Hostess *186* 16™

User's Guide

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Before You Begin

Use this guide to set up and install the Hostess *186* 16 controller hardware. See the appropriate software driver installation manual to install the optional Comtrol device driver for your system.

Scope

This guide discusses features and functionality of the Hostess *186* 16 controller. The part number for the controller is located on the inside of the mounting bracket.

Purpose

This guide explains:

* Setting input/output (I/O) addresses for your computer.

* Installing the controller into your computer.

* Connecting the controller and the peripherals, including detailed information about the connectors, interface boxes, and cables that you use.

* Testing your controller using the diagnostic diskette and the test plug.

* Solving any problems you may encounter during installation.

* The controller specifications, such as hardware interrupts and power information.

Audience

This manual is for the person who sets up and installs the controller.

Prerequisites

Future Hardware Changes

Comtrol continues to refine the Hostess *186* 16 based on your input. Our customer support engineers can help you plan for future modifications. Upcoming revisions to the hardware may occur. You can call Comtrol to find out what changes are planned.

Suggestions

Use Chapter 2 to install the controller in your system. Use Chapter 3 if you need basic information about connectors and cables.

Organization

Chapter 1. Overview of the Hostess *186* 16 Controller

This chapter introduces the Hostess *186* 16 controller.

Chapter 2. Installing the Controller

This chapter lists procedures that you may need to perform before installing the controller into your computer. In addition, it details installation procedures.

Chapter 3. Cabling and Interfaces

This chapter provides detailed information about the connectors, interface boxes, and cables for the controller

Chapter 4. Testing the Controller

This chapter discusses using the diagnostic diskettes and the test plug to test the controller.

Chapter 5. Troubleshooting

This chapter discusses general software and hardware problems with the corresponding solutions

Appendix A. Memory Addresses

This appendix illustrates the system memory map and the I/O address map for many PCs.

Appendix B. ASCII Character Set

This appendix contains the ASCII character set.

Appendix C. 100-Pin Connector Pinout

This appendix provides details about the 100-pin connector on the controller.

Appendix D. Warranty and Technical Support

This appendix provides details about the warranty and technical support on your controller.

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Chapter 1.
Overview of the Hostess *186* 16 Controller

Introduction

This chapter provides you an overview of your new Hostess *186* controller.

The Hostess *186* controller is an intelligent serial communications controller that you can install in a computer that contains 80286, 80386™, or 80486™ technology.

The Hostess *186* controller supports 16 serial ports from one expansion slot in a personal computer. The controller plugs into one ISA bus expansion slot in your personal computer.

Features and Characteristics

The Hostess *186* controllers provide several features:

* Easy system expansion because the controller fits into one ISA bus expansion slot in your computer.

* Multiple users for one PC with a maximum of four controllers per system, up to 64 people can use your system.

* Maximized throughput by using an 80186 processor as a front-end processor that manages the input and output from the ports.

* Memory expansion - the controller has 128K of dual-ported random-access memory onboard. This RAM extends the amount of system memory. Both the onboard processor and the system processor can access this memory and can exchange data between themselves using it.

The Hostess *186* controller has the following characteristics:

* A Dual In-Line Package (DIP) switch for setting input/output (I/O) addresses.

* An EPROM that contains the boot up code and interrupt routines for the controller.

* A reset debug header to reset the controller and invoke the firmware debugger. This is only available with a development controller.

Figure 1-1 illustrates the Hostess *186* controller.
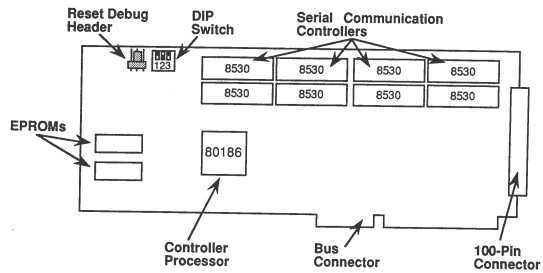
Figure 1-1. Hostess *186* 16 Controller

A system that contains several adapters, boards, and controllers can demand more power than the power supply can provide. Anytime you add a new component to your system that draws power from the system's power supply, you must ensure that you do not exceed the limits of this supply.

Table 1-1 illustrates the power requirements for the Hostess *186* controller.

Table 1-1. Hostess *186* Controller Power Requirements

Power Requirements (+ or - 10 percent)	Hostess *186* Port
+5 VDC	2.30 A
+12 VDC	5.5 mA
-12 VDC	116 mA
	44.2 BTU/h

Notes: *The recommended minimum power supply is 200 watts for the maximum number of the Hostess* 186 *controllers (up to four) in a system.*

Check the manuals for your system to determine the power limits for your computer. Exceeding the power can damage sensitive electronic devices, or cause them to malfunction. Determine your needs and measure them against what your system can provide.

Chapter 2.
Installing the Controller

Introduction

This chapter explains how to set up and install your new Hostess *186* controller. This includes information about the following topics:

- A checklist of the contents of the box that your controller arrived in and the tools necessary for installation.

- An overview of the default I/O address.

- How to set the I/O address DIP switch for your particular application or device driver (operating system).

- How to install the Hostess *186* controller in the PC.

- How to attach the interface box.

After installing the controller and mounting the interface box, you connect your peripherals to the interface box. See Chapter 3 if you need information about cabling your system.

After you have connected all of your peripherals, use Chapter 4 to run the diagnostics test diskette and the loopback plug to verify your installation. After you have verified your installation, you can install your device driver (if applicable). Use the separate software installation instructions to install the device driver for your system.

Preparing for Installation

The Hostess *186* controller is packaged with the following items:

- This guide (and possibly supplements).

> The test software is a diagnostic program that checks the controller. For information about how to test your system after installation, see Chapter 4.
>
> The software that communicates with the operating system is called a software device driver. Software device driver installation instructions are contained in a separate installation guide included in your delivery. Software installation instructions are separate from this guide because software changes frequently.

- Rubber feet and Dual Lock™ squares to fasten the interface box to the computer or to set on a table.

- A test plug, which is a loopback plug. Use the test plug with the diagnostic software to test the signals sent and received.

Compare this list with what is in the box. If anything is missing, please call Comtrol at the number listed in the Technical Support section in Appendix D.

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>
> **Warning!** The Hostess *186* controller is extremely sensitive to static electricity. Static electricity may destroy the controller.
>
> When you unpack the Hostess *186* controller, it is packed in a conductive, anti-static bag that protects it from damaging static electricity. When touching the controller, wear a grounding strap. Hold the controller by its edges only. Do not touch the connector, pins, nor any metal parts.

You will need the following items to set up your system:

- An 80286, 80386, or 80486 based personal computer system with at least one high-density diskette drive, 512K bytes of RAM, and a 200-watt power supply.

- A monitor, display adapter, and keyboard.

- A flat-head screwdriver, a Phillips screwdriver, or a 3/16" nut-driver or wrench.

Controller Settings Overview

Initially, the controller is set to operate at input/output (I/O) address range 218 through 21B (hexadecimal). The operating system for your computer may require different addresses. Refer to the software installation instructions, your computer reference manuals, or operating system manuals for specific instructions for I/O addresses.

Table 2-1 illustrates the factory settings for the Hostess *186* 16 controller.

Table 2-1. Default I/O Address Settings

Factory Settings for the Hostess *186* Controller	
Communications protocol	Asynchronous
Hexadecimal I/O Address Range (DIP switch SW1)	ON [switch diagram] 1 2 3 218 - 21B

The input/output base address is the start of a reserved range of I/O address space for each controller in the system. This range is a distinct I/O address space and is unrelated to ordinary memory addresses.

The following section in this chapter explains how to set the I/O DIP switch for your operating system.

