

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Visit our website - *Click HERE*

ALLEN-BRADLEY

Communication Interface Module

Cat. No. 1784-KT2/B

Installation Data

Introducing the 1784-KT2/B Communication Interface Module

The 1784-KT2/B Communication Interface Module allows an IBM PS/2 compatible MicroChannel computer to communicate directly with Allen-Bradley PLC-2 or PLC-3 family programmable controllers. The 1784-KT2/B also allows an IBM PS/2 compatible MicroChannel computer to communicate over the Allen-Bradley Data Highway Plus network to all Data Highway Plus family programmable controllers.

WARNING: The following provides information for Allen-Bradley Industrial Computer and Communication Group (ICCG) products that have been verified to meet the Electromagnetic Interference (EMI) requirements of the Federal Communication Commission (FCC) and the Canadian Department of Communications for use in a commercial environment:

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

WARNING: 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.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

We will refer to the 1784–KT2/B Communication Interface Module as simply the 1784–KT2 throughout this document.

What this Document Contains

This document contains information on the following topics:

Introducing the 1784–KT2/B Communication Interface Module
Important User Information
Features of the 1784-KT2
How the 1784–KT2 Operates
Preparing the IBM PS/2 Reference Diskette for the 1784–KT2 Configuration
Installing the 1784–KT2
Configuring the 1784–KT2
Connecting the 1784–KT2
The 1784–KT2 Diagnostic Program
Diagnostic Program Files
Installing the Diagnostic Program onto a Hard Disk
Starting Up the Diagnostic Program
Running the Diagnostic Program
Diagnostic Program Error Messages
The Diagnostic Program Output File
Building Loopback Connectors
Ordering Information
Specifications

Important User Information

Because of the variety of uses for 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.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

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 which should be taken into consideration when applying products such as those described in this publication.

Reproduction of the contents of this copyrighted publication, in whole or in part, without written permission of Allen–Bradley Company, Inc. is prohibited.

WARNING: With any complex communication system you need to identify potential application–related communication problems and make provisions in the system design to prevent hazardous or undesired consequences if a problem occurs. These problems include, but are not necessarily limited to, the possibility of:

unexpected loss of communication
erroneous or incomplete data being supplied to the network and passed on to your application

Features of the 1784-KT2

The 1784-KT2 Communication Interface Module is an IBM PS/2® MicroChannel card that you can insert into any 8- or 16-bit IBM PS/2 expansion slot. The 1784-KT2 provides the following features:

makes your PS/2 computer an active node on Data Highway Plus
provides single cable connection to a PLC-2, PLC- 3, or PLC-5 family programmable controller
operates with 6200 programming software
is address selectable; you can use with other option boards installed in your PS/2 computer
when combined with Allen-Bradley 6001-F1E2 software, allows you to create your own custom interface to Data Highway Plus

Compatibility

The 1784-KT2 has been verified for operation with the following computers:

Allen-Bradley 6123, 6124
IBM PS/2 7541, 7561, 8550, 8555, 8560, 8570, 8580

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

How the 1784-KT2 Operates

The 1784-KT2 allows you to communicate with PLC-2s, PLC-3s, and Data Highway Plus nodes. The 1784-KT2 conducts the data communication, management, and local Data Highway Plus diagnostics. The interface to the personal computer is through board-resident shared memory that passes preformatted Data Highway Plus packets. Upon powering up the computer and downloading module code, diagnostics are run automatically to verify the 1784-KT2's operation. Allen-Bradley's 6001-F1E2 software manages the transmission and reception of data through board-resident shared memory.

Preparing the IBM PS/2 Reference Diskette for 1784-KT2 Configuration

To prepare the IBM PS/2 Reference diskette for 1784-KT2 configuration capability, you must:

create a backup copy of the IBM PS/2 Reference diskette and the 1784-KT2 Options and Diagnostics diskette
copy the 1784-KT2 Adapter Description file to the backup copy of the IBM PS/2 Reference diskette
create a backup copy of your PS/2 computer's current configuration

The following sections provide information on the above procedures.

Creating Backup Diskettes

Before installing or configuring your 1784-KT2, make a backup of the 1784-KT2 Options and Diagnostics diskette that was shipped with your 1784-KT2. Follow IBM instructions for completing this process.

Also make a backup of your most recent version of the IBM PS/2 Reference diskette. In this document, we refer to this backup copy as the "current" IBM PS/2 Reference diskette. Follow IBM instructions for completing this process.

After you have created the above backup copies, store the original diskettes.

Copying the 1784–KT2 Adapter Description File

This section provides information on how to copy the 1784-KT2 Adapter Description file (60C6.ADF) from the backup 1784-KT2 Options and Diagnostics diskette to the current IBM PS/2 Reference diskette. You cannot configure the 1784-KT2 until the Adapter Description file is added to the current IBM PS/2 Reference diskette.

To copy the Adapter Description file, follow the steps below:

1. Insert the current IBM PS/2 Reference diskette into drive A of your computer.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

2. Turn on the power switch. The following message appears:

```
Press [ENTER] to continue.
```

Press [ENTER].

3. The main menu appears:

MAIN MENU

1. Learn about the computer

2. Backup the Reference Diskette

3. Set configuration

4. Set features

5. Copy an option diskette

6. Move the computer

7. Test the computer

Use or to select. Press Enter.

Escape=Quit F1=Help

Move the cursor down to the **Copy an Option Diskette** option and press [ENTER].

4. The following message appears:

```
Remove your backup copy of the Reference
diskette and insert the options diskette into drive
A.
```

Insert the 1784-KT2 Options and Diagnostics diskette into drive A and press [ENTER]. Follow the instructions on your screen.

The above process copies only the 1784-KT2 Adapter Description file to the current IBM PS/2 Reference diskette. When this copy procedure is complete, store both diskettes.

Creating a Backup of the PS/2 Computer's Current Configuration

Important: We assume you have prepared your current IBM PS/2 Reference diskette for 1784-KT2 configuration capability. If you have not yet done so, turn to the section earlier in this document.

To create a backup of the PS/2 computer's current configuration, follow the steps below:

1. Insert the current IBM PS/2 Reference diskette into drive A.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

2. Turn on the power switch. The following message appears:

```
Press [ENTER] to continue.
```

Press [ENTER].

3. The main menu appears:

MAIN MENU

1. Learn about the computer

2. Backup the Reference Diskette

3. Set configuration

4. Set features

5. Copy an option diskette

6. Move the computer

7. Test the computer

Use or to select. Press Enter.

Escape=Quit F1=Help

Move the cursor down to the **Set Configuration** option and press [ENTER].

4. The Set Configuration menu appears:

Set Configuration

1. View configuration

2. Change configuration

3. Backup configuration

4. Restore configuration

5. Run automatic configuration

Press a number to select

Esc=Quit F1=Help

Move the cursor down to the **Backup Configuration** option and press [ENTER]. This creates a backup of your PS/2 computer's current configuration.

5. When the procedure is complete, press [ENTER] to return to the Set Configuration menu.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

6. Press [ESC] to quit.

7. Remove the current IBM PS/2 Reference diskette from drive A and re-start the PS/2 computer.

Installing the 1784-KT2

This section provides information on installing the 1784-KT2 into an Allen-Bradley 6123, an Allen-Bradley 6124, or an IBM PS/2 computer. When installing the 1784-KT2 into a 6123 or 6124, refer to the 6123/6124 User's Manual (publication 6123-2.1).

