p> <p>You should</p> <ul style="list-style-type: none"> • change switch settings and cycle power, or • remove all other cards and try again <p>If you are still unsuccessful, contact your local Allen-Bradley sales representative or distributor.</p>

5. Replace the CPU cover (when computer comes up correctly).

Running the 1784-KTC/KTCX Card Installation Check Utility

Run the installation check utility *before you connect to the network* to make sure that your KTC card has been properly installed. Follow these steps:

1. Place the utility disk in drive A of the host computer.

If you are running the utility software from another drive, use the appropriate drive letter.

2. At the DOS prompt, type:

a:\ktcinst 

You see a screen similar to this one:

```

1784-KTC/KTCX Card Installation Check Utility
Version 1.XX - DD-MMM-YY
Copyright 1996 Allen-Bradley Company, Inc.

Usage: KTCINST NetworkAddress [IOaddress]

NetworkAddress= KTC/KTCX Network Address, in hex
IOaddress      = KTC/KTCX I/O base address (Default 220), in hex

In order to run the KTC/KTCX installation utility, you must specify the
network address and the I/O address, if other than 220.

For a network address of 3 and I/O address of 260, type:
      KTCINST 3 260

For a network address of 2 and I/O address of 220 (default), type:
      KTCINST 2

C:\

```

3. Type:

a:\ktcinst 8  (where 8 is the network address you've selected)

You see:

Warning.. Make sure that the card is not connected to a network. Press any key.

4. Press any key.

You see a similar message:

```
Succeeded Make sure that the card is not connected to a network.  
Succeeded Hard resetting KTC/KTCX.
```

5. Recheck the I/O address if hard resetting fails.

```
Succeeded I/O Address: 220, Dual Port Address: D000:0000  
Are these your intended address settings? [y/n]
```

6. Press **Y for yes or **N** for no.**

You see a similar message:

```
Boot code version: 0.23 5/16/94, Serial #: 4294967295 (FFFFFFFFh)  
Main code version: 0.43 9/30/94  
Succeeded Testing dual-port interface.
```

If this test fails, contact your local Allen-Bradley sales representative or distributor.

```
Waiting.. Soft resetting KTC/KTCX as network address 8. Press any key.
```

The utility initializes the network media access controller.

7. Press any key.

You see a similar message:

```
Succeeded Soft resetting KTC/KTCX as network address 8.
```

If this test fails, make certain that you are not connected to a network. Contact your local Allen-Bradley sales representative or distributor.

```
Waiting.. Setting KTC/KTCX to online. Press any key.
```

The utility tests the card's ability to connect to the network.

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8. Press any key.

You see:

```
Succeeded Setting KTC/KTCX to online. KTCX LEDs should show flashing red.
```

Flashing red LEDs indicate that the card can communicate on a network, if it's connected to a network.

If this test fails, contact your local Allen-Bradley sales representative or distributor.

```
Waiting.. Setting KTC/KTCX to offline. Press any key.
```

The utility takes the card off of the network.

9. Press any key

You see:

```
Succeeded Setting KTC/KTCX to offline. KTCX LEDs should show flashing green.
```

Flashing green LEDs indicate that the card successfully made the transition from online to offline, i.e., from simulating network communication to operating independently.

If this test fails, contact your local Allen-Bradley sales representative or distributor.

```
Waiting.. Resetting KTC/KTCX. Press any key.
```

The utility re-initializes the card.

10. Press any key.

You see:

```
Succeeded Resetting KTC/KTCX. KTCX LEDs should alternate green and red.  
Test of KTC/KTCX's basic functionality succeeded. Installation successful.
```

Alternate green and red LEDs indicate that your card reset successfully.

If this test fails, contact your local Allen-Bradley sales representative or distributor.