Setting the I/O DIP Switch for Your Operating System

Before you install the Hostess *186* controller into your system, you need to set the appropriate I/O address for your operating system. Use the Dual In-line Package (DIP) switch to set the base I/O address for the Hostess *186* controller. The base I/O address is the address for I/O throughput. The system needs this I/O address identified, to pass data to and from the controller.

There are two things to consider when setting addresses:

• You can place up to four Hostess *186* controllers in your system, however,

If you look at the controller with the component side up, and the bus connector pointing down, the switch block to set the address is at the top left of the controller.

Figure 2-1 illustrates the Dual In-line Package (DIP) switch that you use to set the I/O base address.
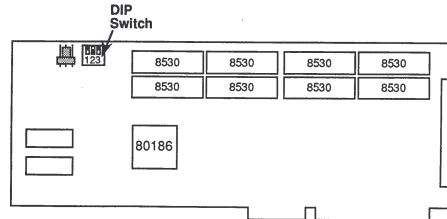
Figure 2-1. Setting the I/O Memory Addresses

In this chapter, a white square shown at the top of the switch indicates ON. A white square at the bottom of the switch indicates OFF.

For example, the following diagram shows that switches one and three are OFF, and switch two is ON:
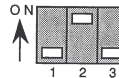
The three-position DIP switch block on the controller sets the system I/O addresses. The controller reserves three consecutive I/O addresses starting with the address set by the switches. Table 2-2 shows possible I/O addresses and their switch settings.

Table 2-2. Hostess *186* 16 I/O Addresses

I/O Address	Dip Switch Settings	I/O Address	Dip Switch Settings
218h		318h	
21Ch		31Ch	
238h		338h	
23Ch		33Ch	

Installing the Controller

If you verified that you received all of the items for installation, have the appropriate tools and set the I/O address for your operating system (if required), you are ready to install the controller.

Figure 2-2 summarizes installation steps for the Hostess *186* controller after configuring the controller for the I/O address and communications modes.
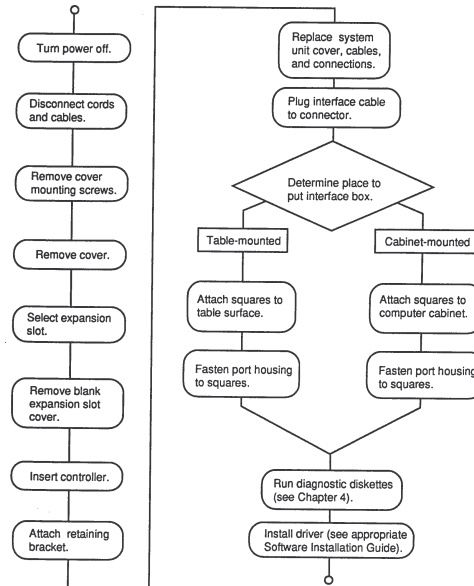
The following steps explain in detail with illustrations of how to install your controller (after configuring the I/O address DIP switch).

1. Turn the power switch for the system unit to the OFF position.

   Remove the AC power cord from the system unit AC power unit.

   WARNING: If you ignore this step, you may expose yourself to severe electric shock.

Cover Mounting Screws

2. Remove system unit cover.

   Unscrew mounting cover screws and store them in a safe place.
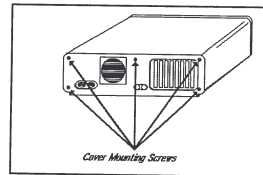
Remove the cover and set it away from your working area.
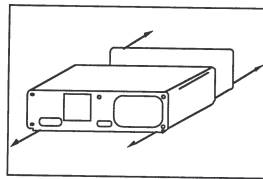
3. Select the slot to place the controller.

   Remove the machine screw that holds the expansion slot cover in place.

   You will use this screw to hold the Hostess *186* controller in place, so save it in a safe place.

   Note: *Make sure that you have set the communications mode and the I/O address.*

   Remove the expansion slot cover.
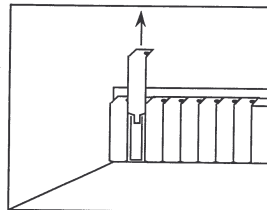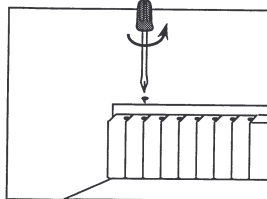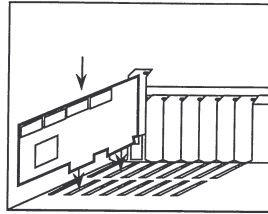
4. Seat the controller in the ISA expansion slot.

   Hold the controller by the edges and carefully insert the controller into the adapter slot on the system controller.

   You will feel some resistance as you press the controller down into the slot.
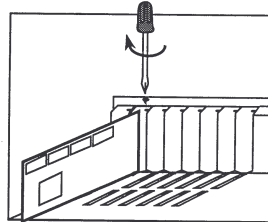
5. Attach the controller to the chassis with the expansion slot screw.

   Place the machine screw into the Hostess *186* 16 controller retaining bracket. Tighten with a screwdriver.

   If you are installing more than one controller, repeat Steps 3 through 5 for each controller.
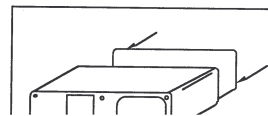
6. Replace the cover on the system unit.

   Place the system unit back on the system unit chassis.
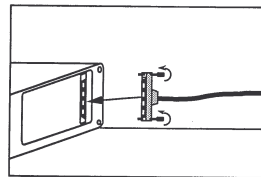
7. Plug the interface cable into the high-density connector on the controller.

   Manually twist the plug's thumbscrews into the connector.

   Do not twist too tightly, nor use a screwdriver to tighten; this may strip the threads of the screw.

The Hostess *186* controller is now in place. You can continue with the following procedures to attach the interface box.

Attaching the Interface Box

The interface box is an interface housing that has the DB25, DB9, or modular connectors. To the back of this box you will attach either squares of Dual Lock™ fasteners, (which is similar to Velcro®), or rubber feet. You can attach this box to the back of your computer, to the top of a desk or table; anywhere that is easy to reach.

You will notice that the interface box comes with eight, one-inch squares mated together (four pairs). These squares allow you to securely attach the interface box. If you look closely at the strips, you can see the hooking connectors:
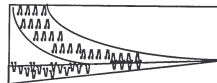
This material snaps together, and can be opened and closed hundreds of times.

The easiest way to align the squares to each other is to peel off the adhesive

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Warning: Do not attach Velcro® to these squares. The two types of fasteners connect to each other and are very difficult to remove.

Attaching the Interface Box to the Back of the Computer

To attach the interface box to the back of the computer, use the following steps:

Peel the backing off one side of the squares and put on the interface box.
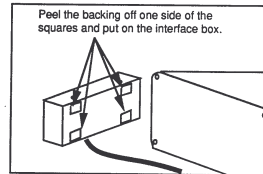
1. Plug the interface cable into the controller connector.

2. Select an area on the back that is clear of power cables, fan cover, or other cables.

3. Clean the area so that it is free of any dust or oil.

4. Peel the backing off **one** side of the mated pairs.

   Place the mated pairs in two rows, with each pair three inches apart, on the back surface of the interface box.

   Press firmly on the square pairs. Let the squares bond for a few minutes.

Peel the backing off the other side of the squares and put on the interface box on the back of the computer.
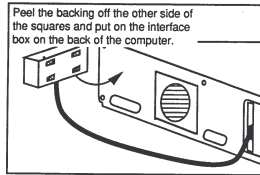
5. Peel the remaining backing off the square pairs you set on the interface box.

   Put the box on the back of the computer and press firmly.