Important: Read the IBM PS/2 Model Quick Reference guide before you install the 1784-KT2. Pay close attention to the section entitled "Installing Options."

> **CAUTION:** The 1784-KT2 utilizes CMOS Technology, which is highly sensitive to electrostatic discharge (ESD). ESD may be present whenever you are handling the 1784-KT2. Handling the 1784-KT2 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 1784-KT2 to be worn during the installation procedure. Instructions for use of the strap are found on the back of its package.

The following is a list of precautions to guard against ESD damage:

Before handling the module, 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 1784-KT2.
If the module is not in use, store the 1784-KT2 in the static bag that the module was shipped in.

To install the 1784-KT2, follow the steps below:

1. Disconnect the ac power to the computer.

2. Remove the computer's system-unit cover (according to the manufacturer's instructions).

3. Select a vacant 8- or 16-bit expansion slot.

   Important: The 1784-KT2 will function in an 8- or a 16-bit expansion slot only.

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

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

5. Insert the 1784-KT2 into the edge connector and tighten the expansion slot screw.

6. Replace the system-unit cover.

7. Connect the ac power to the computer.

You are now ready to configure your 1784-KT2.

Configuring the 1784-KT2

Important: We assume you have already made a backup of your IBM PS/2 Reference diskette and prepared it for 1784-KT2 configuration capability. If you have not yet done so, refer to the section earlier in this document.

In the following, [ENTER] indicates when you must press the enter key.

To configure the 1784-KT2, follow the steps below:

1. Insert the current IBM PS/2 Reference diskette into drive A.

2. Turn on the computer.

3. During the boot process, the computer beeps twice and error code 165 appears on the screen. This indicates an adapter configuration change. The following message appears:

   ```
   Press Enter to continue
   ```

   Press [ENTER].

4. You are asked the following:

   ```
   Automatically configure the system? (Y/N)
   ```

   Type:

   n [ENTER].

5. When the main menu appears, move the cursor down to the **Set Configuration** option and press [ENTER].

6. When the Set Configuration menu appears, move the cursor down to the **Change Configuration** option and press [ENTER]. A configuration table with the following type of information appears (variation is probable):

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

```
                    Change Configuration
Total System Memory
        Installed Memory.....2048KB (2.0MB)
        Useable Memory.....2048KB (2.0MB)
Built-In Features
        Installed Memory.....2048KB (2.0MB)
        Diskette Drive A Type.....1.44MB [3.5”]
        Diskette Drive B Type.....[Not Installed]
        Math Coprocessor.....[Not Installed]
        Serial Port.....[Serial_1]
        Parallel Port.....[Parallel_1]
Slot 1-Allen-Bradley Company 1784-KT2
        Memory Address.....[0C0000h-0C3FFFh]
        Interrupt Level.....[IRQ9]
        Auxiliary Communication
        Port.....[PLC-2/-3 Direct Connect]

        Esc=Quit  F5=Previous  F10=Save  Home  Page up

        F1=Help  F6=Next  End  Page Down
```

7. Select a memory address by moving the cursor down to the 1784-KT2 **Memory Address** option. The 1784-KT2 supports the following memory addresses (in hexadecimal):

0C0000 - 0C3FFF

0C4000 - 0C7FFF

0C8000 - 0CBFFF

0CC000 - 0CFFFF

0D0000 - 0D3FFF

0D4000 - 0D7FFF

0D8000 - 0DBFFF

0DC000 - 0DFFFF

Use [F5] and [F6] to scroll back and forth through the addresses. Display your selection on the screen. Make sure you select an address that is not being used by another adapter card in your PS/2 computer. If you select an address currently in use, an asterisk will appear next it.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

CAUTION: Configuring two adapter cards at the same address may damage your cards and your PS/2 computer.

---

8. Set the interrupt level by moving the cursor down to the **Interrupt Level option**. The 1784-KT2 supports the following interrupts:

- IRQ9
- IRQ10
- IRQ11
- IRQ12

Use [F5] and [F6] to scroll back and forth through the interrupts. Display your selection on the screen. Make sure you select an interrupt that is not being used by another adapter card in your PS/2 computer.

9. Set the auxiliary communication port by moving the cursor down to the **Auxiliary Communication Port** option. This port, one of the two communication ports available through a single 1784-KT2 connector, is used for communication with a PLC-2 or PLC-3 connected to the 1784-KT2.

The other communication port, the main port, is used for Data Highway Plus communication when the 1784-KT2 is connected to the Data Highway Plus network. You do not need to configure the main port.

The 1784-KT2 supports the following auxiliary port options:

PLC-2/3 Direct Connect Reserved (for future 1784-KT2 auxiliary port usage)
Use [F5] and [F6] to display “PLC-2/-3 Direct Connect” on your screen.

10. Press [F10] to save the memory, interrupt, and auxiliary communication port options.

11. You are asked if you want to continue. Press [ENTER].

12. Press [ESC] to return to the Set Configuration menu.

13. Press [ESC] again. A message indicating a configuration change has been made appears on your screen. Remove the current IBM PS/2 Reference diskette.

14. Press [ENTER] to restart the computer.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

Connecting the 1784-KT2

Important: Make sure you have the software that supports connecting the 1784-KT2 to your programmable controller. If you are not sure your software supports this connection, contact your local Allen-Bradley sales office

The following sections provide directions for connecting a 1784-KT2 to a PLC-2, PLC-3, or PLC-5. Refer to Table 1 for the catalog numbers of the cables you need to use and the corresponding PLCs.

Table 1
Required Cables for Connecting to a Programmable Controller

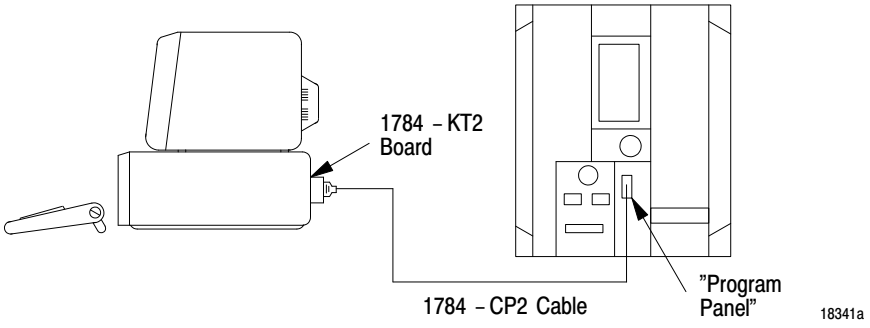
Use this cable:	When connecting to:
1784-CP2	PLC-2 Family Programmable Controllers
1784-CP3	PLC-3 Family Programmable Controllers
1784-CP	PLC-5 Family Programmable Controllers
1784-CP6	PLC-5/40 and PLC-5/60 Programmable Controllers (refer to publication 1784-2.26)
1784-CP7 Adapter with 1784-CP Cable	PLC-5/40 and PLC-5/60 Programmable Controllers (refer to publication 1784-2.29)

Connecting the 1784–KT2 to a PLC–2

To connect the 1784-KT2 to a PLC-2, follow the steps below:

WARNING: To avoid personal injury, always disconnect the ac power before making the cable connection.