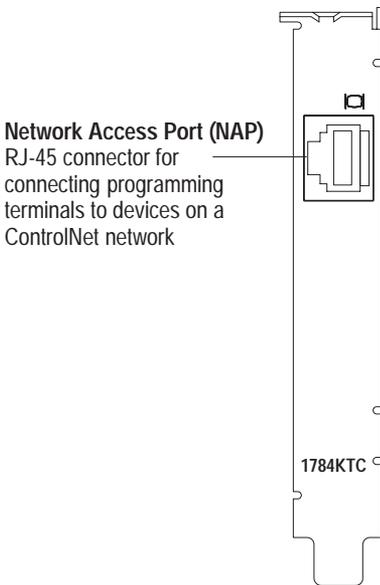
Connecting the Card

After you have installed the card, you can connect it:

- to a device already connected to the ControlNet network (page 23)
- directly to a ControlNet network, which requires a tap (page 26)

Figure 3 shows the KTC card connector.

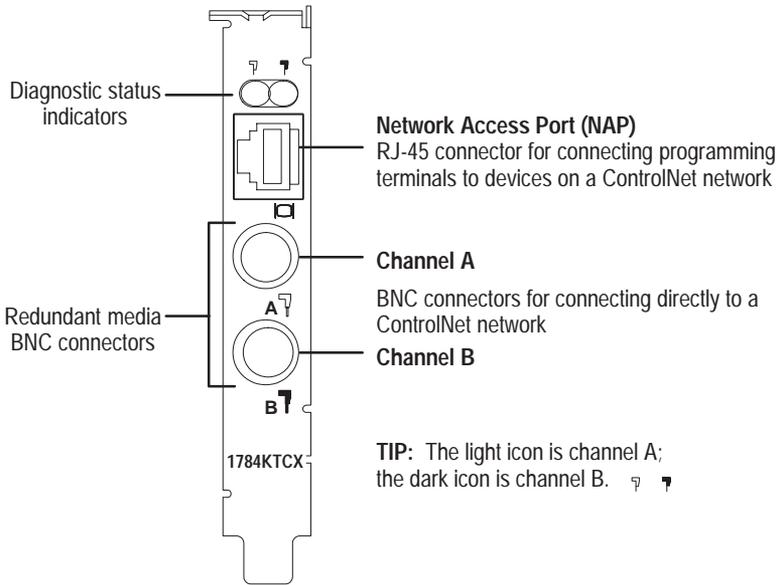
Figure 3
1784-KTC card connector



ATTENTION: Do not use the KTC card to connect to more than one network at a time. Attempting to connect to a second network will cause erratic operation of your communication system.

Figure 4 shows the KTCX card connectors.

Figure 4
1784-KTCX card connectors



See page 27 for information about status indicators. Indicators diagnose only redundant media BNC connections.

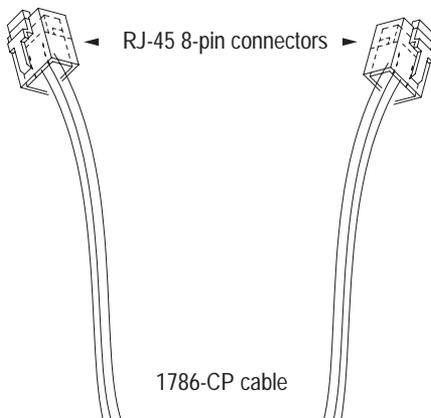
Important: If you are using a non-redundant cabling system, all ControlNet devices must be on the same channel, channel A.

Connecting to a Device on the ControlNet Network

By using the KTe card's RJ-45 connector (known as the network access port or NAP), you can connect the KTe card to a ControlNet network, without a tap, through a programmable controller, I/O adapter, 1770-KFC, or another KTCX card (Figure 6 and Figure 7).

The 1786-CP cable (Figure 5) connects a portable host computer to another computer; it has two RJ-45 8-pin connectors.

Figure 5
1786-CP cable



ATTENTION: Use the **1786-CP** cable when connecting a programming terminal to the network through the network access port (NAP); using another cable could result in possible network failures.