Attaching the Interface Box to a Table

To attach the box to a table, use the following steps:

Peel the backing off one side of the squares and put on the interface box.
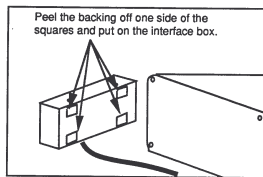
1. Plug the interface cable into the controller connector.

2. Select an area on the table that is clear of power cables, monitor cables, or other cables.

   The cable is 12 inches long, so you should place the box near the computer system.

3. Clean the area so that it is free of any dust or oil.

4. Peel the backing off **one** side either of the mated pairs of Dual Lock, or the rubber feet.

For the Dual Lock squares, place the mated pairs in two rows, with each pair three inches apart, on the back surface of the interface box.

Press firmly on the square pairs. Let the squares bond for a few minutes.

For the rubber feet, place a foot in each corner of the interface box's back plate. Skip to step 5.
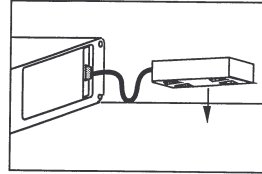
5. Peel the backing off the squares you set on the interface box.

6. Put the box on the surface of the table.

After you have installed the controller and connected the interface box, you can connect your peripherals. You may need to install a device driver for your operating system. See the separate software installation instructions to install the device driver.

Overview of Post-Installation Procedures

If you need information about connectors for your peripherals, see Chapter 3 for information.

After connecting the interface box to your peripherals, you can begin the controller test described in Chapter 4. After completing the controller test, go to the software installation instructions, and install the device driver for the controller.

Chapter 3.
Cabling and Interfaces

After installing the controller, the next phase is to connect terminals, modems, printers or other peripheral devices to the interface box. Usually this is not difficult; you can buy the correct cables from distributors and electronics stores.

Read this chapter if you want to know more about what interfaces are, or what cables are recommended.

This chapter includes the following information:

• A cabling and interface overview that discusses the parts you need to connect your controller to peripherals.

• The differences between Data Terminal Equipment (DTE) and Data Communications Equipment (DCE).

• Subsections that discuss each of the supported connector types and the following information:

  - Pin arrangement for DB25 connectors and Hostess *186* signals.

  - Pin arrangement for DB9 connectors and Hostess *186* signals.

  - Pin arrangement for RJ45 connectors and Hostess *186* signals, and pinouts for the RJ45 interface box .

• Discussions about basic asynchronous cables (for D-type and modular connectors) used to connect the Hostess *186* controller and peripherals.

Cabling and Interface Overview

Use the following to connect the controller to your peripherals:

• The interface box that connects to the controller.

The following types of interface boxes are available:

• DB25 (male or female 25-pin connectors).

• DB9 (male or female 9-pin connectors).

• RJ45 (female 8-pin, modular connectors).

Connecting Peripherals

You can connect the Hostess *186* controller to several types of Data Terminal Equipment (DTE) and Data Communications Equipment (DCE). All Comtrol serial ports are configured as DTE.

DTE and DCE conventions specify the direction of information flow for data and control signals. The DTE and DCE designations are used in the EIA Standard RS-232. (The most recent standard replaced the "RS" with "EIA." As of this printing the standard is officially called EIA-232-D. The more familiar "RS" prefix is used throughout this guide.)

The Electronic Industries Association (EIA) has defined two basic types of serial interfaces:

• Data Terminal Equipment (DTE).

  The connectors on most serial boards for IBM PC™/AT compatible computers are DTE, as are most terminals.

• Data Communications Equipment (DCE).

  Most modems are configured DCE.

Other types of equipment, such as printers or plotters, may be either DTE or DCE. You should always check your equipment's documentation to determine if it is DTE or DCE.

The DTE and DCE designations become important when choosing a serial cable because a line that sends on one end must receive on the other end. Any pin that is sending in a DTE interface will be receiving in a DCE interface. This means that a DTE to DCE cable simply connects pins with the same numbers, (that is,
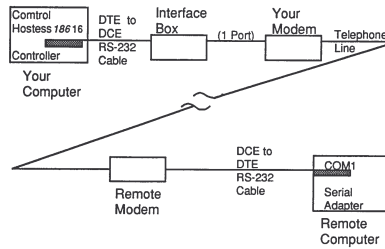
Figure 3-1. DTE to DCE Communications Link

To establish a communications link directly between a DTE Hostess *186* controller and another DTE device, such as a computer or a terminal, a DTE to DTE cable is required.

To establish a communications link, you must connect the sending pins to the receiving pins. This is done by *crossing* wires in the cable. That is, pin 2 to pin 3, pin 3 to pin 2, and so forth. This is often called a null modem cable because it has the effect of eliminating the modems in the communications link. It may also be called a crossover cable. Some typical communications links using DTE to DTE RS-232 cables are shown in Figure 3-2.
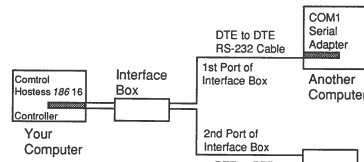
Interface Basics

An interface is an electronic component (in this case, the Hostess *186* controller and the interface box) that links an external device to a computer. The Electronic Industries Association (EIA) has a set of standards that defines the electronic signals, the physical connection, and the circuits to use to connect computers and peripherals. The Hostess *186* controller supports RS-232 mode with the following interface box types:

- DB25

- DB9

- RJ45

The interface box uses either D-type or modular connectors. There are two types of D-type connectors, the 9-pin (DB9) and the 25-pin (DB25).

Each pin carries a signal. There are essentially two types of signals:

- Data signals used to transfer information through the cable.

- Control signals used to control the flow of data in the cable.

For more detailed information about the pin arrangements and common signals for these connectors see one of the appropriate subsections.

Figure 3-3 illustrates the outside of the DB25 interface box.

Port 16   Port 8
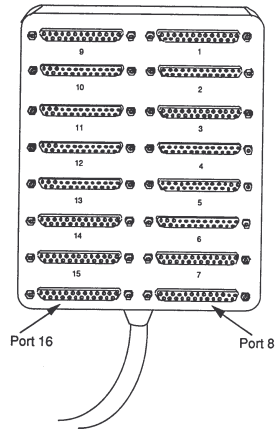
Figure 3-3. Outside View of the DB25 Interface Box

Table 3-1 illustrates transmission distance, data transfer, and connector information for the Hostess *186*.

Table 3-1. Basic RS-232 Interface Information

Interface	Transmission Distance	Data Transfer	Connector
RS-232	(EIA-232-D)	Full duplex	D-type:
	Up to 50 feet	using three	- 9-pin male or female
(default	(15.24 meters).	lines. Modem	- 25-pin male or female

Using the DB25 Interface Box

The following subsections discuss the following topics:

- Pin arrangements for 25-pin connectors.

- Hostess *186* signals assignments for the connectors on the DB25 interface box.

Pin Arrangements for DB25 Connectors

This subsection discusses male and female DB25 (25-pin, D-type) connectors and the Hostess *186* signals associated with the connectors.

Figure 3-4 shows the pin arrangement of the male DB25 connector.
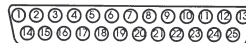
Figure 3-4. Pin Arrangement of the Male 25-Pin D-Type Connector

Figure 3-5 shows the pin arrangement of the female DB25 connector.
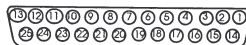
Figure 3-5. Pin Arrangement of the Female 25-Pin D-Type Connector

DB25 Hostess *186* Signals

Table 3-2 shows the relationship of the Hostess *186* pin signal assignments and their DTE and DCE directions for RS-232. The table shows that signals with the same name have opposite directions in DTE interfaces as in DCE interfaces.