1. Plug the 62-pin connector end of the 1784-CP2 cable into the 1784-KT2 and secure with captive screws.



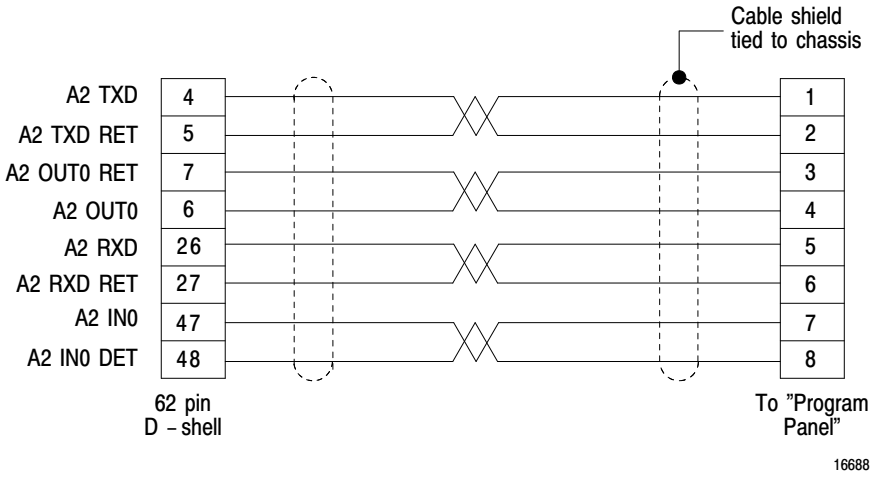
2. Connect the other end of the 1784-CP2 cable into the PROGRAM PANEL connector on the PLC-2.

3. Reinstall the ac power cord and turn on the computer.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

Figure 1 shows cable pinouts for the 1784-CP2 cable.

Figure 1
Cable Pinouts for the 1784-CP2 Cable



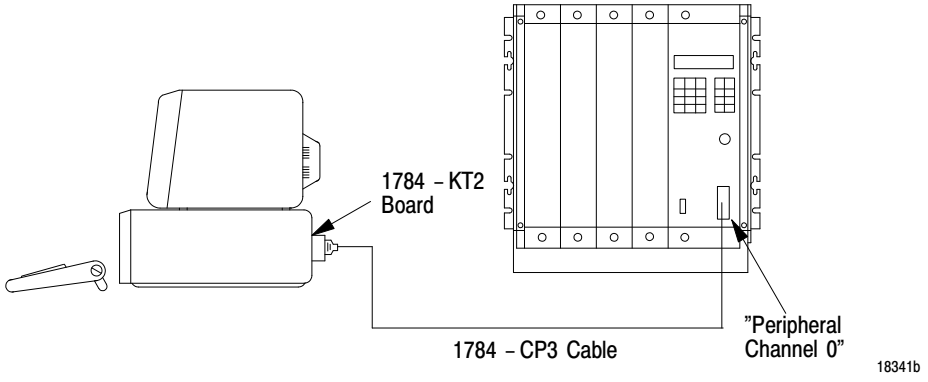
Connecting the 1784–KT2 to a PLC–3

To connect the 1784-KT2 to a PLC-3, follow the steps below:

WARNING: To avoid personal injury, always disconnect the ac power before making the cable connection.

---

1. Plug the 62-pin connector end of the 1784-CP3 cable into the 1784-KT2 and secure with captive screws.



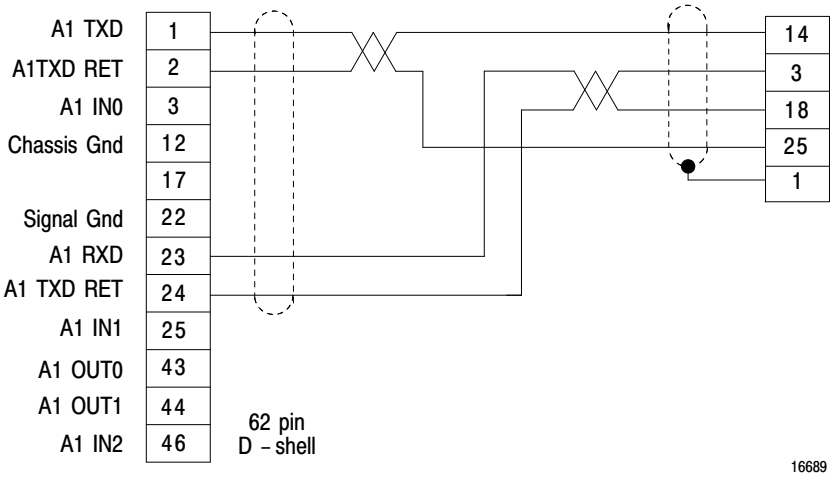
2. Connect the other end of the 1784-CP3 cable (labeled "Industrial Terminal End") into the PERIPHERAL CHANNEL 0 connector on the PLC-3.

3. Reinstall the ac power cord and turn on the computer.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

Figure 2 shows cable pinouts for the 1784-CP3 cable.

Figure 2
Cable Pinouts for the 1784-CP3 Cable



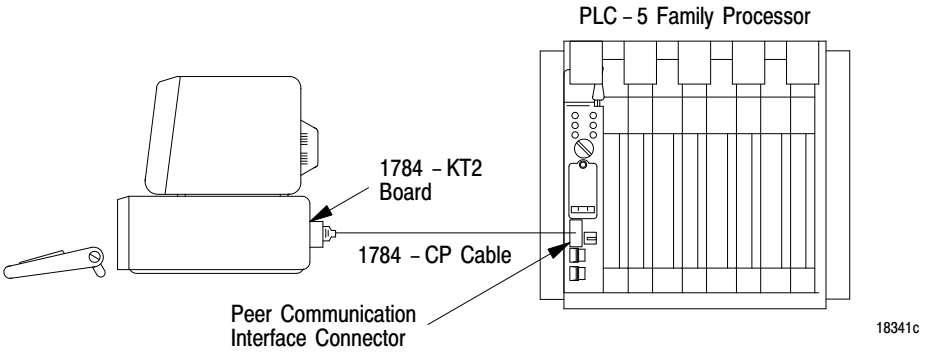
Connecting the 1784–KT2 to a PLC–5

To connect the 1784-KT2 to a PLC-5, follow the steps below:

WARNING: To avoid personal injury, always disconnect the ac power before making the cable connection.

---

1. Plug the 62-pin connector end of the 1784-CP cable into the 1784-KT2 and secure with captive screws.



Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

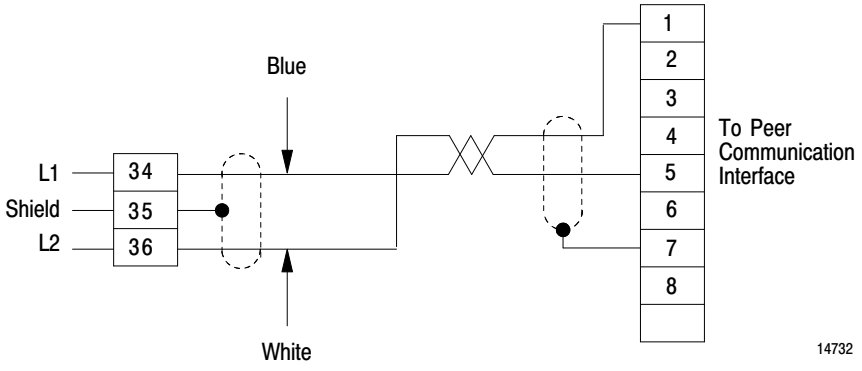
2. Connect the other end of the 1784-CP cable into the PEER COMM INTFC connector on the PLC-5.