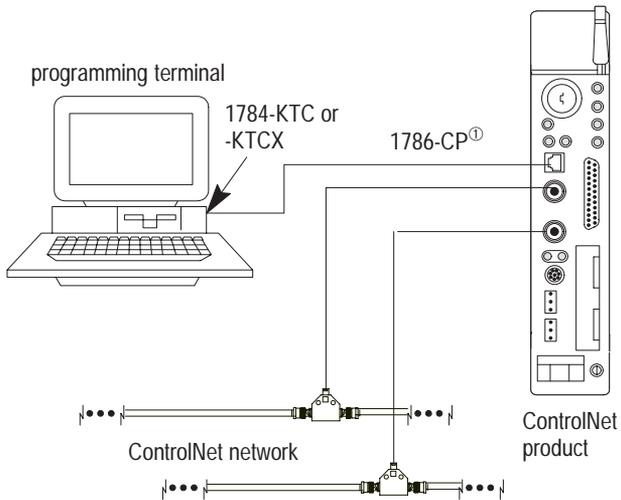
Table A shows the wiring for the cable.

Table A
Wiring for 1786-CP connector cable

Connector 1		
Wire Number	Signal Mnemonic	Signal Name
1	ISO-GND	Isolated Ground
2	N.C.	No Connection
3	PCTX-H	Transmit Data High
4	PCTX-L	Transmit Data Low
5	PTRX-L	Receive Data Low
6	PTRX-H	Receive Data High
7	N.C.	No Connection
8	ISO-GND	Isolated Ground

Connector 2		
Wire Number	Signal Mnemonic	Signal Name
1	ISO-GND	Isolated Ground
2	N.C.	No Connection
3	PTRX-H	Receive Data High
4	PTRX-L	Receive Data Low
5	PCTX-L	Transmit Data Low
6	PCTX-H	Transmit Data High
7	N.C.	No Connection
8	ISO-GND	Isolated Ground

Figure 6
Connecting a portable host computer to a ControlNet network through a programmable controller or an I/O adapter



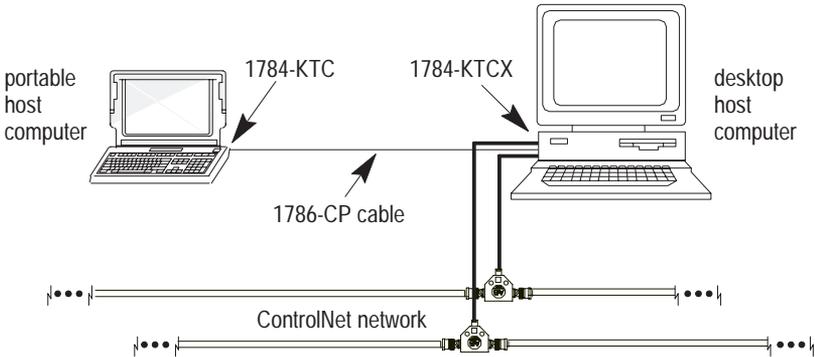
- ① The 1786-CP cable can be plugged into any ControlNet product's NAP to provide programming capability on the ControlNet network. A programming terminal connected through this cable is counted as a node and must have a unique address.



ATTENTION: If you connect the product to a cable system that does not support redundant media, connect the tap dropline to the BNC connector labeled channel A. Channel B is left open.

If the cable system is redundant, connect the product such that all devices on the network use the same cable for the same channel. That is, all channel A connectors connect to one cable; all channel B connectors connect to the other.

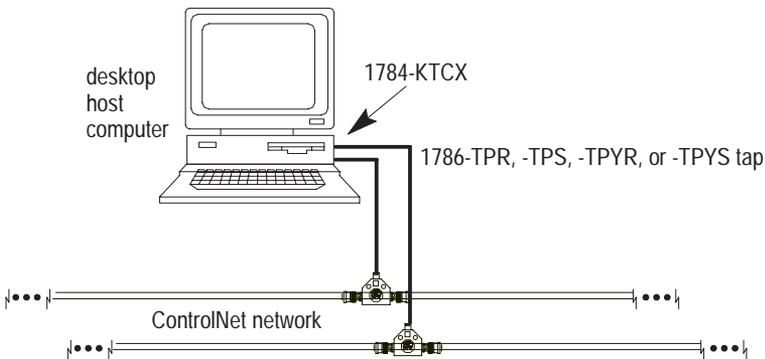
Figure 7
Connecting a portable host computer to ControlNet through a desktop host computer



Connecting the Card Directly to the ControlNet Network

To connect the card directly to a ControlNet network as shown below, follow the instructions in these publications:

- ControlNet Tap Installation Instructions, publication 1786-2.3
- ControlNet Cable Planning and Installation Manual, publication 1786-6.2.1



Interpreting the Status Indicators on the 1784-KTCX

The status indicators on the KTCX card give you information about the card and the network when you're connected via the BNC connectors.

Table B outlines the states, and explains what each state means to you and the action you should take, if any, to correct that state.

Table B
ControlNet status interpretation

- steady – indicator is on continuously in the defined state.
- alternating – the two indicators alternate between the two defined states at the same time (applies to both indicators *viewed together*). The two indicators are always in opposite states, out of phase.
- flashing – the indicator alternates between the two defined states (applies to each indicator *viewed independent* of the other). If both indicators are flashing, they must flash together, in phase.

 A and  B	Cause	Action
off	no power	none or power up
steady red	faulted unit	cycle power or reset unit If fault persists, contact A-B representative or distributor.
alternating red/green	self-test	none
alternating red/off	incorrect node configuration	check network address and other ControlNet configuration parameters

 A or  B	Cause	Action
off	channel disabled	program network for redundant media, if required
steady green	normal operation	none
flashing green/off	temporary errors	none; unit will self-correct
	node is not configured to go on line	make sure the configuration node is present and working ①
flashing red/off	media fault	check media for broken cables, loose connectors, missing terminators, etc.
	no other nodes present on network	add other nodes to the network
flashing red/green	incorrect network configuration	cycle power or reset unit If fault persists, contact A-B representative or distributor.

① The configuration node is the node responsible for distributing ControlNet configuration data to all nodes on the network.

Important: When you have a cable connected to the network access port (NAP), the LEDs are meaningless.

About the Application Software

The Allen-Bradley standard application programming interfaces (APIs) are INTERCHANGE™, WIntelligent LINX™, and RSLinx™ software from Rockwell Software Inc. Contact your local Allen-Bradley sales representative or distributor for further information.

Environmental Specifications

The operating parameters describe the environment within the KTC slot. Refer to the documentation for your computer for environmental requirements. The KTC card should not exceed those specifications.

	Operating	Nonoperating
Slot Temperature	0 to 50° C (32 to 122° F)	-40 to 85° C (-40 to 185° F)
Humidity	5 to 95% without condensation	5 to 95% without condensation
Vibration	10 to 150 Hz, constant .012 in displacement 10 to 150 Hz, constant 2.0G acceleration	not applicable
Shock	30G peak/11 ms	50G peak/11 ms
Agency Certification (when product or packaging is marked)	<ul style="list-style-type: none"> • CSA certified • CSA Class I, Division 2 Groups A, B, C, D certified • UL listed • CE marked for all applicable directives 	

Appendix A: Series A KTC/KTCX Interface Cards

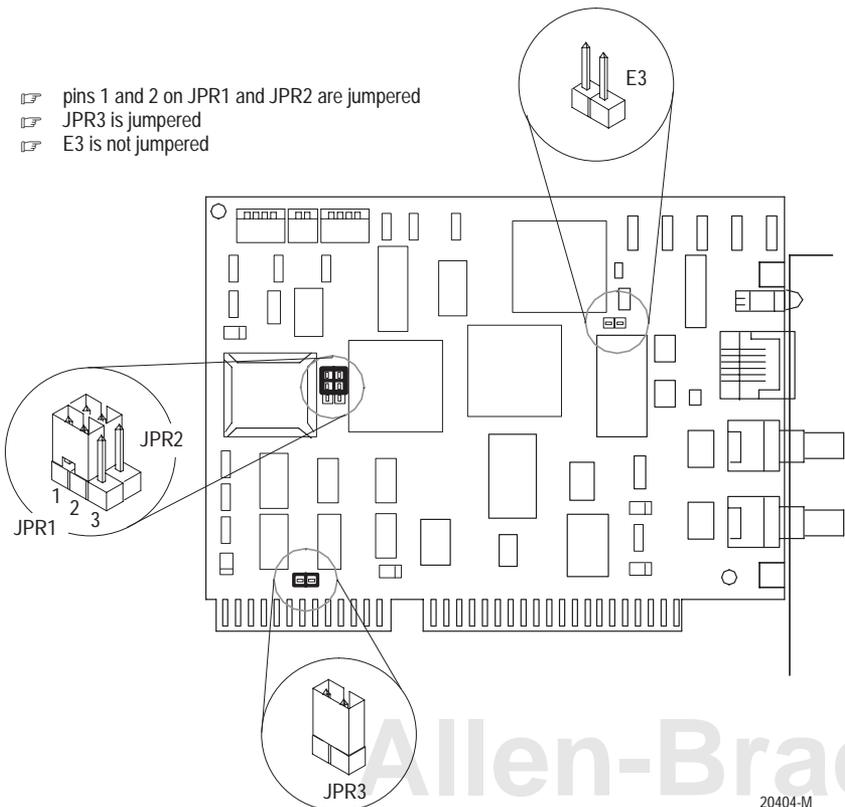
If you have a Series A card, read this appendix to learn about how your Series A card differs from a Series B.

About the Series A Jumpers

Important: Figure 8 shows a Series A KTC card jumpered in the default positions. Do **not** alter these positions. See Figure 9 for an explanation of these jumpers.

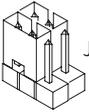
Figure 8
Series A KTC/KTCX jumpers

- ☞ pins 1 and 2 on JPR1 and JPR2 are jumpered
- ☞ JPR3 is jumpered
- ☞ E3 is not jumpered



20404-M

Figure 9
Series A Jumper Explanations

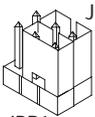


JPR1

JPR2

Use these jumper positions for:

- Normal card operation
- Field flash upgrade of card's main code



JPR1

JPR2

Use these jumper positions for:

- Field flash upgrade of card's boot code

IMPORTANT: All other JPR1 and JPR2 jumper combinations are illegal. Unknown card operation will result.



JPR3

When installed, use this jumper to latch certain address lines that some 286 machines and older may not latch.

If you have this computer

then

286-based or older

you may need to install this jumper

386-based or newer

these address lines are *usually* latched in the computer and, thus, the jumper is not required



E3

Use this jumper only during field flash upgrades.

IMPORTANT: This jumper must be installed during field flash upgrades. This jumper must be removed (uninstalled) during normal card operation.

Selecting the Base Memory Address Location for a Series A Card

Important: You cannot mix 8-bit and 16-bit cards within a 64K segment boundary. That is, a Series A K_{Tc} and K_{T/B} cannot be placed in the same segment range of D000:0000 – DFFF:0000 or C000:0000 – CFFF:0000. The 8-bit card may not work in this setup. The two cards, Series A K_{Tc} (16-bit) and K_{T/B} (8-bit), can be placed with one in the C000:0000 – CFFF:0000 range and one in the D000:0000 – DFFF:0000 range.

Installing the Series A K_{Tc}/K_{TcX} Card Inside the Computer

Important: The Series A K_{Tc} card is 4.7” high and will not fit in all computers. The Series B K_{Tc} card is 4.2” high (by 6.25” long) and meets the ISA 8-bit add-on card height requirement.

Inserting the Series A K_{Tc}/K_{TcX} Card

Important: If you have a Pentium processor and the computer won't boot from the hard drive after installation of the K_{Tc}/K_{TcX} card, examine Pentium/SCSI incompatibility.

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Allen-Bradley Headquarters, 1201 South Second Street, Milwaukee, WI 53204 USA
Tel: (1) 414 382-2000 Fax: (1) 414 382-4444