Table 3-2. Hostess *186* DB25 Signals

Signal Name	Type	DTE Direction	DCE Direction	DB25 Pin Number
Protective ground (not used)[1]	Ground	N/A	N/A	1
Transmit Data (TxD)	Data	Send	Receive	2
Receive Data (RxD)	Data	Receive	Send	3
Request to Send (RTS)	Control	Send	Receive	4
Clear to Send (CTS)	Control	Receive	Send	5
Not used	N/A	N/A	N/A	6
Signal Ground (SG)	Ground	N/A	N/A	7
Data Carrier Detect (DCD)	Control	Receive	Send	8
Not used	N/A	N/A	N/A	9 through 19
Data Terminal Ready (DTR)[2]	Control	Send	Receive	20
Not used	N/A	N/A	N/A	21
Not used	N/A	N/A	N/A	22
Not used	N/A	N/A	N/A	23
Not used	N/A	N/A	N/A	24
Not used	N/A	N/A	N/A	25

1. Connect cable shielding to the metal hood covering the 25-pin connector.

2. DTR is not supported on ports 11 and 12.

Using the DB9 Interface Box

The following subsections discuss the following topics:

- Pin arrangements for 9-pin connectors.

- Hostess *186* signals assignments for the connectors on the DB9 interface box.

Pin Arrangements for DB9 Connectors

This subsection discusses male and female DB9 (9-pin D-type) connectors.

Figure 3-6 shows the pin arrangement of the male DB9 connector.

Figure 3-6. Male DB9 Connector Pin Arrangement

Figure 3-7 shows the pin arrangement of the female DB9 connector.

Figure 3-7. Female DB9 Connector Pin Arrangement

DB9 Hostess *186* Signals

Table 3-3 shows Hostess *186* RS-232 signals for the 9-pin connector. The table shows that signals with the same name have opposite directions in DTE interfaces as in DCE interfaces.

Table 3-3. Hostess *186* DB9 Signals

Signal Name	Signal Type	DTE Direction	DCE Direction	DB9 Pin Number
Data Carrier Detect (DCD)	Control	Receive	Send	1
Receive Data (RxD)	Data	Receive	Send	2
Transmit Data (TxD)	Data	Send	Receive	3
Data Terminal Ready (DTR)[1]	Control	Send	Receive	4
Signal Ground (SG)	Ground	N/A	N/A	5
Data Set Ready (DSR) (not supported)	Control	N/A	N/A	6
Request to Send (RTS)	Control	Send	Receive	7
Clear to Send (CTS)	Control	Receive	Send	8
Ring Indicator (RI) (not supported)	Control	N/A	N/A	9

1. DTR is not supported on ports 11 and 12.

Using Modular Connectors and the RJ45 Interface Box

The following subsections discuss the following topics:

• Pin arrangements for modular connectors.

• Hostess *186* signals assignments for the connectors on the RJ45 interface box.

Pin Arrangements for RJ45 Connectors

A modular connector is a phone-jack type connector. The most common RS-232-C signals are located on pins two through seven. This allows a six-position modular plug (RJ11) to be used if all signals are not required. Do not use a four-position modular plug; this can damage the modular connectors. Figure 3-8 illustrates the pin arrangement for the modular connector.

For reference, pin 1 is on the left end of the modular jack, when viewed from the edge of the board. Pin 1 of the modular plug is on the left side of the plug when viewed with the key on the underside of the plug, and the gold contacts visible on the top.
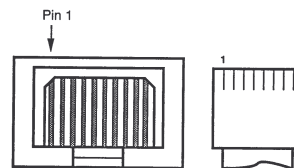
Figure 3-8. Modular (RJ45) Jack and Plug

RJ45 Hostess *186* Signals

Table 3-4 shows Hostess *186* RS-232 signals for the modular connector. The table shows that signals with the same name have opposite directions in DTE interfaces as in DCE interfaces.

Table 3-4. Hostess *186* RJ45 Signals

Signal Name	Signal Type	DTE Direction	DCE Direction	RJ45 Pin Number
Request to Send (RTS)	Control	Send	Receive	1
Data Terminal Ready (DTR)[1]	Control	Send	Receive	2
Signal Ground (SG)	Ground	N/A	N/A	3
Transmit Data (TxD)	Data	Send	Receive	4
Receive Data (RxD)	Data	Receive	Send	5
Data Carrier Detect (DCD)	Control	Receive	Send	6
Not used	N/A	N/A	N/A	7
Clear to Send (CTS)	Control	Receive	Send	8

1. DTR is not supported on ports 11 and 12.

Cables for D-Type Connectors

The cable used to connect DTEs and DCEs have specific requirements; including how to shield cables, the layout of the wires, and which connectors to use.

A cable consists of two connectors connected by wires. These wires connect the pins of one connector to the pins of another connector. The interface box has sixteen ports (using either 9-pin or 25-pin connectors), so one end of the cable must use the reciprocal connector.

Different peripherals use specific cables. Check your equipment to understand what kind of cable to use. Determine what signals the device supports; this may help you choose the appropriate cable.

Figures 3-9 and 3-10 illustrate two basic cabling examples.
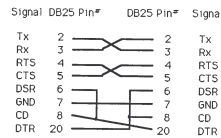
Figure 3-9. DTE to DTE Null-Modem Cable
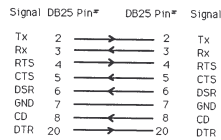
Cables for Modular Connectors

Cables for the modular connector are easily available from your distributor or any electronics store. One way to connect peripherals with D-shell connectors to a modular interface box is to use a straight-through cable and build an adapter.

A cable consists of two connectors connected by wires. These wires connect the pins of one connector to the pins of another connector. The interface box has sixteen ports (using modular connectors), so one end of the cable must use the reciprocal connector. Figure 3-11 illustrates a cabling scheme for RJ45.

Different peripherals use specific cables. Check your equipment to understand what kind of cable to use. Determine what signals the device supports; this may help you choose the appropriate cable.

The following pages show how to build adapters if you want to connect RJ45 cables to DB25 pin connectors. RJ45 to RJ45 cable is inexpensive and easily available, as are RJ45 to DB25 adapters.
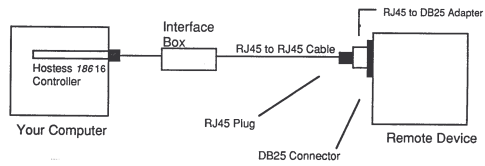
Figure 3-11. RJ45 Cabling Scheme

Configuring RJ45 to DB Shell Adapters

The RJ45 to DB25 adapters are readily available and easily customized for different needs. The following figures show how these adapters must be internally wired for three popular applications. These figures assume that the adapter is used with the crossover cable.

Hostess *186* 16 Connector		Remote Connector	
Signal	RJ45 Pin #	DB25 Pin #	Signal
CTS	8 ◄────────	4	RTS
DCD	6 ◄────────	20	DTR
RxD	5 ◄────────	2	TxD
TxD	4 ────────►	3	RxD
DTR	2 ────────►	6	DSR
		8	DCD
RTS	1 ────────►	5	CTS
GND	3 ────────	7	GND
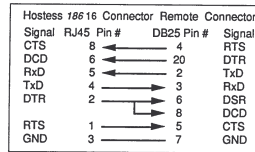
Figure 3-12. RJ45 to DB25 Adapter, RS-232 DTE to DTE Cable

Hostess *186* 16 Connector		Remote Connector	
Signal	RJ45 Pin #	DB25 Pin #	Signal
CTS	8 ◄────────	5	CTS
DCD	6 ◄────────	8	DCD
RxD	4 ◄────────	3	RxD
TxD	5 ────────►	2	TxD
DTR	2 ────────►	20	DTR
RTS	1 ◄────────	4	RTS
GND	3 ────────	7	GND
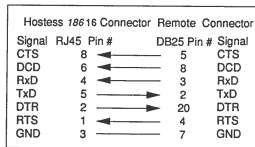
Figure 3-13. RJ45 to DB25 Adapter, RS-232 DTE to DCE Cable

Chapter 4.
Testing the Controller

This chapter discusses how to use the following:

- Diagnostic diskette to test the controller circuitry.