3. Reinstall the ac power cord and turn on the computer.

Important: To allow communication between PLC-5s and other Data Highway Plus nodes, you must connect your PS/2 to a PLC-5 using a 1784-CP cable. The Data Highway Plus network is connected to the PLC-5.

Figure 3 shows cable pinouts for the 1784-CP cable.

Figure 3
Cable Pinouts for the 1784-CP Cable



The 1784-KT2 Diagnostic Program

The 1784-KT2 Diagnostic Program allows you to execute a set of tests to help you make sure the 1784-KT2 is functioning properly. These tests check various operational characteristics, such as network and host communications, interrupts, and memory access. Test results are displayed on your screen and recorded in the diagnostic program output file.

Important: If the 1784-KT2 does not function properly under normal operation, follow the steps below:

1. Check the configuration settings (refer to the section entitled “Configuring the 1784-KT2”). You may have configured the 1784-KT2 at an address already in use by another adapter module.

2. If the 1784-KT2 continues to function improperly, run the 1784-KT2 Diagnostic Program to determine if there are any hardware failures. If hardware failures are indicated, refer to the output file for resulting error messages. (Refer to the sections entitled “The Diagnostic Program Output File” and “Diagnostic Program Error Messages” for additional information.)

3. If, after following steps 1 and 2, the 1784-KT2 continues to function improperly, contact your local Allen-Bradley sales office.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

To properly execute the diagnostic program, you must have the following:

an IBM PS/2 7541, 7561, 8550, 8555, 8560, 8570, or 8580 computer with the 1784-KT2 installed

OR
an Allen-Bradley 6123 or 6124 computer with the 1784-KT2 installed
DOS V3.3 or greater
a PLC-2 or PLC-3 loopback connector (required for Off-Line Communications Diagnostics tests)

For information on how to build the loopback connector, refer to section entitled “Building Loopback Connectors”.

Diagnostic Program Files

Below is a list of the diagnostic program files that you can find on the Options and Diagnostics diskette:

KT2DIAG.EXE
KT2MSG.TXT
KT2DLG.TXT
@60C6.ADF
KT<DIR>

The following files are located in the KT sub-directory:

KT2ST0.BIN
KT2ST1.BIN
KT2ST2.BIN
KT2INT.BIN
KT2PLC2.BIN
KT2PLC3.BIN
KT2DHP.BIN

Installing the Diagnostic Program onto a Hard Disk

Important: If you have not already done so, create a backup copy of the Options and Diagnostics diskette according to IBM instructions.

In the following example, the hard disk is referred to as **C**: . You are not required to install the diagnostic program onto a hard disk. Also, [ENTER] indicates when you must press the enter key.

To install the diagnostic program onto a hard disk, follow the steps below:

1. Turn on the computer.

2. When the prompt appears, type the following to select the hard disk:

```
c:  [ENTER]
```


Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

3. When the prompt appears, type the following to select the top directory of the hard disk:

   ```
   cd c:\  [ENTER]
   ```

4. When the prompt appears, type the following to create a directory called KT:

   ```
   mkdir kt  [ENTER]
   ```

5. When the prompt appears, type the following to create a directory called KT2DIAG:

   ```
   mkdir kt2diag  [ENTER]
   ```

6. When the prompt appears, insert the backup copy of the Options and Diagnostics diskette into drive A: .

7. Type the following to copy the Z80 diagnostic files to the KT directory:

   ```
   copy a:\kt\*.* c:\kt  [ENTER]
   ```

8. When the prompt appears, type the following to copy the diagnostic program files to the KT2 directory:

   ```
   copy a:\*.* c:\kt2diag  [ENTER]
   ```

The diagnostic program now resides in the C:\KT2DIAG directory, and the files the diagnostic program depends on now reside in the C:\KT directory.

Starting Up the Diagnostic Program

Read the following checklist to help avoid damage to your network **before** starting up the diagnostic program:

Make sure your network or PLC is **not** connected to a 1784-KT2 while the diagnostic program is running.

Make sure other programs are **not** running at the same time the diagnostic program is running.

Do not run the diagnostic program in a **windowing or multi-tasking environment**. The diagnostic program does not support these environments.

Make sure there are no **terminate-stay-resident** (TSR) software programs loaded in your PS/2 before you run the diagnostic program.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

The following sections describe how to start the diagnostic program from the:

backup copy of the Options and Diagnostics diskette

OR

hard disk

You are not required to start the diagnostic program from both the backup copy of the Options and Diagnostics diskette and the hard disk.

If you plan to start the diagnostic program from the hard disk, turn to the section ‘‘Starting Up from a Hard Disk” later in this document.

In the following sections, [ENTER] indicates when you must press the enter key.

Starting Up from the Options and Diagnostics Diskette

Important: Before starting the diagnostic program from the backup copy of the Options and Diagnostics diskette, read the following:

Do not remove the backup copy of the Options and Diagnostics diskette while the diagnostic program is running. The diagnostic program cannot write test results to the output file if the diskette is not in the floppy drive.
Make sure the write protection switch on the Options and Diagnostics diskette is off when the diagnostic program is running. The diagnostic program cannot write test results to the output file if the write protection switch is on.
Always exit the diagnostic program through the “exit” menu to avoid losing the output file.

To start the diagnostic program from the backup copy of the Options and Diagnostics diskette, follow the steps below:

1. Turn on your computer.

2. When the prompt appears, insert the backup copy of the Options and Diagnostics diskette.

3. Select the directory containing the diagnostic program by typing:

```
a:  [ENTER]
```

When the prompt appears, type:

```
cd a:\  [ENTER]
```


Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

Important: The diagnostic program adds new test results to results already existing in the output file. If you want to delete test results already existing in the output file, wait for the prompt to appear and type:

```
del kt2out.txt  [ENTER]
```

Do this before you proceed to step 4.

4. When the prompt appears, type the following:

```
kt2diag  [ENTER]
```

You see the following message:

> **WARNING:** Serious damage will occur if 1784-KT2 is connected to a network. Press any key to acknowledge:
>
> Make sure the 1784-KT2 is not connected to your network and press any key to continue.

---

5. Again you are asked if you want to continue. If you have followed the precautions to guard against network damage explained earlier in this section, type **y**. If you have not yet read this information, type **n** to exit the diagnostic program. You **must** read this information before going any further.

6. An Allen-Bradley copyright message appears on the screen. Press any key to continue.

The Allen-Bradley 1784-KT2 Diagnostic Program menu appears on your screen. You are now ready to run the diagnostic program as explained later in this document.

Starting Up from a Hard Disk

Important: We assume you have installed the diagnostic program onto the hard disk. If you have not done so, refer to the section earlier in this document.

In the following example, the hard disk is referred to as **C**: .

To start the diagnostic program from a hard disk, follow the steps below:

1. Turn on the computer.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

2. Select the directory containing the diagnostic program by typing:

```
c:  [ENTER]
```

When the prompt appears, type:

```
cd c:\kt2diag  [ENTER]
```

Important: The diagnostic program adds new test results to results already existing in the output file. If you want to delete test results already existing in the output file, wait for the prompt to appear and type:

```
del kt2out.txt  [ENTER]
```

Do this before you proceed to step 3.

3. When the prompt appears, type:

```
kt2diag  [ENTER]
```

You see the following message:

> **WARNING:** Serious damage will occur if 1784-KT2 is connected to a network. Press any key to acknowledge:
>
> Make sure your 1784-KT2 is not connected to your network and press any key to continue.

---

4. Again you are asked if you want to continue. If you have followed the precautions to guard against network damage explained earlier in this section, type **y**. If you have not yet read this information, type **n** to exit the diagnostic program. You **must** read this information before going any further.

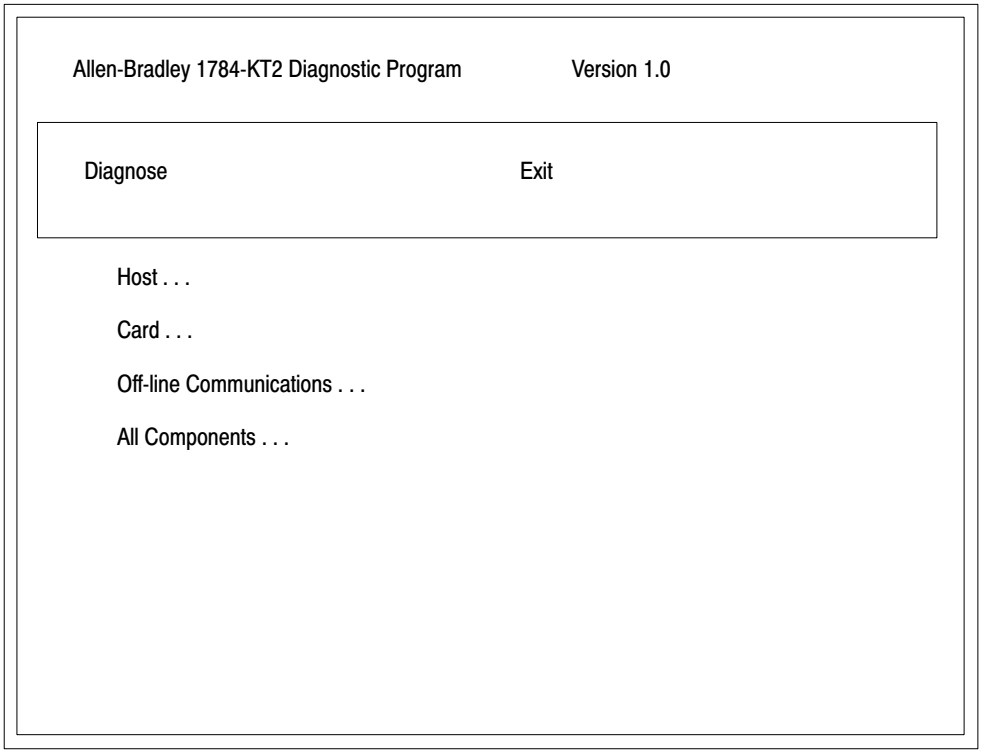
5. An Allen-Bradley copyright message appears on your screen. Press any key to continue.

The Allen-Bradley 1784-KT2 Diagnostic Program menu appears on your screen. You are now ready to run the diagnostic program.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

Running the Diagnostic Program

When you have completed the start-up procedures, the following screen appears:



You must now specify which 1784-KT2 module you want to test. To do this, follow the steps below:

1. Press [F3]. The number of each slot containing a 1784-KT2 is displayed.

2. Specify the slot number of the 1784-KT2 you want to test by moving the cursor to the desired slot number and pressing [ENTER]. You can press [F3] to select a new module whenever [F3] appears on the screen.

The following sections describe each of the above diagnostic options.

The Host Diagnostics Test

The Host Diagnostics option allows you to test for proper communication between the PS/2 computer and the 1784-KT2. To perform this test, follow the steps below:

1. Place your cursor on the Host option and press [ENTER].

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

2. You are asked if you want to run a single test (Single Pass) or a specified number of tests (Repeat). Place your cursor on Single Pass or on Repeat and press [ENTER].

If you choose Repeat, you are asked how many passes you want to make. Specify this number and press [ENTER].

After you make your selection, the following screen appears:

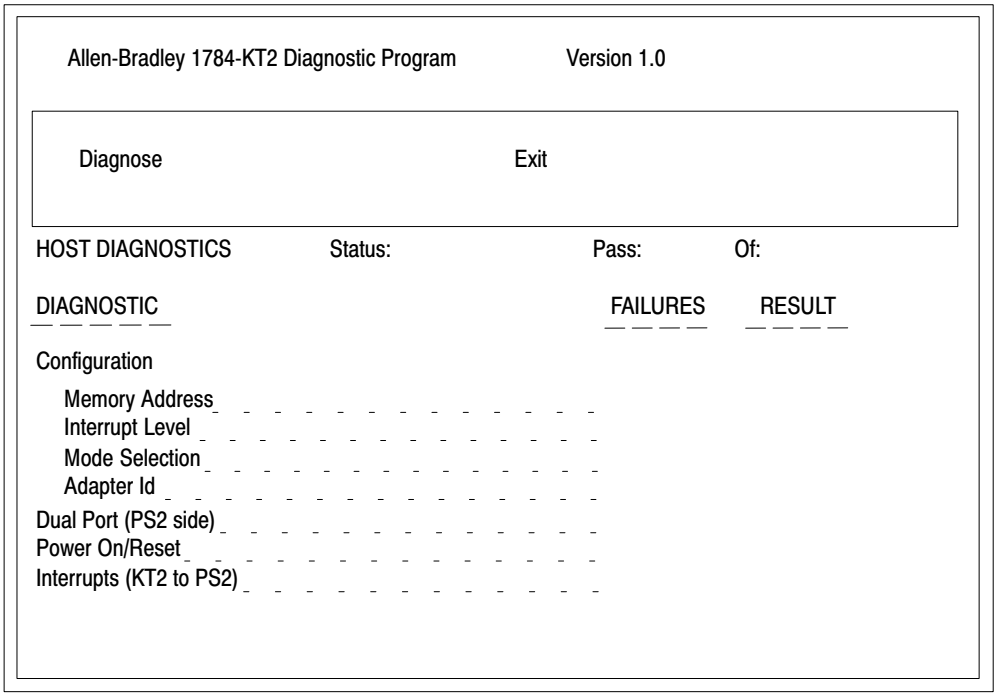


Table 2 describes each of the above terms.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

Table 2
Host Diagnostics Screen Definitions

This term:	Indicates:
Configuration	the 1784-KT2's configuration parameters.
Memory Address	the 1784-KT2's configured memory address.
Interrupt Level	the 1784-KT2's configured interrupt level.
Mode Selection	the 1784-KT2's configured auxiliary communication port.
Adapter ID	the 1784-KT2's adapter identification number (60C6).
Dual Port (PS2 side)	test results of the PS/2's ability to read/write to and from the dual port memory. If any errors occur, the failure counter increments and continues with the next text.
Power On/Reset	test results of the PS/2's ability to reset the 1784-KT2. After reset, the 1784-KT2's status and execution capabilities are verified. If any errors occur, the failure counter increments and continues with the next test.
Interrupts (KT2 to PS2)	test results of the interrupt capabilities from the 1784-KT2 to the PS/2. If the PS/2 cannot receive an interrupt from the 1784-KT2, the failure counter increments and continues with the next test.