- Test plug to test each port.

Testing the Controller Using the Diagnostic Diskette

Use the *Controller Diagnostic for Hostess* 186 to check each port of the controller. The diagnostic test is operating system independent; you use it at start-up, or after you restart your system. The diagnostic is a series of messages and tests of the controller circuitry.

The diagnostic test is a bootable 5.25 inch or 3.5 inch, low density diskette.
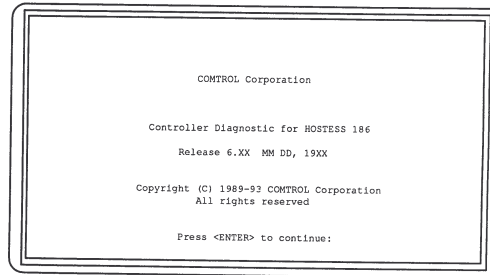
Note: *If your system cannot start-up from a diskette, you cannot use this test.*

Use the following procedure to test the controller.

1. Insert the diagnostic diskette into the appropriate diskette drive, and turn-on the system.

   The program is a series of prompts that asks you for responses. After starting the system, the program begins and the following screen appears:
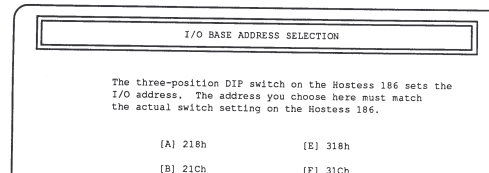
   ```
                          COMTROL Corporation


                  Controller Diagnostic for HOSTESS 186

                      Release 6.XX  MM DD, 19XX


                  Copyright (C) 1989-93 COMTROL Corporation
                           All rights reserved


                      Press <ENTER> to continue:
   ```

2. Press <Enter> to start the program.

   The program prompts you for the controller's I/O address.

   ```
                    I/O BASE ADDRESS SELECTION


          The three-position DIP switch on the Hostess 186 sets the
          I/O address.  The address you choose here must match
          the actual switch setting on the Hostess 186.


                  [A] 218h                [E] 318h

                  [B] 21Ch                [F] 31Ch
   ```

3. Enter the appropriate letter and press <Enter>.

4. Determine where in memory the controller should be tested and select A or B.

   - If you select option A (testing the controller above 1 MB, go to the following subsection.

   - If you select option B (testing the controller below 1 MB, go to the subsection titled, Testing Below the One Megabyte Address Space.

```
┌─────────────────────────────────────────────────────────────┐
│  ┌─────────────────────────────────────────────────────────┐ │
│  │              BASE MEMORY ADDRESS SELECTION              │ │
│  └─────────────────────────────────────────────────────────┘ │
│                                                               │
│                                                               │
│                                                               │
│            [A] Test the controller ABOVE 1 MEGABYTE.          │
│                                                               │
│            [B] Test the controller BELOW 1 MEGABYTE.          │
│                                                               │
│                                                               │
│                                                               │
│        Select the memory range by typing the appropriate letter:_ │
│                                                               │
│                                                               │
└─────────────────────────────────────────────────────────────┘
```

Testing Above the One Megabyte Address Space

5. Select an address for the controller.

```
┌─────────────────────────────────────────────────────────────┐
│  ┌─────────────────────────────────────────────────────────┐ │
│  │            ABOVE 1 MEGABYTE ADDRESS SELECTION            │ │
│  └─────────────────────────────────────────────────────────┘ │
│                                                               │
│      Software sets the base memory address for the Hostess 186. │
│      You may choose any address to use during this diagnostic test. │
│                                                               │
│          [A] F00000h    (First Primary UNIX/XENIX address)    │
│          [B] EE0000h    (Second Primary UNIX/XENIX address)   │
│          [C] EC0000h    (Third Primary UNIX/XENIX address)    │
│          [D] EA0000h    (Fourth Primary UNIX/XENIX address)   │
│          [E] D00000h    (First Secondary UNIX/XENIX address)  │
│          [F] D20000h    (Second Secondary UNIX/XENIX address) │
│          [G] D40000h    (Third Secondary UNIX/XENIX address)  │
│          [H] D60000h    (Fourth Secondary UNIX/XENIX address) │
│                                                               │
│                                                               │
│        Select the base memory address by typing the appropriate letter:_ │
│                                                               │
└─────────────────────────────────────────────────────────────┘
```

The test searches for the controller at the chosen I/O address and base memory address.

6. To complete the testing, see the subsection titled, Continuing the Test.

Testing Below the One Megabyte Address Space

5. Select a base memory address for the controller.

```
┌─────────────────────────────────────────────────────────────┐
│  ┌───────────────────────────────────────────────────────┐  │
│  │         BELOW 1 MEGABYTE ADDRESS SELECTION            │  │
│  └───────────────────────────────────────────────────────┘  │
│                                                              │
│                          [A]  80000                          │
│                          [B]  90000                          │
│                          [C]  A0000                          │
│                          [D]  B0000                          │
│                          [E]  C0000                          │
│                          [F]  D0000                          │
│                          [G]  E0000                          │
│                                                              │
│                                                              │
│            The addresses above are set on the Hostess 186    │
│            via software.  You may choose any address to      │
│            be used during this diagnostic.                   │
│                                                              │
│       Select the base memory address by typing the appropriate letter:_
└─────────────────────────────────────────────────────────────┘
```

6. Select an offset into this address.

```
┌─────────────────────────────────────────────────────────────┐
│  ┌───────────────────────────────────────────────────────┐  │
│  │                  OFFSET SELECTION                     │  │
│  └───────────────────────────────────────────────────────┘  │
│                                                              │
│                                                              │
│                          [A]  0000                           │
│                                                              │
│                          [B]  4000                           │
│                                                              │
│                          [C]  8000                           │
│                                                              │
│                          [D]  C000                           │
│                                                              │
│                                                              │
└─────────────────────────────────────────────────────────────┘
```

Continuing the Test

This subsection assumes that you performed Steps 1 through 6.

The program searches for the controller in your system (where XXXXXH is the hexadecimal address). When the diagnostic test finds a Comtrol intelligent controller, the program reports the address (or, for an above one-megabyte address, the address plus a 64K offset) to you.

```
╭──────────────────────────────────────────────────────────────╮
│ SEARCHING FOR COMTROL MULTIUSER BOARD AT ADDRESS XXXXXH       │
│                                                               │
│ Found controller at address XXXXXH                            │
│ Do you wish to continue testing [Y]: y                        │
╰──────────────────────────────────────────────────────────────╯
```

Note: *At each prompt throughout the test, the default answer appears in brackets.*

7. Press <Enter> or y to continue the diagnostic test.

The first test finds the Input/Output (I/O) base address (where XXXH is the hexadecimal address).

```
╭──────────────────────────────────────────────────────────────╮
│ I/O BASE ADDRESS SEARCH                                       │
│                                                               │
│ Found I/O address XXXH                                        │
│ Do you wish to continue testing [Y]: y                        │
╰──────────────────────────────────────────────────────────────╯
```

8. Press <Enter> or y to continue the diagnostic test.

The second test identifies the controller:

```
╭──────────────────────────────────────────────────────────────╮
│ CONTROLLER TYPE SEARCH                                        │
│                                                               │
│ Controller type has been verified as HOSTESS 186             │
│ Do you wish to continue testing [Y]: y                        │
╰──────────────────────────────────────────────────────────────╯
```

9. Press <Enter> or y to continue the diagnostic test.

The next series of tests check the registers and random access memory on the Hostess *186* controller:

```
SYSTEM DUAL PORT RAM TEST
Testing ..........OK
START REGISTER & MEMORY CONTROL PROGRAM - OK

ON BOARD PROCESSOR RAM TEST

Testing ................................

128K RAM tested OK
Do you wish to continue testing [Y]: y
```

10. Press <Enter> or y to continue the diagnostic test.

The next step of the diagnostic program concentrates on the Comtrol Hostess *186* serial ports using the test plug. Go to the next subsection to continue testing your controller.

Testing the Ports Using the Test Plug

The serial port tests follow the circuitry tests. This subsection assumes that you have already performed steps 1 through 10 in the subsection titled, Testing the Controller Using the Diagnostic Diskette.

The following series of tests concentrate on the signals sent and received through the serial ports using the test plug.   The test plug is a loopback plug (also known as a wrap plug) which returns the signals sent to it.

The following message appears for each port before the tests start.

```
EXIT REGISTER & MEMORY CONTROL PROGRAM - OK

START SERIAL I/O CONTROL PROGRAM - OK


SERIAL CONTROLLER TEST, PORT 1

Install test plug on PORT 1, press <ENTER> when ready to continue.
```

11. Press <Enter> or y to continue the test.

The Serial Controller Test checks the modem control signals for the port and presents a message for each signal.

```
SERIAL CONTROLLER TEST, PORT 1

Install test plug on PORT 1, press <Enter> when ready to continue
Serial I/O test ............ - OK
Modem control RTS to CTS - OK
Modem control DTR to CD - OK

Install test plug on PORT 2, unless there are no more ports to test.
Are there more ports to test [Y]: y
```

12. You can test every port on the controller the same way. Move the loopback plug from one port to the next port (see Figure 4-1 for the order of the ports).
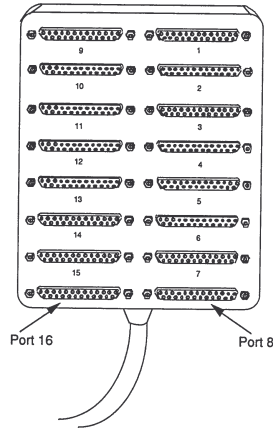
Port 16   Port 8

Figure 4-1. Port Locations for the Interface Box

When you finish testing the ports, the program resets the controller.

```
EXIT SERIAL I/O CONTROL PROGRAM - OK
SOFTWARE RESET TEST - OK
Reset issued, waiting for controller to reboot .. - OK
```

13. When testing is complete, a table appears that summarizes the test results. If you have problems, see the following subsection that describes what to do if you encounter diagnostic problems.

```
TEST SUMMARY

COMTROL CONTROLLER SEARCH                   - OK
I/O BASE ADDRESS SEARCH                     - OK
CONTROLLER TYPE SEARCH                      - OK
SYSTEM DUAL-PORT RAM TEST                   - OK
START REGISTER & MEMORY CONTROL PROGRAM     - OK
ONBOARD PROCESSOR RAM TEST                  - OK
EXIT REGISTER & MEMORY CONTROL PROGRAM      - OK


Press <ENTER> to view remainder of summary:


TEST SUMMARY

START SERIAL I/O PROGRAM                     - OK
SERIAL CONTROLLER TEST, PORT 1              - OK
SERIAL CONTROLLER TEST, PORT 2              - OK
    .
    .
    .
SERIAL CONTROLLER TEST, PORT 16            - OK
EXIT SERIAL I/O CONTROL PROGRAM             - OK
```

14. The diagnostics ask you if you want to test a different Hostess *186* controller. If you install more than one controller, you should test the remaining boards.

To test any remaining boards, press <Enter> or y and go back to step 2 of this chapter.

If you only have one Hostess *186* controller or have tested the last controller, go to step 15.

15. Remove the diskette from drive A, reboot the system, and install the driver software. See the appropriate software device driver installation guide.

What to Do If You Encounter a Diagnostic Problem

The purpose of a diagnostic program is to test your controller. If you encounter any problems, first check your system and connectors, then rerun the test. If problems persist, write down the diagnostic codes and contact Comtrol. See Chapter 5 for troubleshooting information.

In the following example, Port 1 does not pass the Serial I/O Test, nor does it recognize the modem control signals:

```
SERIAL CONTROLLER TEST, PORT 1
Install test plug on PORT 1, unless there are no more ports to test.
Are there more ports to test [Y]: y
Serial I/O test . - FAIL
Modem control RTS to CTS - FAIL
Modem control DTR to DSR - FAIL
Modem control DTR to CD - FAIL

Serial I/O test error.  Check that the test plug is on the correct port.
Please report the following number when calling for technical support: 11 - 24

The modem control failures shown above will occur if your Comtrol board does
not support these signals.  For each of the following questions, respond (Y) if
your board does not support the signal mentioned.
 Disable RTS to CTS testing on remaining ports [Y]:
 Disable DTR to DSR testing on remaining ports [Y]:
 Disable DTR to CD testing on remaining ports [Y]:

If you are unable to resolve the problem, call Comtrol Technical Support at
(800) 926-6876 or (612) 631-7654

Do you wish to continue testing [Y]: y
```

In this example, you may call Comtrol and describe the problem (The Serial I/O Test fails) and refer to the error number (11-24).

Chapter 5.
Troubleshooting

Should you experience difficulty using the Hostess *186* controller, this chapter provides some simple diagnostics to follow. Table 5-1 lists simple problems, possible causes, and possible solutions.

If your problem appears in Table 5-1, first try the suggested solutions. If problems persist:

1. Remove the device driver and reinstall it.

2. Remove the controller and reinstall it.

3. Run the Comtrol operating system independent diagnostic test diskette.

4. Check-out your system using system diagnostics provided by your computer manufacturer (if any).

Table 5-1. Possible Solutions for Problems

Problem	What May Be Wrong	What to Do
'No Adapter Active' message.	1) Controller set at wrong address.	Check address settings of DIP switch.
	2) Controller not seated all the way in the adapter slot.	Power down, reseat adapter, and power up.
	3) Address collision.	Use secondary addresses.
Controller active, but data garbled.	Wrong parity, baud, or speed set.	Check settings or reinstall device driver.
Controller active, can send but not receive data.	Memory caching.	Check version of BIOS chip, use appropriate address configuration.
Transparent Print active, but printer cannot receive or send data.	Mismatched port names.	Enable the "normal" ports. Match correct tpru0X with ttyU0X.
Modem cannot send or receive data.	DCD signal is set high.	Check modem signal settings.
Inconsistent data on screen.	Power overload.	Determine if system components exceed power supply.

In Case of Difficulty

If you encounter problems or have questions about the drivers or the installation procedures, call

Comtrol Corporation

Phone:

(612) 631-7654

1-800-926-6876 (US),

(44) 844-261-634 (UK)

Chapter 6.
Controller Specifications

This chapter lists Hostess *186* controller specifications.

The Hostess *186* controller is a sixteen-port, intelligent controller, which offers several features:

- The 80186 processor found on the Hostess *186* controller relieves the system processor of I/O port processing.

- Dual-ported RAM shared between the system processor and the controller processor allows for easy memory transfers.

- Sixteen bit memory transfers increase the amount of data passed from the peripherals to the processor.

- Modem control provides easy data communications.

The Comtrol Hostess *186* controller operates under these conditions:

Table 6-1. Conditions Specifications

Condition	Values
Air temperature:	
System on	0 to 50 degrees C
System off	-65 to 150 degrees C
Humidity:	
System on	8% to 80%
System off	20% to 80%
Altitude:	
	0 to 10,000 feet
	0 to 3,048 meters
Heat output:	44.2 BTU/Hr

Tables 6-2 lists the specifications for the Comtrol Hostess *186* 16 controller.

Table 6-2. Controller Specifications

Function	Specification
I/O ports/expansion slot	16 ports per 1 expansion slot
Interface	EIA-232-D
Base memory address	Software selected
I/O port address	Switch selected
Processor	10 MHz 80186
Serial Communication Controller	8530
Hardware interrupt	Software selected
	(IRQ 3, 4, 5, 9, 10, 11, 12, 15)
Control (by device driver software):	
Baud rate	50 thru 38.4K bit/sec.
Data bits	5, 6, 7, or 8
Stop bits	1, 1.5, or 2
Modem control	RTS, CTS, DCD, DTR
Power requirements (+ or -10%):	
+5 VDC	2.3 A
+12 VDC	5.5 mA
-12 VDC	116 mA
Power consumption:	
+5 VDC	11.5 W
+12 VDC	.066 W
-12 VDC	1.39 W
RAM	128K dual-ported
EPROM	64K
Bus interface	ISA or compatible 16-bit data, 24-bit address.
Dimensions	AT height, full length card.

Note: *DTR is not supported on ports 11 and 12.*

Appendix A.
Memory Addresses

The Hostess *186* contains 128K of memory on the controller. The controller uses this memory to store data that moves between the peripheral device and personal computer system. To use this memory, the controller's device driver communicates to the operating system and tells it where the memory resides in the system. PCs and compatible computers have memory mapped out for specific uses.

Table A-1 illustrates the system memory map for IBM PC™, IBM AT™, and PS/2 computers.

Table A-1. System Memory Map for IBM PC, AT, and PS/2 Computers

Address	Used By	Comments
0000 through 9FFFF	640K on system board	May be 64K to 640KB, depending on the model.
A0000 through BFFFF	Display adapter reserved	EGA and VGA™ use all of this, CGA and MDA use a portion of it.
C0000 through DFFFF	Reserved for ROM expansion	Used for I/O channel BIOS as in the disk controller). • C0000 through C7FFF (EGA/VGA BIOS) • C8000 through CBFFF (Hard disk BIOS) • D0000 through DFFFF (Cluster/network adapter BIOS)
E0000 through EFFFF	Expansion of system ROM	For the AT and PS/2.
F0000 through FFFFF	System ROM	May be duplicate of ROM in higher memory.
100000 through FDFFFF	Memory expansion	AT and PS/2 only.
FE0000 through FEFFFF	Reserved	AT and PS/2 only.

Table A-2. I/O Map Address (IBM AT and PS/2)

Hexadecimal Range	Device
000 through 01F	DMA controller 1, 8237A-5
020 through 03F	Interrupt controller 1, 8559A Master
040 through 05F	System timers
060 through 06F	Keyboard
070 through 07F	Realtime clock, non-maskable interrupt (NMI) mask
080 through 08F	DMA page registers
090 through 09F	Arbitration control port, card selected feedback, system control port and setup
0A0 through ABF	Interrupt controller 2, 8259A
0C0 through 0DF	DMA controller
0E0	Split address register
0E1	Memory encoding register
0F0 through 0FF	Math coprocessor
010 through 01E	Programmable option select
1F0 through 1F8	Fixed disk
200 through 207	Game I/O
278 through 27F	Parallel printer port 2 (AT) port 3 (PS/2)
2F8 through 2FF	Serial port 2 (RS-232-C)
300 through 31F	Prototype card
360 through 36F	Reserved
378 through 37F	Parallel printer port 1 (AT), port 2 and port 3 (PS/2)
380 through 38F	SDLC, bisynchronous 2
3A0 through 3AF	Bisynchronous 1
3B0 through 3BF	Monochrome Display and Printer Adapter
3C0 through 3CF	Reserved (AT), Video subsystem (PS/2)
3D0 through 3DF	Color/Graphics monitor adapter
3F0 through 3F7	Diskette controller
3F8 through 3FF	Serial port 1 (RS-232-C)

Different operating systems have particular requirements for managing input to and output from, peripheral devices. The Hostess *186* provides several options for both base memory and input/output addresses. The possible base memory addresses range from 218 to 33C. It is between these areas of memory where the

Appendix B.
ASCII Character Set

Table B-1. ASCII Character Set

Decimal	Hexa-decimal	ASCII	Decimal	Hexa-decimal	ASCII	Decimal	Hexa-decimal	ASCII
0	00	NUL	43	2B	+	86	56	V
1	01	SOH	44	2C	,	87	57	W
2	02	STX	45	2D	-	88	58	X
3	03	ETX	46	2E	.	89	59	Y
4	04	EOT	47	2F	/	90	5A	Z
5	05	ENO	48	30	0	91	5B	[
6	06	ACK	49	31	1	92	5C	\
7	07	BEL	50	32	2	93	5D	]
8	08	BS	51	33	3	94	5E	^
9	09	HT	52	34	4	95	5F	_
10	0A	LF	53	35	5	96	60	`
11	0B	VT	54	36	6	97	61	a
12	0C	FF	55	37	7	98	62	b
13	0D	CR	56	38	8	99	63	c
14	0E	SO	57	39	9	100	64	d
15	0F	SI	58	3A	:	101	65	e
16	10	DLE	59	3B	;	102	66	f
17	11	DC1	60	3C	<	103	67	g
18	12	DC2	61	3D	=	104	68	h
19	13	DC3	62	3E	>	105	69	i
20	14	DC4	63	3F	?	106	6A	j
21	15	NAK	64	40	@	107	6B	k
22	16	SYN	65	41	A	108	6C	l
23	17	ETB	66	42	B	109	6D	m
24	18	CAN	67	43	C	110	6E	n
25	19	EM	68	44	D	111	6F	o
26	1A	SUB	69	45	E	112	70	p
27	1B	ESC	70	46	F	113	71	q
28	1C	FS	71	47	G	114	72	r
29	1D	GS	72	48	H	115	73	s
30	1E	RS	73	49	I	116	74	t
31	1F	US	74	4A	J	117	75	u
32	20	SP	75	4B	K	118	76	v
33	21	!	76	4C	L	119	77	w
34	22	"	77	4D	M	120	78	x
35	23	#	78	4E	N	121	79	y
36	24	$	79	4F	O	122	7A	z

Appendix C.
100-Pin Connector Pinout Information

This appendix provides detailed information about the 100-pin connector for the controller. You can use this information if you are building your own interfaces.

Figure C-1 illustrates pinout information for the 100-pin connector.
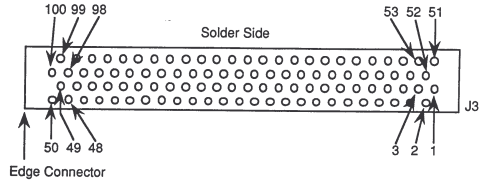
Figure C-1. 100-Pin Connector Pinout

Table C-1 lists the Hostess *186* Signals for the 100-pin connector for RS-232 mode.

Table C-1. Hostess *186* Signals for the 100-Pin Connector

Pin Number	Signals	Pin Number	Signals	Pin Number	Signals
1	CD1	34	DTR4	67	TX13
2	CD2	35	CTS3	68	TX14
3	RX1	36	CTS4	69	RX13
4	RX2	37	RTS3	70	RX14
5	TX1	38	RTS4	71	CD13
6	TX2	39	DTR7	72	CD14
7	DTR1	40	DTR8	73	RTS13
8	DTR2	41	TX7	74	RTS14
9	CTS1	42	TX8	75	CTS13
10	CTS2	43	RX7	76	CTS14
11	RTS1	44	RX8	77	CD11
12	RTS2	45	CD7	78	CD12
13	GND	46	CD8	79	RX11
14	GND	47	RTS7	80	RX12
15	DTR5	48	RTS8	81	TX11
16	DTR6	49	CTS7	82	TX12
17	TX5	50	CTS8	83	CTS11
18	TX6	51	CD9	84	CTS12
19	RX5	52	CD10	85	RTS11
20	RX6	53	RX9	86	RTS12
21	CD5	54	RX10	87	GND
22	CD6	55	TX9	88	GND
23	RTS5	56	TX10	89	DTR15
24	RTS6	57	DTR9	90	DTR16
25	CTS5	58	DTR10	91	TX15
26	CTS6	59	CTS9	92	TX16
27	CD3	60	CTS10	93	RX15
28	CD4	61	RTS9	94	RX16
29	RX3	62	RTS10	95	CD15
30	RX4	63	GND	96	CD16
31	TX3	64	GND	97	RTS15
32	TX4	65	DTR13	98	RTS16
33	DTR3	66	DTR14	99	CTS15
				100	CTS16

Appendix D.
Warranty and Technical Support

Comtrol Corporation provides:

* A 30-day money-back guarantee

* A lifetime warranty[*] (US and Canada)

* Lifetime support for your Comtrol Hostess *186* controller. Call 1-800-926-6876, (612) 631-7654 (US), or (44) 844-261-634 (UK), for help with your controller.

[*]Check with your distributor for guarantee conditions in countries other than the U.S.A. and Canada.

Limited Warranty

Comtrol Corporation, Inc. ("the Company") and its affiliate (Comtrol Europe, Ltd.) make no representations or warranties, expressed or implied including warranties of merchantability, noninfringement, and fitness for a particular purpose except as provided below.

Hardware

Comtrol warrants to the original purchaser that its Hostess *186* is free of defect in design, materials and workmanship for the life of the product from the date of delivery of a new Hostess *186*. Comtrol (or its authorized repair center), at its option, will repair or replace, at the business location of Comtrol each part of the Hostess *186* which is proven to the satisfaction of Comtrol to have been defective in design, material or workmanship.

This warranty shall not apply to any part of the Hostess *186* which, in the

This warranty is void if the serial number of the Hostess *186* has been defaced, altered or removed. This warranty does not apply to expendable components such as fuses or bulbs. Repair and replacement parts will be furnished on an exchange basis and may be either reconditioned or new. All replaced parts or controllers become the property of Comtrol.

The sole remedy for breach of warranty shall be repair, replacement, or refund, at the option of Comtrol, of the defective product provided as follows.

Software

Comtrol warrants that for a period of ninety (90) days from the date of delivery to you as evidenced by a copy of your receipt, the disks on which the program is furnished will under normal use be free from defects in materials and workmanship and the program under normal use will perform substantially in accordance with the documentation without significant errors that make it unusable.

Comtrol's entire liability and your exclusive remedy under this warranty (which is subject to you returning the program to Comtrol or an authorized dealer with a copy of your receipt) will be, at Comtrol's option, to attempt to correct or help you around errors with efforts that Comtrol believes suitable to the problem, to replace the program or disks with functionally equivalent software or disks, as applicable, or to refund the purchase price and terminate this Agreement.

No Comtrol dealer, distributor, agent or employee is authorized to modify this warranty.

Comtrol does not warrant that the functions contained in the programs will meet your requirements or that the operation of the programs will be uninterrupted or error-free. You assume the responsibility for the selection of the programs and hardware to achieve your intended results and for the installation, use and results obtained from the programs.

Some programs contained on disk are specifically for and have been optimized to run with Comtrol products. Therefore, the programs on these disks will not run effectively and will cause errors in data or operation when this software is attempted to be used with non-Comtrol products.

General

To qualify for the previously discussed warranty, the original purchaser must follow the procedure outlined below:

1. Comtrol must be notified in writing within thirty (30) days of the date that the defect is discovered. Comtrol will then issue a Return Material Authorization (RMA) Number which the purchaser must include with all correspondence and display on the outside of the shipping container when returning the Hostess *186*.

2. All Hostess *186* controllers must be shipped freight and insurance prepaid, in the original shipping container, or in a container providing equal or better protection, with the Return Material Authorization (RMA) Number displayed on the outside of the container in a prominent manner.

3. A written description of the defect together with a copy of your receipt or other proof of purchase, and the name of the dealer which sold you the Comtrol product, must be shipped with the Hostess *186*. All defects must be reproducible at Comtrol's location to qualify for this limited warranty. Ship the controller to:

    Comtrol Corporation
    2675 Patton Road, Dock D
    St. Paul, Minnesota 55113

Comtrol will return a Hostess *186* which qualifies under this warranty freight and insurance prepaid. Comtrol will repair or replace Hostess *186* controllers that do not qualify under the terms of this warranty at the option of the purchaser, in which case the purchaser will pay the cost of repair or replacement, and return freight and insurance.

This limited warranty is in lieu of all other warranties and conditions expressed, implied or statutory including merchantability, fitness for purpose, non-infringement, course of dealing, trade or performance and all other liabilities of Comtrol all of which are hereby disclaimed.

In no event will Comtrol be liable for damages, including lost profits, lost savings or other special, punitive, incidental, or consequential damages arising out of the use of or inability to use the Hostess *186*, even if Comtrol or

Limited Liability

Independent of the warranty or any other agreement between you and Comtrol, regardless of the basis for any claim, neither Comtrol nor anyone else who has been involved in the creation, production, or delivery of this software or hardware shall be liable for any direct, indirect, consequential or incidental damages; Comtrol's maximum liability shall be limited to refund of the purchase price. Some consumer laws may not allow the limitation or exclusion of incidental or consequential damages for consumer products, so the above limitations or exclusions may not apply to you. The price of the materials and programs reflects this allocation of risk.

Technical Support

Comtrol Corporation provides lifetime support for all its products. If you have questions about your controller, please call or FAX Comtrol at:

Toll free: 1-800-926-6876 (US)

Phone: (44) 844-261-634 (UK)
or
(612) 631-7654 (US)

FAX: 612-631-8117 (US)
or
(44) 844-261-227 (UK)

Comtrol has a staff of engineers, programmers, technicians, and managers available for help.

Glossary

asynchronous
Serial communication where each character has a preceding start bit that lets the receiver know that the character is about to be sent, a stop bit that lets the receiver know that the character is finished, and in some cases, a parity bit for error detection.

buffering
A way to temporarily store data.

dual-ported RAM
An area of memory where software instructions may be stored. Either the system CPU or the intelligent chip on the controller may access the resident Random Access Memory (RAM) on the Comtrol controller.

eight-bit versus sixteen-bit
Information is passed from the system to add-in peripherals in either bytes (eight bits) or words (16 bits). A word write in 16-bit mode takes one write cycle. A word write in an eight-bit mode takes two write cycles.

full modem control
An ambiguous term. Full modem control should have all the necessary signal lines to support RS-232 communication between DTE and DCE devices (this is, transmit, receive, signal ground, RTS, CTS, DSR, DTR, CD, and RI signals). Some full-modem definitions do not include the DSR, DTR, or RI signals.

> *Note:* *SCO XENIX (and other operating systems) do not support the DSR and RI signals.*

interface
An electronic component that connects two different devices.

RJ45
Definition of a standard 8-pin modulator, telephone-type connector. RJ45 is the industry designation for the 8-place receptacle and plug.

RS-232

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