The Host Diagnostics test runs according to the number of times specified in step two. Your screen shows you when the tests are complete (Status column), how many errors were discovered (Failures column), and final test results (Result column).

3. When you are finished, press any key to return to the main menu.

The Card Diagnostics Test

The Card Diagnostics option allows you to test the 1784-KT2s various components and operations. To perform this test, follow the steps below:

1. Place your cursor on the Card option and press [ENTER].

2. You are asked if you want to run a single test (Single Pass) or a specified number of tests (Repeat). Place your cursor on Single Pass or on Repeat and press [ENTER].

If you choose Repeat, you are asked how many passes you want to make. Specify this number and press [ENTER].

After you make your selection, the following screen appears:

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

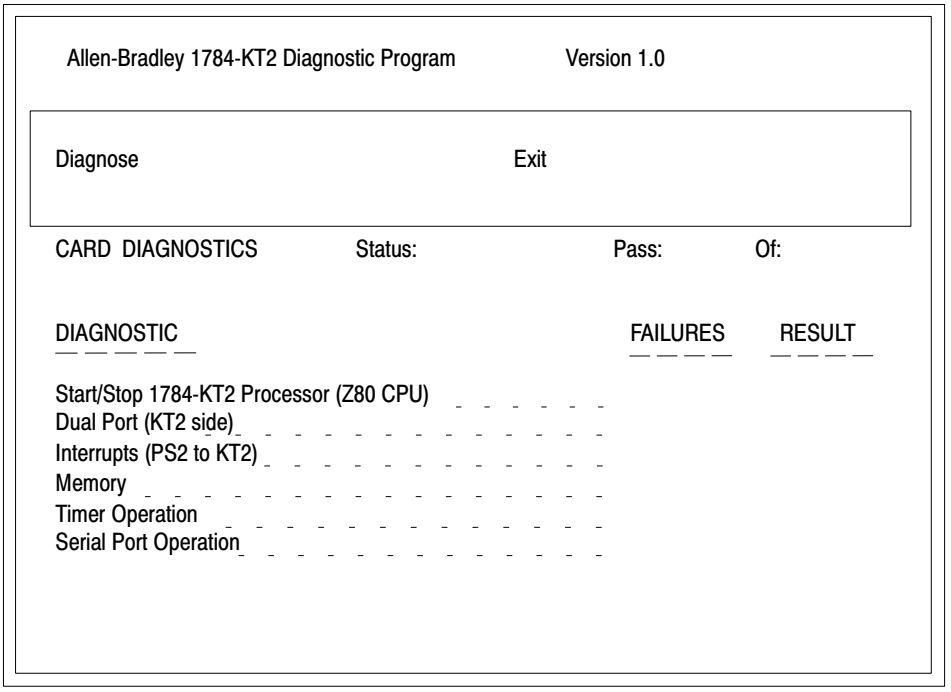


Table 3 describes each of the above terms.

Table 3
Card Diagnostics Screen Definitions

This term:	Indicates
Start/Stop 1784-KT2 Processor (Z80 CPU)	tests results of the PS/2's ability to perform a software reset of the 1784-KT2. After the reset, the 1784-KT2's status and execution capabilities are verified. If any errors occur, the failure counter increments and continues with the next test.
Dual Port (KT2 side)	tests results of the 1784-KT2's ability to read from and write to the dual port memory. If any errors occur, the failure counter increments and continues with the next test.
Interrupts (PS2 to KT2)	test results of the interrupt capabilities from the PS/2 to the 1784-KT2. If the 1784-KT2 cannot receive an interrupt from the PS/2, the failure counter increments and continues with the next test.
Memory	test results of the 1784-KT2's ability to read from and write to the 1784-KT2's internal memory chips. If any errors occur, the failure counter increments and continues with the next test.
Timer Operation	test results of the accuracy and capabilities of the 1784-KT2's counter-timer chips. If any errors occur, the failure counter increments and continues with the next test.
Serial Port Operation	test results of the interrupts and loopback capabilities of the 1784-KT2's Serial I/O chip. If any errors occur, the failure counter increments and continues with the next test.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

The Card Diagnostics test runs according to the number of times specified in step two. Your screen shows you when the tests are complete (Status column), how many errors were discovered (Failures column), and final test results (Results column).

3. When you are finished, press any key to return to the main menu.

The Off–Line Communications Diagnostics Test

The Off-Line Communications option allows you to test the communication capabilities of the 1784-KT2. The Off-Line Communications test performs two loopback tests. These tests are performed across:

the auxiliary (PLC-2 or PLC-3) port. This loopback test checks the pins used to directly connect the 1784-KT2 to either a PLC-2 or PLC-3. You specify which PLC function you want to test and attach the corresponding loopback connector to the 1784-KT2.
the main (Data Highway Plus) port. This loopback test checks the pins used to connect the 1784-KT2 to the Data Highway Plus network. This port accepts either loopback connector (you must choose one).

For more information on loopback tests, refer to the section entitled "Building Loopback Connectors."

To perform an Off-Line Communications test, follow the steps below:

1. Depending on which set of auxiliary port pins you want to test, install either the PLC-2 or PLC-3 loopback connector.

2. Place your cursor on the Off-Line Communications option and press [F4].

3. You are asked to select a direct connect function of the auxiliary port. Press [F2].

4. The PLC-2 and PLC-3 direct connect functions are displayed. If you want to test the pins used to connect the 1784-KT2 to a PLC-2, place your cursor on the PLC-2 function and press [ENTER]. If you want to test the pins used to connect the 1784-KT2 to a PLC-3, place your cursor on the PLC-3 function and press [ENTER].

5. Press [ESC] to return to the main menu. You can press [F4] to select a new direct connect function whenever [F4] appears on your screen.

6. Press [ENTER]. You are asked if you want to run a single test (Single Pass) or a specified number of tests (Repeat). Place your cursor on Single Pass or on Repeat and press [ENTER].

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

If you choose Repeat, you are asked how many passes you want to make. Specify this number and press [ENTER].

After you make your selection, the following screen appears (in this example, the PLC-2 function is displayed):

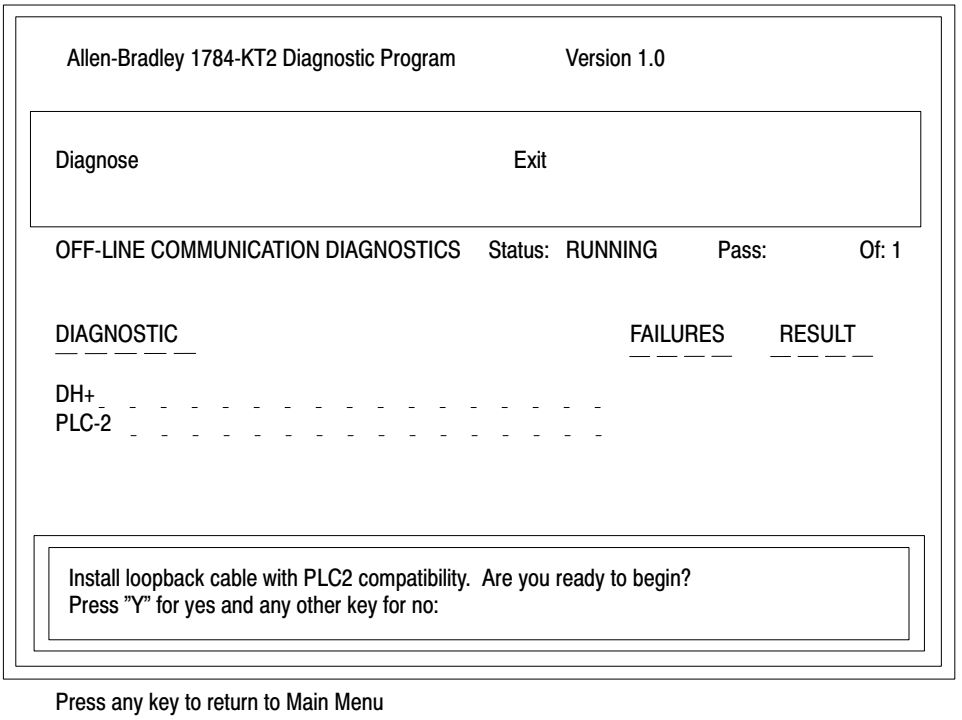


Table 4 describes each of the above terms.

Table 4
Off-line Communications Diagnostics Screen Definitions

This term:	Indicates:
DH+	test results of the loopback test. This loopback test checks the capability of the Data Highway Plus (DH+) channel on the SIO (main port) chip. If any errors occur, the failure counter increments and continues with the next test.
PLC-2 (or PLC-3)	test results of the loopback test. This loopback test checks the capability of the PLC-2 (or PLC-3) channel on the SIO (auxiliary port) chip. If any errors occur, the failure counter increments and continues with the next test.

7. You are asked to install your loopback connector with PLC-2 or PLC-3 capability. Make sure your loopback connector is installed and press [Y].

The Off-Line Communications test runs according to the number of times specified in step six. Your screen shows you when the tests are complete (Status column), how many errors were discovered (Failures column), and final test results (Results column).

8. When you are finished, press any key to return to the main menu.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

The All Components Diagnostic Test

The All Components option allows you to run the Host, Card, and Off-line Communications tests discussed in the previous sections. To perform an All Components test, follow the steps below:

1. Install your PLC-2 or PLC-3 loopback connector.
2. Place your cursor on the All Components option and press [F4].
3. Follow steps 3 through 8 of the Off-line Communications test.

Diagnostic Program Error Messages

Table 5 lists possible error messages you may receive when running the diagnostic program. Refer to the "1784-KT2 Diagnostic Program" section for more information on making your 1784-KT2 function properly.

Table 5
Diagnostics Program Error Messages

This error message:	Indicates:
2 Ram0 Failure	the 1784-KT2 cannot read or write to the RAM0 chip, or the 1784-KT2 is configured at an address already in use.
4 KT2 Dual Port Failure	the 1784-KT2 cannot read or write to the dual port, or the 1784-KT2 is configured at an address already in use.
8 CTC Timer Mode Failure	the timer on the counter-timer chip (CTC) is functioning improperly.
9-19 Diagnostic File KT2STXXXX.BIN Open or Missing	the KT2STXXXX.BIN file is not in the KT directory. Make sure all delivered files with the extension BIN are in the A:\KT or C:\KT directory.
16 CTC Counter Mode Failure	the counter on the CTC chip is functioning improperly.
24 CTC Timer/Counter Mode Failure	the CTC chip's timer, counter, or both are functioning improperly.
32 SIO Channel A Failure-No Interrupts	interrupts to the Serial Input/Output (SIO) channel A are functioning improperly.
64 SIO Channel A Failure-No Loopback	data communications to and from the SIO channel A have failed.
15 Host Dual Port Failure	the diagnostic program cannot read or write to the dual port, or the 1784-KT2 is configured at an address already in use.
17 Board Held at Reset	the 1784-KT2 will not start, or the 1784-KT2 is configured at an address already in use.
128 RAM 1 Failure	the 1784-KT2 cannot read or write to the RAM1 chip, or the 1784-KT2 is configured at an address already in use.
130 RAM0, RAM1 Failure	the 1784-KT2 cannot read or write to both the RAM0 and RAM1 chips, or the 1784-KT2 is configured at an address already in use.
132 RAM1, Dual Port Failure	the 1784-KT2 cannot read or write to the RAM1 or dual port chip, or the 1784-KT2 is configured at an address already in use.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

This error message:	Indicates:
48-56 Diagnostic Time-outs	the 1784-KT2 cannot be started or stopped, or the 1784-KT2 is configured at an address already in use, or a dual port memory error has occurred, either on the 1784-KT2 side or the PS/2 side, preventing download or execution of the test.
52 Card Interrupt Time-out	possibly any of the same problems listed for the Diagnostic Time-out error message, or the interrupts from the PS/2 to the 1784-KT2 are not working.
62 KT2 to PS/2 Interrupt Failure	interrupts from the 1784-KT2 to the PS/2 are not functioning properly.
66 Status Register Indicates 1784-KT2 Start Failure	the 1784-KT2 started, but the status register does not indicate this.
68 Status Register Indicates 1784-KT2 Stop Failure	the status register does not indicate that the 1784-KT2 stopped, or the 1784-KT2 did not stop when commanded to.
70 Interrupt Successful but Status Register is Inaccurate	the status register does not indicate a successful interrupt.
85 Off-line RTS CTS error	data control communication to and from the SIO channel B (PLC-2 function) has failed.
86 Off-line Data Error	data communication to and from the SIO channel B (PLC-2 or PLC-3 function) has failed.

The Diagnostic Program Output File

The output file (KT2OUT.TXT) provides detailed error message information gathered from the diagnostic program. The output file displays each test that was run, as well as final test results. Each time the diagnostic program runs, it adds the test results to the output file.

The output file has a maximum file size of 250K. If you reach this limit, a message will appear under the title bar on your screen and in your output file. The diagnostic program will continue to run tests if this maximum file size is reached, but it will not record the test results in the output file. If you want to record test results in the output file but have reached the 250K limit, you must delete the file (see the section entitled “Starting-Up the Diagnostic Program” for information on how to delete the output file).

If an error occurs during a test, the final results section will show you which diagnostic failed and the amount of times it failed.

Figure 4 shows an example of a Card Diagnostics test.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

Figure 4
The Output File For a Card Diagnostics Test

```
CARD DIAGNOSTICS          PASS:    1        OF      2        Wed Aug 22 11:48:13 1990
Start/Stop 1784-KT2 Proce NUM FAILS:       0                 PASS/FAIL:       PASS
  Error:  No error found.
Dual Port (KT2 side) . . . NUM FAILS:      0                 PASS/FAIL:       PASS
  Error:  No error found.
Interrupts (PS2 to KT2). . NUM FAILS:      0                 PASS/FAIL:       PASS
  Error:  No error found.
Memory . . . . . .NUM FAILS:          1    PASS/FAIL:        FAIL
  Error Code:  128 RAM1 Failure.
Timer Operation. . . . . . NUM FAILS:      1                 PASS/FAIL:       FAIL
  Error Code:  16  CTC Counter Mode Failure.
Serial Port Operation. . . NUM FAILS:      0                 PASS/FAIL:       PASS
  Error:  No error found.

CARD DIAGNOSTICS          PASS:    2        OF:     2        Wed Aug 22 11:48:16 1990
Start/Stop 1784-KT2 Proce NUM FAILS:       0                 PASS/FAIL:       PASS
  Error:  No error found.
Dual Port (KT2 side) . . . NUM FAILS:      0                 PASS/FAIL:       PASS
  Error:  No error found.
Interrupts (PS2 to KT2). . NUM FAILS:      0                 PASS/FAIL:       PASS
  Error:  No error found.
Memory . . . . . .NUM FAILS:          0    PASS/FAIL:        PASS
  Error:  No error found.
Timer Operation. . . . . . NUM FAILS:      0                 PASS/FAIL:       PASS
  Error:  No error found.
Serial Port Operation. . . NUM FAILS:      0                 PASS/FAIL:       PASS
  Error:  No error found.

CARD DIAGNOSTICS          FINAL RESULTS                      Wed Aug 22 11:48:17 1990
Start/Stop 1784-KT2 Proce. NUM FAILS:      0                 PASS/FAIL:       PASS
Dual Port (KT2 side) . . . NUM FAILS:      0                 PASS/FAIL:       PASS
Interrupts (PS2 to KT2). . NUM FAILS:      0                 PASS/FAIL:       PASS
Memory . . . . . .         NUM FAILS:      1                 PASS/FAIL:       FAIL
Timer Operation. . . . . . NUM FAILS:      1                 PASS/FAIL:       FAIL
Serial Port Operation. . . NUM FAILS:      0                 PASS/FAIL:       PASS
```

In the above example, the Card Diagnostics test was run twice. The timer operation and the memory diagnostics show errors in the first pass of tests and none in the second pass. The final results section indicates the failure of both diagnostics from the first run of tests.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

Building Loopback Connectors

This section shows you how to build the PLC-2 and PLC- 3 loopback connectors required for Off-Line Communications Diagnostics tests. Two loopback tests are performed during an Off-Line Communications test. In a loopback test, you download a program to the 1784-KT2 which:

transmits a packet of data
receives the same packet of data
verifies that the transmitted and received packets are identical

For more information on loopback tests, see the section entitled “The Off-Line Communications Diagnostics Test.”

To build the PLC-2 and PLC-3 loopback connectors, you will need the following items:

Table 6
Required Items for Building a Loopback Connector

Item:	Quantity:	AMP Part No.:
Connector housing	2	748367-1
Contact pins	16	748333-4
Hand-crimp tool	1	90430-1
22-28 AWG wire	2 ft	(none)

Important: To ensure correct and reliable assembly, use the hand-crimp tool with the AMP part number listed above.

Also, the maximum insulation diameter for each wire is 0.04”.

To build the PLC-2 and PLC-3 loopback connectors, follow the steps below:

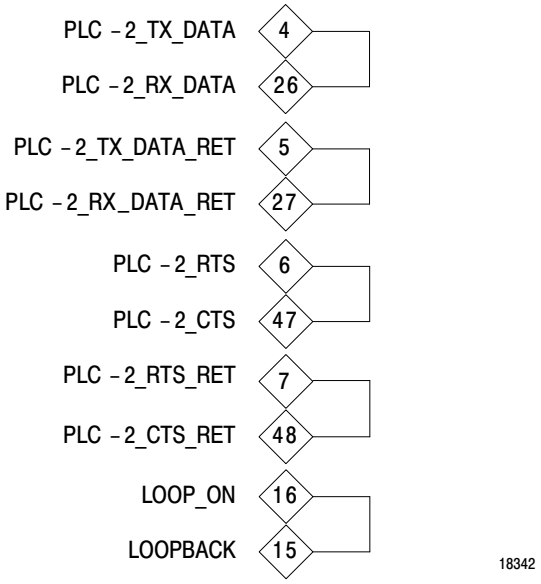
1. Cut eight 3-inch sections of wire.

2. Strip 0.2” of insulation off each end of wire.

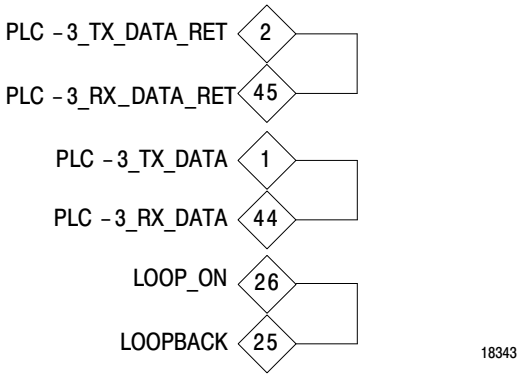
3. Using the crimp tool, crimp the contact pins onto each end of wire.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

4. Insert 5 of the wires into the back of a connector housing according to the following PLC-2 wire-assembly diagram. Label this connector PLC- 2.



5. Insert 3 of the wires into the back of the remaining connector housing according to the PLC-3 wire-assembly diagram shown below. Label this connector PLC-3.



Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

Ordering Information

Use the 1784-KT2 with the following:

IBM PS/2 7541, 7561, 8550, 8555, 8560, 8570, or 8580 computer
Allen-Bradley 6123 or 6124 computer
Allen-Bradley 6001-F1E2 or 6200 software
1784-CP, -CP2, -CP3, or -CP6 cable or 1784-CP7 adapter

Contact your local Allen-Bradley distributor or sales office for additional information.

Specifications

Specifications for the 1784–KT2 are listed below.

Module Location	IBM PS/2 computer, 8/16–bit MicroChannel slot
Module Output Connector	62–pin D–shell
Outputs	PLC–2 serial interface PLC–3 serial interface Data Highway Plus
Module Compatibility	Allen–Bradley 6123 Allen–Bradley 6124 IBM PS/2
Hardware Interrupt	IRQ9 IRQ10 IRQ11 IRQ12
Baud Rate	Asynchronous (PLC–2, PLC–3): 9600; 19.2K Synchronous (Data Highway Plus): 57.6K
Maximum Line Length	PLC–2: 10ft (3m) PLC–3: 10ft (3m) Data Highway Plus, PLC–3 and PLC–5: 10,000ft (3050m) @ 57.6Kbaud
Power Requirements	+5V dc @ 0.25A (1W) ±12V dc @ 0.04A (0.48W)
Operating Temperature	32 to 113ºF (0 to 45ºC)
Humidity	5 to 95% noncondensing
Requlatory Compliance	FCC Class A

IBM PS/2 is a registered trademark of International Business Machines Corporation.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

Publication 1784–2.21 – May 1992
Supersedes Publication 1784–2.21 – April 1991

PN4046330–05
Copyright 1992 Allen-Bradley Company, Inc. Printed in USA

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP