

**Radio Shack**  
TRS-80  
**COMPUTER PRODUCTS**



**Network**  
CONTROLLER **3**

**OPERATION  
GUIDE**

# Network 3 Operating Software

Catalog Number 26-2775



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This Network 3 Operating Software is designed for use with a TRS-80 Network 3 Controller (Cat. No. 26-1212) in a network of up to 16 TRS-80 Model III "student stations" connected to a central disk-equipped "host" TRS-80 Model III. This software package makes it possible for each student station to use the disk at the host computer to load and save programs, to use disk data files, and to use a printer attached to the host computer, all without teacher intervention. Student stations can also operate independently, without disturbing the network connections. The minimum host computer is a 32K TRS-80 Model III with one disk drive and RS-232C interface. The minimum student station is a 16K TRS-80 Model III with Model III BASIC and RS-232C interface.

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## Important Note to Model III Users

From time to time, Radio Shack may release new versions of TRSDOS, the TRS-80 disk operating system. Check with your local Radio Shack or the *TRS-80 Microcomputer News* for notices and instructions on these enhanced versions of TRSDOS.

If you receive a new version of TRSDOS, read the following before making any modifications to your existing software packages (applications, languages, or system utilities):

- Do not convert your Radio Shack software packages for use with the new version of TRSDOS unless you are instructed to do so.
- Before converting a Radio Shack supplied Model I software package to a Model III format, check to see if Radio Shack provides a Model III version of the package. If so, you should obtain a copy of that version.
- If you're using several different software packages, press the RESET button whenever you change software.

Thank-You!

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# Important Information for Cassette Users

**Note:** Model III BASIC on the TRS-80 Model III is essentially the same as Level II BASIC on the TRS-80 Model I. All of the following references to Level II BASIC also refer to Model III BASIC. The only difference is that a higher baud rate for saving onto tape can be set if you have a Model III with Model III BASIC (high = 1500 and low = 500). Both low and high baud rate use the same volume setting on the Model III.

## Using Your Cassette Deck

Many factors affect the performance of a cassette system. The most significant one is volume. Too low a volume may cause some of the information to be missed. Too high a volume may cause distortion and result in the transfer of background noise as valid information.

Four different cassette models have been supplied with the TRS-80 system—the CTR-40, CTR-41, CTR-80, and CTR-80A. Each model has its own loading characteristics. The table below gives the suggested volume ranges for each of the CTR models.

Notice that the volume ranges for Level I and Level II are different. This is because the Level II data transfer rate is faster (500 baud vs. 250 baud). Also, notice that for the TRS-80 Model I, pre-recorded Radio Shack programs need a slightly higher volume setting than that required by your own CSAVE tapes. This is because the pre-recorded tapes are produced with high-speed audio equipment at a slightly lower volume level than the CSAVE process provides. The Model III records at a lower volume than the pre-recorded tapes are recorded at, so the volume setting for user-generated tapes is higher than for pre-programmed tapes. You will need to take this into account when CLOADing Level II programs into a Model III.

Recorder Model	User-Generated Tapes		Pre-Recorded Radio Shack Tapes	
	LEVEL I	LEVEL II	LEVEL I	LEVEL II
CTR-40	YELLOW LINE	RED LINE	YELLOW LINE	RED LINE
CTR-41	6-8	4-6	6.5-8.5	5-7
CTR-80 & CRT-80A	4.5-6.5	3-5	5.5-7.5	2.5-5

**Recommended Volume Settings for Radio Shack Cassette Decks  
When Used with the TRS-80 Model I**

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Recorder Model	User-Generated Tapes	Pre-Recorded Radio Shack Tapes
CTR-80, CTR-80A	5-7	4-6

**Recommended Volume Settings for Radio Shack Cassette Decks  
When Used with TRS-80 Model III**

(With the CTR-40, CTR-80, and CTR-80A, turn the control to the left to increase volume. With the CTR-41, turn the control to the right.)

When information is being loaded from the cassette tape, two asterisks will appear on the screen. The one on the right will flash on or off as the program is read in. If the asterisks do not appear, or the one on the right does not flash, then the volume setting is probably too low. Increase the volume and try again. If you have a Model III this may be an indication that the tape's baud rate is different than the Computer's baud rate. (All Radio Shack Model I Level II pre-recorded cassettes are recorded at 500 baud rate, so Low baud rate must be selected when they are loaded on the Model III.) Try resetting the baud rate from high to low or vice versa (See your Operation Manual).

Use the reset button to stop the cassette and return control to you if loading problems occur.

Radio Shack programs are recorded at least twice on each tape. Following this practice when you record programs on tape will give you a back-up if one does not load properly or if it becomes damaged.

**Important Note:** The CTR-41 requires that you keep the supplied "dummy plug" in the MIC jack at all times. However, the other models should never be used with the "dummy plug."

## Level I

Sometimes you will get an error message during an attempted CLOAD. This means that some information was lost or garbled. Adjust the volume level slightly and try again.

## Level II (Also Model III BASIC)

In case of an error message, proceed as above. In Level II, there is also a rare case in which the program is not loaded correctly even though no error message is generated. So, after CLOADING a program, be sure to LIST it. If some data was garbled, then at some point in the listing the display will be filled with meaningless words and characters. Adjust the volume and try again.

## Hints and Tips

Computer tapes should be stored in a relatively dust-free area (a cassette case is recommended) and protected from high temperatures. Magnetic and electrical fields may alter recorded information, so avoid placing the tape near them

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(i.e. household appliances, power sources such as transformers and television sets, etc.).

The cassette deck supplied with the TRS-80 is very compatible with the system and will perform its duties with great success. To keep the cassette deck in top condition and thus minimize your problems, you should periodically perform some routine maintenance on it. Dirty heads can cause as much as a 50% loss of volume. Also, heads become magnetized with use and may cause distortion. We recommend that you clean the head, capstan, and pinch roller after every four hours of operation. Heads on new recorders should always be cleaned before use.

**Note:** Cassette cleaning and demagnetizing accessories are available from your local Radio Shack store.

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# Introduction

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Your TRS-80 Network 3 Controller is specifically designed to give you, the teacher, more freedom in the classroom, as well as more efficient use of your existing computer equipment.

The Network 3 Controller connects up to 16 independent AUXILIARY COMPUTERS (sometimes referred to as Student Stations) to a CENTRAL COMPUTER (or Host System). While the Network 3 Controller and the CENTRAL COMPUTER attend to such tasks as saving, loading, or printing out student programs or data, you can devote more time to your real job — teaching.

The Network 3 Controller also enables you to use your entire computer system more efficiently by allowing each student station access to the CENTRAL COMPUTER's disk drive and printer. Instead of providing 16 separate printers, for example, the Controller enables all computers in the Network 3 system to use a single printer without moving any equipment from one place to another.

The Network 3 Controller can be used with any TRS-80 computer that has an RS-232-C Interface, for faster transmission of information.

In this manual, you'll learn how to connect and start up a Network 3 controlled system. For instructions on using the Network 3 once it's started up, see the manual which comes with your Network 3 software package.

It's important to remember that the Network 3 requires special software before you can use it. The specific operation of the Network 3 depends solely upon the capabilities of the software package you're using.

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## What Is A Network 3 System?

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A TRS-80 Network 3 System is made up of three major components. You can also include optional equipment (such as a printer) for special operations. To set up a Network 3 system, you'll need:

**Network 3 Controller.** The Controller package includes its own special power supply and a cable for connecting the Network 3 to your CENTRAL COMPUTER.

**Central Computer.** This is your Computer and can be any TRS-80 Model I, II, or III which has an RS-232-C Interface. Note that most Network 3 software packages also require the CENTRAL COMPUTER to have at least one disk drive.

**Auxiliary Computers.** These are the fully independent computers used by the students and can be any combination of up to 16 TRS-80 Model I, II, III, or Color Computers.

**Note:** TRS-80 Model I's and Model III's must be equipped with RS-232-C Interfaces.



# Connecting the Network 3 System

**Important Note!** Before you begin connecting the Controller System, be sure the power switches of the Controller and all Computers (including attached optional equipment) are turned OFF.

The Network 3 Controller package includes a special *Controller-to-Central* cable. This allows you to use a TRS-80 Model I, II, or III as the CENTRAL COMPUTER when you connect it to the Controller. (**Note:** A TRS-80 Color Computer cannot be used as a CENTRAL COMPUTER.)

The *Controller-to-Auxiliary* cable you need will depend upon how far away your AUXILIARY COMPUTERS are from the Network 3 Controller. To decide which *Controller-to-Auxiliary* cable you need, see **Table 1**.

**Controller-to-Auxiliary Cable**

Cable Length	Catalog Number
10'	26-1490
25'	26-1491
50'	26-1492
100'	26-1493

**Table 1**

The maximum distance an AUXILIARY COMPUTER can be from the Controller is 100 feet. If an AUXILIARY unit is more than 100 feet from the Controller, information may be lost or garbled during operation.

You may also need special adaptors to connect the AUXILIARY COMPUTERS to the Network 3 Controller.

The Color Computer Adaptor allows you to connect the rectangular *Controller-to-Auxiliary* cable jack to the round RS-232-C jack on the back of the TRS-80. Plug the round end of the adaptor (the DIN plug) into the RS-232-C port on the Computer and attach the other end to the *Controller-to-Auxiliary* cable.

If you use a Model III as an AUXILIARY COMPUTER, you'll need to connect the *Controller-to-Auxiliary* cable to the Computer via the Model III Adaptor. Simply plug the appropriate end of the flat cable adaptor to the Computer and connect the other end to the *Controller-to-Auxiliary* cable.

The Cable Connector lets you attach two shorter cables to each other, making one long cable. For instance, if you need a cable 20 feet

**Cable Adaptors**

Type of Adaptor	Catalog Number
Color Computer	26-1494
Cable Connector	26-1495
Model III	26-1497



**Table 2**

long, simply link two 10' cables together with the Adaptor. It's important to remember, however, that the maximum cable length is 100'. For example, do not try to link three 50' cables (150') or you may lose information when it is transmitted.

All *Controller-to-Auxiliary* cables need to be connected to the Controller on one end and the RS-232-C jack of a Computer on the other end. The location of the RS-232-C Interface jack will depend on the TRS-80 you're using.

**TRS-80 RS-232-C Jack Locations**

**Model I** users will find the RS-232-C jack on the *front* of the Expansion Interface. You'll need to use the special *Model I RS-232-C Cable* to connect the Controller cable to the Model I.

**Model II** users will find the RS-232-C jack on the *rear* of the Computer. (Connect the Controller to CHANNEL A and insert a TERMINATOR PLUG into CHANNEL B. If you don't have a TERMINATOR PLUG, check with your local Radio Shack.)

**Model III** users will find the RS-232-C jack on the *bottom* of the Computer.

**Color Computer** users will find the jack on the *rear* of the Computer. You'll need to use the special Color Computer *Controller-to-Auxiliary* RS-232-C Cable to connect the Controller to your Color Computer.

**Table 3**

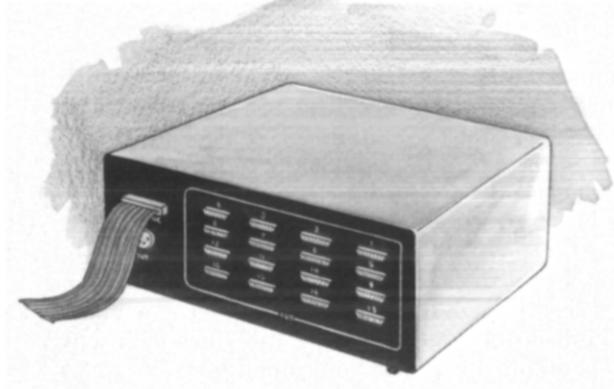
# Installation

When you're ready to connect the TRS-80 to the RS-232-C jack on your Computer, follow the procedure described below. For specific information on connecting and using the RS-232-C interface, see your Computer's owner's manual.

**Important Note for Model I users:** Before a TRS-80 Model I can be used as an AUXILIARY COMPUTER, the COMM/TERM Switch on the RS-232-C board *must be set to TERM*. See the RS-232-C owner's manual for specific instructions. (If a Model I is used as a CENTRAL COMPUTER, the COMM/TERM switch can be set to either COMM or TERM.)

If your AUXILIARY COMPUTER is a Model II, connect the cable to CHANNEL A. Be sure to attach the TERMINATOR PLUG to CHANNEL B.

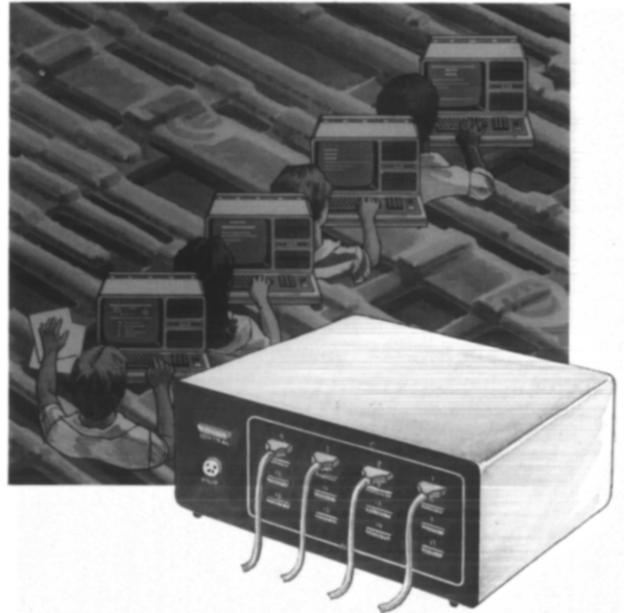
1. Attach one end of the *Controller-to-Central* cable to the Network 3 Controller jack labeled **CENTRAL**.



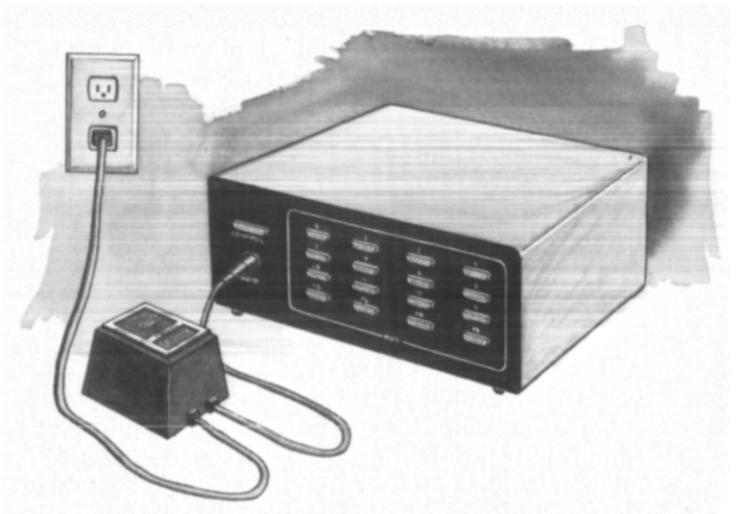
2. Attach the other end of the *Controller-to-Central* cable to the RS-232-C jack on the CENTRAL COMPUTER.
3. Attach one end of the *Controller-to-Auxiliary* cable to the jack labeled **AUXILIARY 1** (Auxiliary Station #1) on the Controller.



4. Attach the other end of the *Controller-to-Auxiliary* cable to the RS-232-C jack on the AUXILIARY COMPUTER specified as **Auxiliary #1**.
5. Continue connecting *Controller-to-Auxiliary* cables one at a time — first to the Controller, then to the AUXILIARY COMPUTERS.



6. Connect the Network Controller Power Supply by inserting the *round* Power Supply Plug into the jack labeled **POWER** on the *back* of the Controller. Plug the other end of the Power Supply into a wall outlet.



**Warning!** Do not attempt to make connections to the Network 3 Controller with cables other than those supplied. Use only the supplied UL-listed AC adaptor.

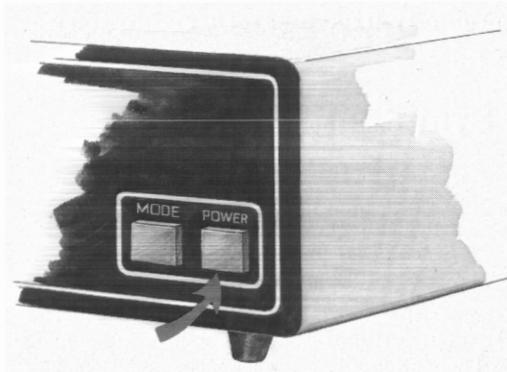
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# Starting Up

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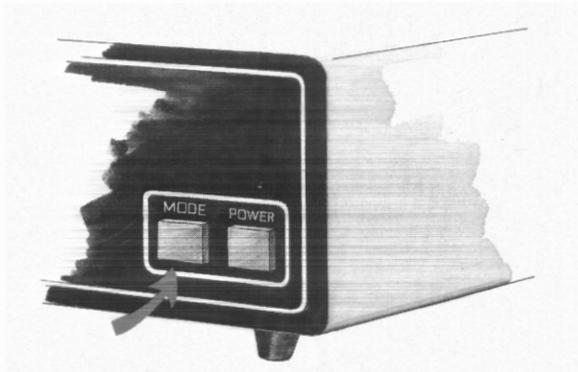
Be sure to follow these steps when turning on the power.

1. Push the Controller's **POWER** Switch (located on the *front* of the Controller) to turn the Network 3 Controller ON.



When the Switch is illuminated, power is ON. When the Switch is not illuminated, the power is OFF. (Push the Switch again to turn the Controller OFF.)

2. Turn all other optional equipment (printers, etc.) ON.
3. Turn the **CENTRAL COMPUTER** ON (see your Computer's owner's manual for specific instructions).
4. Turn the **AUXILIARY COMPUTERS** ON.
5. Push the Controller's **MODE** Switch for either Automatic or Programmable control.
  - When the Switch is illuminated, the Controller is in Automatic Mode.
  - When the Switch is not illuminated, the Network 3 is in Programmable Mode.



You are now ready to begin working with your Network 3 Controller system.

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# Using the Controller

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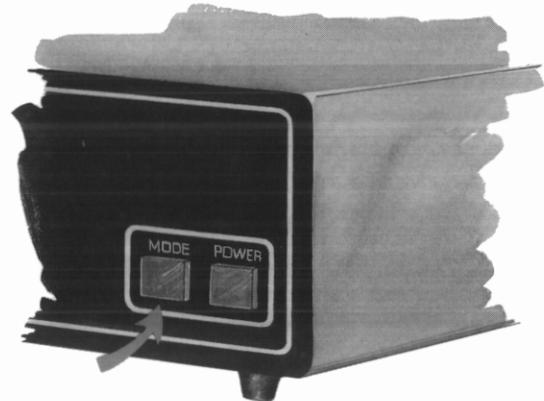
Once the Controller is properly connected and the power is on, you'll find the Network 3 System extremely simple to use since there's only one switch to press — the **MODE** Switch.

The Controller is in **Automatic Mode** when the **MODE** Switch is illuminated.

When the **MODE** Switch is not illuminated, the Controller is in **Programmable Mode**.

## Automatic Mode

When the **MODE** Switch is lit-up and the Network 3 is set to **Automatic mode**, the Controller automatically checks (polls) each **AUXILIARY COMPUTER** until it finds a student who is requesting help.

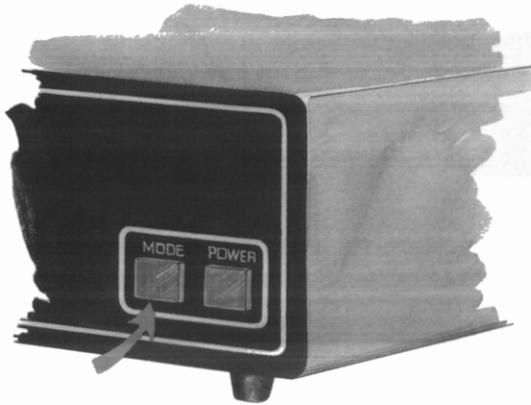


The Controller then notifies the **CENTRAL COMPUTER**, which asks the student what kind of help he/she needs (whether saving, loading, or printing out data or programs). When the student is finished, he/she must "release" the **CENTRAL COMPUTER**. (In Auto Mode, the specific command which the student uses to release the **CENTRAL COMPUTER** depends upon the program the student is running at the particular time.) The Network 3 can continue polling only after the student has released the **CENTRAL COMPUTER**.

**Note:** The Color Computer cannot be used in Automatic Mode.

## Programmable Mode

When the MODE Switch is not illuminated, the Controller is in Programmable Controlled Polling Mode.



In this Mode, the Controller's operation depends on the program running in the CENTRAL COMPUTER. For instance, if your program allows it, you can go directly to a specific AUXILIARY COMPUTER without checking to see if any other student needs assistance. Or, if the software allows it, you can password protect certain files on a CENTRAL COMPUTER diskette.

The point to keep in mind is that the CENTRAL COMPUTER is in charge when the Controller is in Programmable Mode.

## Troubleshooting and Maintenance

If you have problems operating your Network 3 Controller System, check the following table of symptoms. Hopefully, you'll find the cure as well. If you still can't remedy the problem, take the unit to your local Radio Shack where it will be promptly fixed and returned to you.

Symptom	Cure
The Network 3 Controller will not power-up.	Check to be sure both the Power Supply to Controller and the Power Supply to wall are properly connected.
The CENTRAL or a AUXILIARY COMPUTER will not power-up.	Check connections for Computer power supplies. For further information, see Computer's owner's manual.
All AUXILIARY COMPUTERS power-up but will not operate.	Check the <i>Controller-to-Central</i> cable connection.
A single AUXILIARY COMPUTER powers-up but does not operate properly.	Check the AUXILIARY COMPUTER's <i>Controller-to-Auxiliary</i> connection.
Data is lost or garbled during transmission.	Check all connectors. Be sure cable length does not exceed 100'.

Network  
CONTROLLER 3



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## Specifications

## Notes

Maximum System Configuration (CENTRAL COMPUTER) One TRS-80 Model I, II, or III computer.

Maximum System Configuration (AUXILIARY COMPUTERS) One to 16 TRS-80 Model I, II, III, or Color Computer.

### Network 3 Controller

Cable (Supplied) One 6' cable DB-25 to DB-25.

Cables (Optional) DB-25 to DB-25 in the following lengths:  
10' (26-1490)  
25' (26-1491)  
50' (26-1492)  
100' (26-1493)

Adaptors Color Computer DB-25 to DIN (26-1494)  
Model III DB-25 to DB-25 (26-1497)  
Cable Connector DB-25 to DB-25 (26-1495)

AC Power Requirements 120 VAC, 60 Hz

### Serial Interface

Standard RS-232-C DB-25 Pin #

Signal  
1 Protective Ground  
2 Transmit Data  
3 Receive Data  
4 Request to Send  
5 Clear to Send  
6 Data Set Ready  
7 Signal Ground  
8 Carrier Detect  
20 Data Terminal Ready  
22 Ring Indicate

### Dimensions

Weight 9.8 lbs.  
(21.5 kg)

Measurements Height 5 1/2 inches  
(13.9 cm)  
Width 13 3/4 inches  
(34.9 cm)  
Depth 10 inches  
(25.4 cm)

### Temperature

Operation 55 to 85 degrees F.  
13 to 29 degrees C.

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## **SERVICE POLICY**

Radio Shack's nationwide network of service facilities provides quick, convenient, and reliable repair services for all of its computer products, in most instances. Warranty service will be performed in accordance with Radio Shack's Limited Warranty. Non-warranty service will be provided at reasonable parts and labor costs.

Because of the sensitivity of computer equipment, and the problems which can result from improper servicing, the following limitations also apply to the services offered by Radio Shack:

1. If any of the warranty seals on any Radio Shack computer products are broken, Radio Shack reserves the right to refuse to service the equipment or to void any remaining warranty on the equipment.
2. If any Radio Shack computer equipment has been modified so that it is not within manufacturer's specifications, including, but not limited to, the installation of any non-Radio Shack parts, components, or replacement boards, then Radio Shack reserves the right to refuse to service the equipment, void any remaining warranty, remove and replace any non-Radio Shack part found in the equipment, and perform whatever modifications are necessary to return the equipment to original factory manufacturer's specifications.
3. The cost for the labor and parts required to return the Radio Shack computer equipment to original manufacturer's specifications will be charged to the customer in addition to the normal repair charge.

# Network 3 Operating Software

**FIRST EDITION**

*TRSDOS™ Operating System:*  
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*Network 3 Model III Operating System and NBASIC  
and  
Network 3 Model III Student Station System Software:*  
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## INTRODUCTION

The Radio Shack® TRS-80® Network 3 Controller enables educators to design a network of up to 16 non-disk TRS-80 Model III microcomputers (or Student Stations) around one TRS-80 Model III disk Host system.\* The Network 3 provides the Student Stations with most of the capabilities of a disk-equipped computer system. For example:

- All 16 Student Stations can load and store programs and other information using the disk at the Host system.
- All Student Stations can use a line printer attached to the Host system without interrupting other students or the teacher.
- Student Stations can store information on the Host disk, allowing class records to be kept in one location.
- Network 3 even makes it possible for computer science students to learn and use Disk BASIC on non-disk TRS-80s.

In addition to being a part of a network, each participating TRS-80 Student Station can also be used as an independent, stand-alone unit. This flexibility helps to make the Network 3 an ideal choice for classroom or administrative purposes.

The Network 3 system in its maximum 16 Student Station configuration is most suitable for situations where there is moderate-to-infrequent student interaction with the Host computer (that is, loading or saving programs, reading or writing disk data files, or accessing the printer). Where a higher frequency of student interaction with the Host is desirable, smaller configurations (fewer Student Stations) may be appropriate depending on your particular application. If you have questions about the best configuration for your application, contact your Radio Shack Regional Educational Sales Coordinator or a Radio Shack Store or Computer Center near you.

\*Future Network 3 Software will support the TRS-80 Color Computer as Student Station and the TRS-80 Model II as Host.



## OPERATING THE NETWORK 3

### Equipment Requirements

The TRS-80 Network 3 Controller connects up to 16 TRS-80 Model III micro-computers to a central disk-equipped TRS-80 Model III to share the disk storage and printer. The minimum Host computer is a TRS-80 Model III with 32K of memory, one disk drive, and an RS-232C interface. A Student Station needs 16K of memory, Model III BASIC, and an RS-232C interface. The Network 3 Controller requires 1 cable (10 to 100 feet) for each Student Station and 1 cable for the Host system.

### Using the Network 3 System

Before doing anything else, you should make a backup copy of the "Network 3 Operating System and NBASIC" diskette (hereafter referred to as the Network 3 software diskette) supplied with this package, following the directions on page 33 of this manual. You should also make a backup of the Student Station System Software cassette, following the instructions on page 36. Use these backup copies when operating the Network, and store the original diskette and cassette in a safe place to protect them from damage.

Once you have made a backup copy of the Network 3 software diskette and the Student Station System Software cassette, follow the directions in the Network 3 Operation Guide which came with the Controller to connect the Network 3 to the Host system and Student Stations. Then turn on all equipment.

To load a program from the Host computer into one or more Student Stations, follow the steps below.

#### At the Network 3 Controller:

1. Make sure the Network 3 Controller is ON (the Power button on the front of the Controller should be illuminated).
2. The Mode button should NOT be illuminated; if it is, press the Mode button once and the light will go off.

#### At each Student Station:

3. Make sure each computer is ON (the ON/OFF switch is under the right side of the keyboard).

If the Student Station is equipped with the special ROM-based loader, follow the initialization procedure described in the literature accompanying the loader; then skip to Step 10 below.

If the Student Station is not equipped with the ROM-based loader, continue with

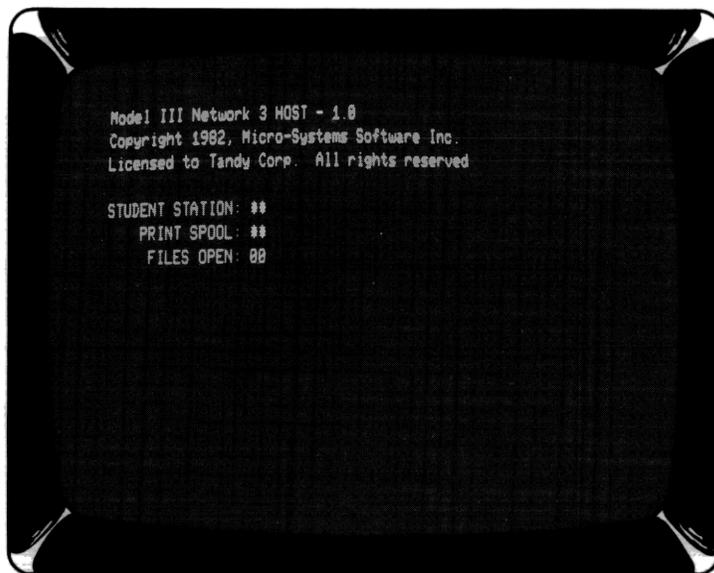


10. "Baud rate?" will be displayed on the screen. Press **ENTER**. The screen will now display "Network 3" and a blinking cursor.

(Note: Be sure to follow Steps 3 through 10 above at *each* Student Station.)

**At the Host (Disk) Computer:**

11. Make sure the computer is ON (the ON/OFF switch is under the right side of the keyboard).
12. Insert the backup copy of the Network 3 software diskette in Drive 0 (the bottom drive) with the label facing up and the square notch to the left, close the disk drive door, and press the orange Reset button.
13. Type the date, using two digits each for the month, day, and year, with a slash separating each pair. (Example: **09/01/82** for September 1, 1982.) Then press **ENTER**. When asked for the time, simply press **ENTER**. (The computer will ask for the date and time only after it is first turned on.)
14. When "TRSDOS Ready" appears on the screen, type **HOST ENTER**.
15. When "Baud rate?" appears on the screen, press **ENTER**. \* The screen should now display:



\*The baud rate is the rate at which information is transferred between the Host computer and the Student Stations. When **ENTER** is pressed in response to the "Baud rate?" question, the fastest rate (9600 baud) is used. Other rates which may be chosen include 300, 600, 1200, 1800, 2400, 3600, 4800, and 7200 baud. The Host computer and the Student Stations must be set at the same baud rate for accurate transfer of information between the Host computer and the Student Stations.

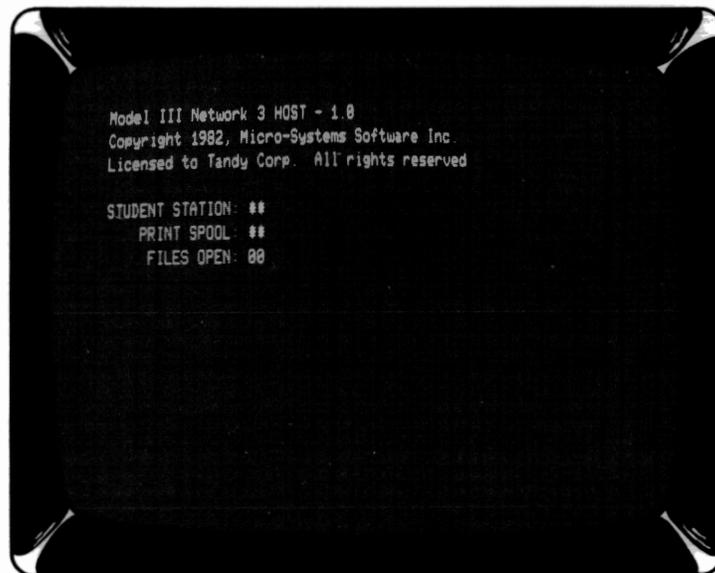
16. Insert the diskette containing the program(s) you want to run at the Student Stations in Drive 1 (the top drive) of the Host computer, with the label facing up and the square notch to the left. Close the disk drive door.

**At each Student Station:**

17. a. If you want to run an Assembly language program that is contained on the diskette in Drive 1 of the Host system, type the filename of the program and press **ENTER**.
- b. If you want to run a BASIC program or to program in BASIC, type **N B A S I C ENTER**.\* The screen will show "Ready." To run a BASIC program that is contained on the diskette in Drive 1 of the Host system, type **R U N " filename " ENTER**. (Substitute the filename of the desired program for the word *filename*.)

As the program loads into the Student Station, the two asterisks next to the words "STUDENT STATION" on the Host computer screen are replaced by the number of the Student Station that is loading.

**DO NOT** turn off power to any Student Station while disk files are open or while printing/spooling is occurring. Computers can be turned off only when the Host computer screen looks like this (with two pairs of asterisks and one pair of zeroes displayed):



\*If you want to run programs that are stored on Model I diskettes, you can use the CONVERT instruction to transfer them to a Model III diskette, before running them. (Refer to the manual that accompanied the program or to the *Disk System Owner's Manual* for directions on using CONVERT.)

If a computer is turned off while disk files are open or while printing/spooling is occurring, the Student Station(s) affected will show "IE ERROR". To start the program again, at the Station or Stations showing the error message type **C L O S E** **ENTER**, then type **R U N** **ENTER**.

**CAUTION:** If the orange Reset button is pressed at a Student Station, that computer will return to independent operation (that is, it will no longer be a part of the network). If this happens, the Student Station System Software will have to be loaded into that Student Station again (following Steps 3 through 10 above) in order for it to function as part of the network.

To avoid having to re-load the Student Station System Software each day, you may leave the Student Stations on overnight. (The Network 3 Controller and the Host computer may be turned off.) As long as a Student Station remains on and the Reset button is not pressed, the software remains in that computer's memory and does not need to be re-loaded. If a computer is left on overnight, the screen brightness should be turned all the way down (using the brightness control under the left side of the video display) to prolong the life of the video display.

For instructions on how to print from a Student Station to a printer attached to the Host system, see **Printing and Spooling** on page 9 of this manual.

For a list of commands available in Network 3 BASIC (NBASIC), refer to the Network 3 BASIC Quick Reference section in this manual (page 26). All Model III BASIC (non-disk) commands are available in NBASIC.

The next section gives an example, using the Radio Shack K-8 Math with Student Management Program, of how a program with student record-keeping capabilities runs on the Network 3 system.

## EXAMPLE:

### USING RADIO SHACK'S K-8 MATH WITH STUDENT MANAGEMENT PROGRAM WITH THE NETWORK 3

These instructions present an example of how a disk-based educational program can be used with the Network 3. The program used in this example is Radio Shack's K-8 Math With Student Management Program, which has a student record-keeping capability. (This particular program requires 32K Student Stations.) Other programs can be used in a similar way.

#### To run K-8 Math With Student Management:

1. Set up the Network 3 Controller, Host system, and Student Stations. Run the HOST program and load in the Student Station System Software program by following Steps 1 through 15 beginning on page 3.
2. Insert the selected K-8 Math With Student Management Model III program diskette into Drive 1 (the top drive) of the Host computer.
3. At each Student Station you want to run the program, type **N B A S I C** and press **ENTER**; then type **R U N** **" A D D I T I O N "** **ENTER**. (This example is for the K-8 Math program with the filename "ADDITION". You should use the filename of the program you want to run.) You will notice that the disk drive on the Host computer begins turning, loading the program from the diskette to the Student Station.

The program will load and run normally on the Student Station, just as if it were running on a disk-based computer. At the end of each session, the students' scores are transferred from the Student Station to the Host system, where they are stored on the K-8 Math program diskette in Drive 1. To view the scores stored on this diskette, the teacher types the special code (as described in the K-8 Math With Student Management teacher's manual) at a Student Station in which the desired program is running. The disk at the Host computer turns as the student scores are transferred from the diskette to the Student Station screen for the teacher's review.

## ADVANCED FEATURES OF NETWORK 3

### Equipment Choices

Any TRS-80 Model III microcomputer that has the minimum features listed under **Equipment Requirements** on page 3 can be used with the Network 3 system.

**Note:** Since the Student Station System Software and NBASIC occupy approximately 9K of memory, some 16K programs will require an additional 16K of memory to run. Additional RAM (available at Radio Shack Stores and Computer Centers) may be purchased and installed in 16K increments up to a maximum of 48K.

The Host computer is always completely dedicated to the Network 3 when the Host program is running; at this time it can only receive requests from Student Stations and perform those requests.

A disk-equipped Student Station will retain the use of its cassette I/O port (the round socket where the cassette is plugged in), but its disk drives will be disabled as long as it is participating in the network.

**Note:** Pressing the Reset button of the Host computer or any Student Station will return the computer to its regular independent operations. The cable on the back of the TRS-80 does not need to be disconnected to operate the computer independently.

### Printing and Spooling

All Student Station printing requests are routed to the Host printer under normal conditions. (If you want to use a local printer at a Student Station, see the discussion of CMD“H” on page 26 of the **Network 3 BASIC Quick Reference** section.)

When a printing request goes to the Host computer, a function called “spool” stores the material to be printed until the printer can get to it. This allows the Student Station to continue working while its request is still being printed, or possibly before its request has begun to print if another request was already on the spool.

If a large amount of printing has been requested, the spool storage space will fill up. When this space is full, Student Stations requesting printouts will have to wait until more printing has been completed, making more spool storage space available, before proceeding. If the printer is turned off, or runs out of paper, the spool will fill to its maximum volume and continue to wait for the printer. When the printer is ready, the spool will begin to print everything that was requested.

If requests are small enough, many can be sent to the spool during a class period. Ten minutes before the end of class the printer can be turned on to print them all at one time. This technique can be used to keep printer noise from interrupting other activities.

### **Programming Hints for Programs to be Used With the Network 3**

Successive printer requests from a Student Station should be made with a minimum of delay between them. Do all of the necessary processing before beginning to print the results. This will prevent print requests from other Student Stations from being printed in between the start and finish of your document. This technique will also prevent blank lines from appearing in the middle of your document. Avoid keyboard input in the middle of a printing activity to prevent interference from other print requests.

Disk file processing should also be kept as short and fast as possible. One way to do this is to write subroutines which open and close the files that will be used in the program. When you need the file, call the opening routine, process data in or out, and call the closing routine before doing anything else. This technique is unnecessary for an independent computer, but is recommended when more than one Student Station will be calling the same file.

These procedures are recommended because Network 3 allows only one Student Station to use a single data file at a time. All other Stations are locked out until that Station closes the file. For the same reason, you should avoid keyboard input between opening and closing a file. Always prepare all data before opening the file, and close the file before the next processing or input point.

## NETWORK 3 UTILITY SOFTWARE

### Using MENU with the Network 3

MENU is a BASIC program (included on the Network 3 software diskette) which you can use to allow students to choose which programs they want to run from a selection of BASIC programs. MENU sets up an option list (or "menu") which makes it easy for the student to select the desired program.

Follow the steps below to create your own option list program:

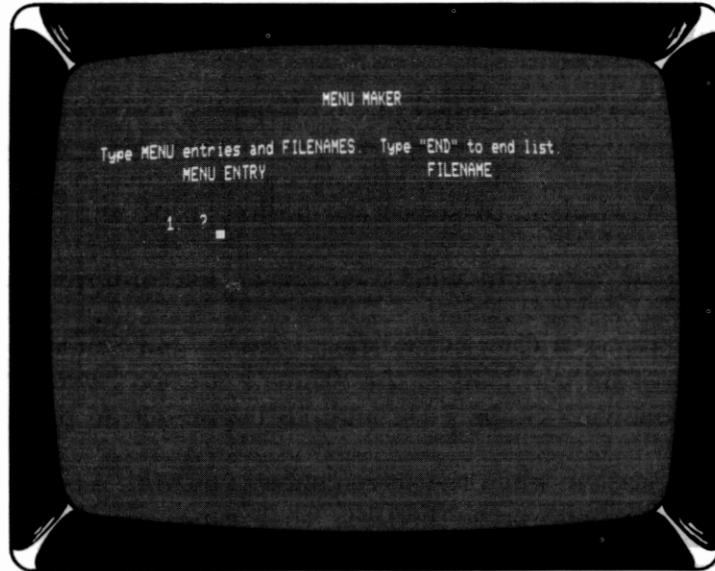
1. Set up the Network 3 Controller, Host system, and Student Stations. Run the HOST program and load in the Student Station System Software program by following Steps 1 through 15 beginning on page 3.
2. At a Student Station, when the screen shows Network 3 type **N B A S I C** and press **ENTER**; then type **R U N " M E N U " ENTER**.
3. You will need to assign a filename to the new option list program you are creating. This filename can contain up to eight letters and numbers, and it must begin with a letter. In this example, we will use "CHOICES" as the filename of the new option list program being created. When the line:

**What is the filename for the new menu?**

appears on the screen, type **C H O I C E S** (or whatever filename you choose) and press **ENTER**.

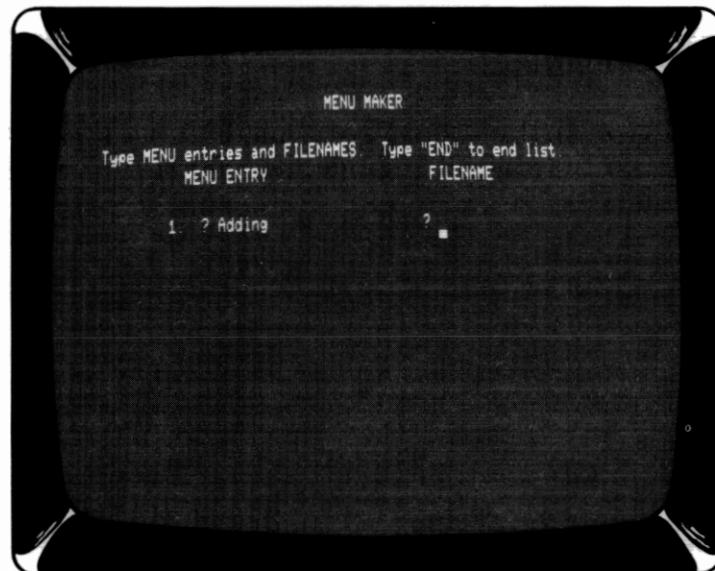
4. Next you will type in 1) a descriptive name for each program that you want to be available on the student's option list, and 2) the corresponding filename of each program.

When your screen shows:



type the descriptive name you want to appear on the Student Station screen for the first program, and press **ENTER**. (“Adding” is used in this example.)

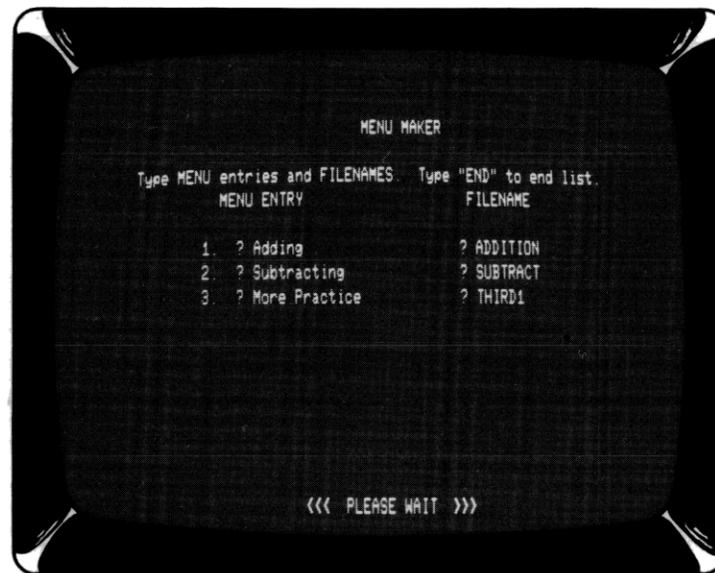
Now, when the screen shows:



type the filename of the corresponding program, and press **ENTER**. (The filename can be found on the program diskette or in the user’s manual.)

5. The program will continue to prompt you for up to ten menu entries and corresponding filenames. If you want fewer than ten entries in your option list, enter all desired menu entries and filenames; then type **e n d** and press

**ENTER** for the next menu entry in the “MENU ENTRY” column. In this situation, the screen might look like this:



6. When <<<**PLEASE WAIT**>>> is displayed on the screen, the computer saves the option list program you have created onto the Network 3 software diskette in Drive 0, under the filename you specified in Step 3 above. When saving is complete, the screen displays “**DONE**”.

To run this option list program at the Student Stations, follow these steps:

1. Set up the Network 3 Controller, Host system, and Student Stations. Run the HOST program and load in the Student Station System Software program by following Steps 1 through 15 beginning on page 3.
2. At the Host system, the Network 3 software diskette (which now also contains the menu program you have created) should be in Drive 0 (the bottom disk drive). Place the diskette containing all the programs listed in the menu program in Drive 1 (the top disk drive).
3. At each Student Station that will use the option list you have created, type **R U N " C H O I C E S " ENTER**. (In this example, the filename “CHOICES” is used. Be sure to use the filename of the option list program you created.)
4. The program will now display the list of descriptive names you entered when you set up the option list. (The list of corresponding filenames will not appear.) The student can choose the desired option by typing the number that appears next to that option. The option list program will automatically run the lesson program the student has chosen.
5. To return to the option list, terminate the current lesson program and start again at Step 3.

To erase the menu program you created, place the Network 3 software diskette (which contains your menu program) in Drive 0 and press the orange Reset button. When "TRSDOS Ready" is displayed, type **K I L L [ ] C H O I C E S** (or whatever filename you assigned your menu) and press **ENTER**. When "TRSDOS Ready" reappears, your menu program is erased.

### Using MAILBOX with the Network 3

MAILBOX is a demonstration BASIC program contained on the Network 3 software diskette which is designed to illustrate the operation of the Network 3. It allows students to send messages to one another from Student Stations. The messages are stored on the Network 3 software diskette at the Host computer.

Follow these steps to use MAILBOX:

1. Set up the Network 3 Controller, Host system, and Student Stations. Run the HOST program and load in the Student Station System Software program by following Steps 1 through 15 beginning on page 3.
2. At each Student Station that is to participate, type **N B A S I C** and press **ENTER**; then type **R U N " M A I L B O X " ENTER**.

From this point on, the program guides the student through its use. A total of 25 student messages can be stored by the program.

The teacher can leave a "bulletin board" message (a message that will be seen by all the students using the program) by selecting option 1 and typing **A L L ENTER** in response to the question, "WHO DO YOU WANT TO SEND IT TO?" (Unlike other messages, these bulletin board messages cannot be erased by the student.)

The teacher can erase a bulletin board message by choosing option 2, typing **A L L ENTER**, and then typing **Y** when **Erase?** appears on the screen.

To erase all messages: (1) choose option 1, (2) hold down the **SHIFT** key while pressing **@**, and (3) press **ENTER**.

## USING A NETWORK 1 OR NETWORK 2 CONTROLLER TO LOAD THE STUDENT STATION SYSTEM SOFTWARE

If you are using the cassette version of the Student Station System Software (included with this package) instead of the ROM-based loader, you can use a Network 1 or Network 2 Controller to load this software into the Student Stations more efficiently. Follow these steps:

1. Set up the Network 3 Controller, Host system, and Student Stations.
2. Connect the Network 1 or Network 2 Controller, the Host computer, and the Student Stations according to the instructions in the Network 1 or Network 2 manual. (This will not interfere with the Network 3 connections.)
3. Turn on all equipment.

**At the Network 1 or Network 2 Controller unit:**

4. Set the Selector switch to MPLX.
5. If you are using a Network 2, set the Baud Rate switch at 1500. (The Network 1 does not have this switch.)

**At each Student Station:**

6. "Cass?" will appear on the Student Station display. If you are using a Network 1, press **L**. If you are using a Network 2, press **ENTER**.
7. When "Memory Size?" appears on the screen, press **ENTER**.
8. When "Ready" appears on the screen, type **S Y S T E M ENTER**.
9. "\*?" will appear. Type **S T U D E N T ENTER**.  
(The red lights on the Network 1 or Network 2 Controller unit that correspond to the active Student Stations should now be lit.)

**At the Host Computer:**

10. Insert the Network 3 software diskette in the bottom drive with the label facing up and the square notch to the left.
11. Press the orange Reset button.

12. When the screen reads: You type:
- Enter date:** **0 9 / 0 1 / 8 2 ENTER**  
(Example for September 1, 1982)
- Enter time:** **ENTER**
- TRSDOS Ready** **T A P E ( S = D , D = T )**  
**ENTER**  
(Be sure to type a space between the **E** and the **(**).
- Cass?** For Network 1, type **L**  
For Network 2, press **ENTER**
- Device = Disk to Tape –  
Filespec?** **S T U D E N T / C M D**  
**ENTER**
- Press ANY key when  
Cassette ready** **ENTER**

The Student Station System Software will now load into the Student Stations. Two asterisks will appear in the upper right corner of each Student Station that is loading, and the right asterisk will blink.

Now, follow Steps 13 through 16 below in exact order.

**At each Student Station:**

13. “\*?” will appear again. Type **/ ENTER**.
14. When “**Baud rate?**” appears, press **ENTER**. The screen should now display “**Network 3**” and a blinking cursor.

**At the Host Computer:**

15. When “**TRSDOS Ready**” appears, type **H O S T ENTER**.
16. When “**Baud rate?**” appears, press **ENTER**.

You can now load programs from the Host computer into the Student Stations, following Steps 16 and 17 on page 6.



10. When "Ready" reappears, the program is loaded into the computer. To make sure, you can type **L I S T** **ENTER**, and the program lines should be displayed on the screen. You are now ready to save the program onto diskette. (If you should want to save the program onto a diskette other than the Network 3 software diskette now in Drive 0, insert the diskette on which you want to save the program into Drive 1.)
11. The filename ADDITION is used in this example; you use the actual filename of the program that you want stored on the diskette.

**Note:** Be sure to use a different filename for each program you save onto the diskette. Each filename must contain from one to eight letters and numbers, and the first character in each filename must be a letter. Do not use the filenames HOST/CMD, STUDENT/CMD, or SPOOL/TXT, as these filenames are already used on the diskette.

When the screen reads:

You type:

Ready

**S A V E " A D D I T I O N "**  
**ENTER**

(Note: If you want to save the program on a formatted or system diskette in Drive 1, you should type

**S A V E " A D D I T I O N : 1 "**  
**ENTER**

instead of the above.)

12. If you are saving programs on the Network 3 software diskette and the screen displays "Disk full", follow Steps B through E beginning on page 21. Place your new backup copy of the Network 3 software diskette in Drive 0 (the bottom drive) and press the orange Reset button. When "TRSDOS Ready" appears on the screen, type **H O S T** **ENTER**. When "Baud rate?" appears, press **ENTER**. Then go back to the Student Station and continue with Step 11 above.
13. If you are saving programs on Drive 1 and the screen reads "Disk full", follow Step B on page 21. Place another formatted or system diskette in Drive 1 (the top drive). Go back to the Student Station and continue with Step 11 above.

If you have transferred all the programs you want to run, you are finished when the red light on the disk drive goes off. Your programs are now stored on this diskette. Be sure this diskette is in the Host computer when you want your students to run these programs.

If you want to transfer additional programs from a cassette to your diskette, repeat Steps 4 through 13 above.

## **APPENDIX I:**

### **LIST OF RADIO SHACK SOFTWARE FULLY COMPATIBLE WITH THE NETWORK 3**

Many Radio Shack software packages are fully compatible with the Network 3 (that is, no modifications to the programs are necessary). Those Radio Shack educational software packages available at the time of this printing which are fully compatible include the following:

- **K-8 Math Program, Volume One (26-1715)**
- **K-8 Math With Student Management, Volume One (26-1725)**
- **Essential Math, Volumes One and Two (26-1716, 26-1719)**
- **Euclid Geometry Tutor (26-1724)**
- **Advanced Graphics (26-1714)**
- **Vector Addition (26-1720)**
- **Graphical Analysis of Experimental Data (26-1722)**
- **Interpreting Graphs in Physics (26-1721)**
- **Investigations in Integral Calculus (26-2600)**
- **Plane Analytic Geometry (26-2602)**
- **AlphaKey™ (26-1718)**

## APPENDIX II: FOR ONE-DRIVE HOST SYSTEMS

### a. USING THE NETWORK 3 CONTROLLER WITH A ONE-DRIVE HOST COMPUTER

Most programs can be used with the Network 3 and a one-disk-drive Host computer. Possible exceptions are programs that use special data files (for example, to store student records).

If you want to use programs which are stored on a cassette tape, turn to page 17 and follow the directions given.

If the programs are on a Model I diskette, use the accompanying cassette tape to load the program, following the directions on page 17.

If you want to use programs stored on a Model III diskette, you must first determine which version of the operating system is on the diskette. Then you can transfer the programs, one at a time, to the Network 3 software diskette. Follow the steps below:

#### Determining the Operating System Version

1. Place an adhesive write-protect tab (provided with new diskettes) over the square notch in the diskette containing the program(s) you want to run with Network 3. If you do not have any tabs, use a small piece of cellophane tape.
2. Turn on the Host computer.
3. When the red light on the disk drive goes off, insert the diskette containing the program(s) you want to run with the Network 3 into the disk drive. (Be sure the label is up and the covered square notch is to the left.) Close the disk drive door.
4. Press the orange Reset button.
5. When the operating system Ready prompt appears, read the screen display. If "TRSDOS 1.3 July 1, 1981" is displayed, continue on to Step 6. If any other operating system and/or any other date is displayed, turn to page 23, **USING PROGRAMS FROM A DISKETTE WITH A DIFFERENT VERSION OF THE OPERATING SYSTEM**, and follow the procedure described. When you have done so, your programs will be transferred onto the Network 3 software diskette and will be ready to run at the Student Stations.

**Transferring a Program  
From a Diskette with TRSDOS 1.3, JULY 1, 1981  
To the Network 3 Software Diskette**

**At the Host Computer:**

6. Make sure that your disk drive contains the diskette with the program(s) you want to run on the Network 3, *not* your Network 3 software diskette.

When the screen reads:    You type:

**TRSDOS Ready**            **B A S I C** **ENTER**

**How Many Files?**        **ENTER**

**Memory Size?**            **ENTER**

7. (In this example, the filename ADDITION is used. Be sure to use the actual filename of the program you want to run.)

When the screen reads:    You type:

**Ready**                    **L O A D " A D D I T I O N "**  
**ENTER**

8. When the red light on the disk drive goes off, remove your program diskette. Insert a backup copy of the Network 3 software diskette, with the label facing up and the square notch to the left. Close the disk drive door.

9. When the screen reads:    You type:

**Ready**                    **S A V E " A D D I T I O N "**  
**ENTER**

10. If the screen displays "Disk full", follow steps A through F below:

- A. Be sure the Network 3 software diskette is still in the disk drive.
- B. Since the last program you attempted to transfer to the diskette was not completely copied, you must remove the partial copy of the program from the diskette. (In this example, the filename ADDITION is used. Be sure to use the actual filename of the last program you attempted to transfer.)

When the screen reads:    You type:

**Ready**                    **K I L L " A D D I T I O N "**  
**ENTER**

- C. That copy of the Network 3 software diskette is full, so remove it from the disk drive and store it away.
  - D. Make another backup copy of the original Network 3 software diskette following the directions in Appendix IV on page 33.
  - E. Store the original Network 3 software diskette supplied with this package in a safe place.
  - F. You can now transfer the program to the new backup copy of the Network 3 software diskette. Continue from Step 6 above.
11. If you have additional programs you want to run with the Network 3, wait until the red light on the disk drive goes off. Then remove the Network 3 software diskette. Place an adhesive tab over the square notch in the diskette containing the programs you want to run with the Network 3. Insert the diskette in the drive, with the label facing up and the covered square notch to the left. Close the disk drive door. If you are not certain that this diskette contains TRSDOS 1.3 July 1, 1981, follow Steps 4 and 5 above. If the diskette does contain this version of the operating system, continue from Step 7 above.

**b. USING PROGRAMS FROM A DISKETTE WITH  
A DIFFERENT VERSION OF THE OPERATING SYSTEM  
(One-Drive Host Systems Only)**

If the program(s) you want to run with the Network 3 are on a diskette with a version of the operating system other than TRSDOS 1.3 July 1, 1981, you must first transfer the program(s) to cassette tape, and then transfer the programs from the tape to the Network 3 software diskette. Follow these steps:

1. Connect a cassette recorder to the Host computer. Be sure the recorder is plugged in. Set the volume of the recorder at 6.
2. Insert a cassette tape in the cassette recorder.
3. Press PLAY or FAST FORWARD on the recorder to advance the tape past the leader and any programs already on the cassette tape.
4. Reset the tape counter on the cassette recorder to zero by pressing the button next to the tape counter.
5. Press the PLAY and RECORD buttons on the recorder simultaneously. (If the recorder is connected properly, it should not come on at this point.)

**At the Host Computer:**

6. Turn on the computer.
7. Place the diskette containing the program(s) you want to run with the Network 3 in the disk drive with the label facing up and the square notch to the left. Close the disk drive door.
8. Press the orange Reset button.
9. When the screen reads:    You type:

**TRSDOS Ready**                   **B A S I C ENTER**  
(or other operating  
system Ready prompt)

**How Many Files?**           **ENTER**  
(TRSDOS only)

**Memory Size?**               **ENTER**  
(TRSDOS only)

10. (In this example, the filename ADDITION is used. Be sure to use the actual filename of the program you want to use with the Network 3.)

When the screen reads:    You type:

**Ready**                    **L O A D " A D D I T I O N "**  
**ENTER**

**Ready**                    **C S A V E " A D D I T I O N "**  
**ENTER**

The recorder will now start running and the program will be saved on the cassette tape.

11. When "**Ready**" reappears on the screen and the cassette recorder goes off, press the STOP button on the recorder.
12. Press REWIND. When the tape counter is again at zero, press STOP.
13. Press the PLAY button on the recorder.
14. Remove the diskette from the disk drive.
15. Place the Network 3 software diskette in the drive with the label facing up and the square notch to the left. Close the disk drive door.
16. Press the orange Reset button.
17. When the screen reads:    You type:

**TRSDOS Ready**            **B A S I C ENTER**

**How Many Files?**        **ENTER**

**Memory Size?**            **ENTER**

18. When the screen reads:    You type:

**Ready**                    **C L O A D ENTER**

19. The cassette recorder will come on and begin to load the program. If the program is loading properly, two asterisks will appear in the upper right corner of the screen. The right asterisk will blink.

If the asterisks do not appear after several seconds:

- press the **BREAK** key on the computer
- press the STOP button on the recorder
- turn the volume on the recorder a little higher
- repeat Steps 12 and 13 above and then continue from Step 18 above.

If the asterisks appear, but the right one does not blink:

- press the **BREAK** key on the computer
- press the STOP button on the recorder
- turn the volume on the recorder a little lower
- repeat Steps 12 and 13 above and then continue from Step 18 above.

20. When “**Ready**” reappears on the screen, the program is loaded into the computer. You are now ready to save it onto the Network 3 software diskette. The filename ADDITION is used in this example; you use the actual filename of the program that you want stored on the diskette.

**Note:** Be sure to use a different filename for each program you save onto the diskette. Each filename must contain from one to eight letters and numbers, and the first character in each filename must be a letter. Do not use the filenames HOST/CMD, STUDENT/CMD, or SPOOL/TXT, as these filenames are already used on the diskette.

When the screen reads:      You type:

**Ready**                              **S A V E “ A D D I T I O N ”**  
   **ENTER**

21. If the screen displays “**Disk full**”, follow Steps A through E beginning on page 21. Press the STOP button on the tape recorder. Repeat Steps 11 through 13 above. Place your new backup copy of the Network 3 software diskette in the disk drive and close the drive door. Continue with Step 16 above.

If you have transferred all the programs you want to run, you are finished when the red light on the disk drive goes off. Your programs are now stored on this copy of the Network 3 software diskette. Use this diskette when you want your students to run these programs.

If there are additional programs you want to transfer to the Network 3 software diskette, continue from Step 3 above.

## APPENDIX III: NETWORK 3 BASIC (NBASIC) INFORMATION

### a. NETWORK 3 BASIC QUICK REFERENCE

This section summarizes Disk BASIC instructions which are available in Network 3 BASIC. All Model III BASIC (non-disk) commands are available in NBASIC (see the green reference card that comes with each TRS-80 Model III for a list of these commands).

In the commands listed on the left side of the page, upper-case letters and words are literal; i.e., they are to be used exactly as is. Italicized lower-case letters and words with one of these commands represent information to be supplied by the user. Below the explanation for each command appears one or more examples of its use.

CLOSE .....	Closes all open buffers or specified buffer(s).
	CLOSE      CLOSE1,4      CLOSEN
CMD" B ", "switch" .....	Enable/disable the <b>BREAK</b> key.
	CMD" B ", "ON"      CMD" B ", "OFF"
CMD" E " .....	Displays NETWORK error message again.
	CMD" E "
CMD" H ", "OFF" .....	Changes printer output from Host printer to local printer.
	CMD" H ", "OFF"
CMD" H ", "ON" .....	Restores Host printer as the destination of output. (This is the normal condition when Network begins.)
	CMD" H ", "ON"
CMD" P ", <i>string var</i> .....	Checks printer status.
	CMD" P ", X\$
CMD" R " .....	Enables interrupts.
	CMD" R "
CMD" S " .....	Returns to level of Network from NBASIC.
	CMD" S "

**CMD“T”** ..... Disables interrupts.  
**CMD“T”**

**CVD(string var)** ..... Converts to double precision after GET.  
**A# = CVD(I\$)**

**CVI(string var)** ..... Converts to integer after GET.  
**PRINT CVI(FD\$)**

**CVS(string var)** ..... Converts to single precision after GET.  
**FK! = CVS(RATE\$)**

**DEFFN(var name)** ..... Defines a programmer-created function.  
**DEF FNA\$(X) = STRING\$(X,45)**

**DEFUSRn** ..... Defines the entry point for machine language subroutine number *n*.  
**DEFUSR2 = 32480**

**FIELD*b,c* AS string var,list** ..... Organizes random file buffer *b* into fields.  
**FIELD1,255 AS Q\$**  
**FIELD3,16 AS NM\$,25 AS AD\$**

**GET*b,n*** ..... Gets record *n* or next record from a disk file and puts it in buffer *b* (random access files).  
**GET1**            **GET3,25**

**INPUT#*b,var name,list*** ..... Inputs data from sequential file through buffer *b* to variable named in command.  
**INPUT#1,A**  
**INPUT#1,C\$,A,B,D**

**INSTR(*c,string var#1,string var#2*)** .... Starts searching at position *c* in string #1 for string #2. If found, returns position; otherwise, returns 0.  
**Q = INSTR(5,A\$,AA\$)**

**KILL“filename”** ..... Deletes a disk file. (Refer to your Disk System Owner’s Manual for information on filenames.)  
**KILL“BLITZ:1”**

LINE INPUT *string var* ..... Inputs a line from keyboard; **ENTER** ends input.

LINE INPUT A\$  
LINE INPUT "ENTER YOUR NAME?";N\$

LINE INPUT#*b,string var* ..... Inputs an entire line from sequential file through buffer *b* to string variable named.

LINE INPUT#2,A\$

LOAD"*filename*" ..... Loads a program file from disk. (Refer to your Disk System Owner's Manual for information on filenames.)

LOAD"BLITZ"

LOC(*b*) ..... Gets current record number of file associated with buffer *b*.

PRINT LOC(2)

LOF(*b*) ..... Gets the number of the last record of the file associated with buffer *b*.

Q = LOF(5)

LSET *string var* ..... Puts string into random access field with extra spaces at the right.

LSET NAME\$ = "JOHN"

MERGE"*filename*" ..... Merges disk program with the program in the computer memory. Disk program must be in ASCII format.

MERGE"BLITZ"

MID\$(*string var,c,d*) = *string var* ..... Replaces portion of one string with another string. First number is starting position, second is length.

MID\$(A\$,3,2) = "NO"

MKD\$(*x*) ..... Prepares double precision number *x* for disk write (random access).

LSET C\$ = MKD\$(C#)

MKI\$(*n*) ..... Prepares integer *n* for disk write (random access).

LSET C\$ = MKI\$(C%)

MKS\$(*x*) ..... Prepares single precision number *x* for disk write (random access).

LSET C\$ = MKS\$(C!)

OPEN“*mode*”,*b*,”*filename*”,*n* ..... Opens a file, assigns mode (I = input, O = output, E = output to end of file, R = random), assigns buffer *b*, specifies filename and logical record length *n*.

OPEN“R”,1,”LIST:1”

PRINT#*b*,*var name*,*list* ..... Writes data to file buffer *b* (sequential file).

PRINT#3,F\$  
PRINT#1,A\$,B\$,X,Y,Z

PUT*b*,*n* ..... Moves data from file buffer *b* into the specified record *n* (random access). If *n* is omitted, the current record number is used.

PUT1,25

RSET *string var* ..... Puts string into random access field with extra spaces at the left.

RSET NAME\$ = “JOHN”

RUN“*filename*” ..... Loads and executes program named.

RUN“BLITZ”

SAVE“*filename*”,A ..... Records program from computer memory to disk. Appending ‘A’ specifies ASCII format. (Refer to your Disk System Owner’s Manual for information on filenames.)

SAVE“BLITZ”

USR*n*(*var name*) ..... Calls any one of 10 machine language subroutines (*n* = 0 to 9).

X = USR2(DE)

## **b. NETWORK 3 BASIC ERROR MESSAGES**

The following is a description of error messages which may be encountered at a Network 3 Student Station when a disk error or NBASIC error occurs.

### **AD File access denied**

This error message occurs when a file protected by a password is called without the password, when the wrong password is used, or when a password is given and none exists (i.e., Password = " ").

### **AO File already open**

This error message is generated when your program tries to open the same file a second time, without closing it between the two requests. It does not occur when two Student Stations open the same file.

### **BM Bad file mode**

This message occurs when you: 1) use random access statements to manipulate sequential files; 2) use sequential statements to access random files; 3) write to a file that is open for input; or 4) read a file open for output.

### **BN Bad file number**

File number refers to buffer number specified in FIELD, OPEN and CLOSE statements. This error occurs when the program attempts to access a file with an invalid buffer number.

### **DF Disk full**

The space allotted for program and data storage on the diskette is full. If this error message appears while saving a program to disk, the program was probably not saved in its entirety.

### **DS Direct statement in file**

When a LOAD "filename" command is entered, the system requires that the file be a BASIC program (i.e., a file in which every line begins with a line number). If it is not a BASIC program, then a file cannot be loaded. This happens if the file is data (not a program), or if there was a write error when the file was saved or a read error during loading. A flawed track on a diskette could also cause this message. Possible solutions are to COPY the file to another disk and try again, BACKUP the disk, or read the program in line by line by another program, correct the bad line number, and save it on another disk.

**EF** End of file encountered

This error occurs when a program attempts to read data beyond the end of the file.

**FF** File not found

The file you have requested does not exist on the diskette(s) that are in the Host computer. Perhaps you have inserted the wrong disk, misspelled the name of the file that you want, or left off the extension: "*filename/BAS*". Common extensions are BAS (BASIC program), DAT (data file), and CMD (assembly language program).

**FL** Too many files

More files have been called for than have been opened (more need to be open).

**FO** Field overflow

With a random access file, an attempt was made to FIELD a buffer which was longer than the logical record length of the file opened.

**IE** Internal error

An internally generated error with the file structure or the system has occurred.

**IO** Disk input/output error

This error occurs whenever the disk read/write head is unable to perform the operation the computer told it to do, or whenever there is an inadequate transfer of information between the read/write head and the diskette. This could be caused by a worn diskette. See DS for possible solutions to the problem.

**MM** Mode mismatch (sequential/random)

Sequential file commands were used on a file opened as a random access file, or vice versa.

**NM** Bad filename

An illegal filename was used. Each filename may contain up to 8 letters and numbers, and the first character must be a letter. Optional extensions of up to 3 characters, passwords of up to 8 characters, and a drive specification may be added. Examples of legal filenames:

ADDITION  
SUBTRACT/P12  
DIVISION/N5.PSWD  
MULTIPLY/K1.PWD:0

**RN** Bad record number

A record number that is smaller than or greater than the number allowed was used (random access files).

**UE** Undefined error

An error which the system cannot identify has occurred.

**UF** Undefined user function

The function used was not previously defined with a "DEFFN" statement.

**WP** Disk write protected

The diskette is write protected with a write-protect tab.



then remove the original Network 3 software diskette from Drive 0 and store it in a safe place. You can now place your backup copy in Drive 0 and continue using the program.

If, after the drives stop spinning, the screen shows an error message of any kind, or does not say **Backup Complete**, then press the orange Reset button and go back to Step 6. If an error still occurs, then get a new blank diskette or bulk erase the diskette you have been using as destination disk. Then insert the blank diskette in Drive 1, press the Reset button, and go to Step 6.

## II. Model III One-Drive System

1. Turn on the Host (disk) computer. (The ON/OFF switch is under the right side of the keyboard.)
2. Place an adhesive tab (provided with new diskettes) over the square notch in the Network 3 software diskette. If you do not have any tabs, use a small piece of cellophane tape.
3. Insert the Network 3 software diskette in the disk drive with the covered notch to the left and the label facing up. Close the disk drive door.
4. Press the orange Reset button.

5. When the screen shows:

You type:

Enter Date (MM/DD/YY)?

**0 9 / 0 1 / 8 2** **ENTER**

(Example for September 1, 1982)

Enter Time (HH:MM:SS)?

Press **ENTER**

TRSDOS Ready

**B A C K U P** **ENTER**

SOURCE Drive Number?

**0** **ENTER**

DESTINATION Drive Number?

**0** **ENTER**

SOURCE Disk Master Password?

**P A S S W O R D** **ENTER**

Insert SOURCE Diskette

Press **ENTER**

<ENTER>

Insert DESTINATION Diskette

After the red light goes off, remove the Network 3 software diskette and insert a new, blank diskette with the uncovered square notch to the left and the label facing up. Close the door and press **ENTER**.

<ENTER>

**Insert SOURCE Diskette**  
**<ENTER>**

Continue to switch back and forth between the Network 3 software diskette (**SOURCE diskette**, notch covered) and the new diskette (**DESTINATION diskette**, notch uncovered) as instructed on the screen. Do not open the disk drive door while the red light is on.

If the screen shows:

**\*\*Backup Complete\*\***  
**Insert SYSTEM Diskette <ENTER>**

then press **ENTER**.

If the screen shows an error message of any kind, or does not say **Backup Complete**, then put the Network 3 software diskette back in the drive, press the Reset button, and go back to Step 5. If an error still occurs, get a new blank diskette or bulk erase the diskette you have been using as destination diskette. Put the Network 3 software diskette back in the drive, press the Reset button, and go to Step 5.

## b. MAKING A BACKUP COPY OF THE STUDENT STATION SYSTEM SOFTWARE TAPE

It is good practice to make a backup copy of the Network 3 Student Station System Software for day-to-day use. The original cassette supplied with the package should be stored to protect it from damage. To make a backup copy, follow the steps below at the Host computer to transfer the Student Station System Software from the Network 3 software diskette to cassette tape.

1. Connect a cassette recorder to the Host computer. Be sure the recorder is plugged in.
2. Insert a blank cassette in the recorder.
3. Make sure the tape is rewound. Use the FAST FORWARD button if necessary to advance the tape past the leader.
4. Press the PLAY and RECORD buttons on the recorder simultaneously. (If the recorder is connected properly, it should not come on at this point.)
5. Turn on the Host computer. (The ON/OFF switch is under the right side of the keyboard.)
6. Insert the Network 3 software diskette in the bottom disk drive with the label facing up and the square notch to the left. Close the disk drive door.
7. Press the orange Reset button.
8. When the screen reads:

Enter date:

**0 9 / 0 1 / 8 2 ENTER**

(Example for September 1, 1982)

Enter time:

**ENTER**

TRSDOS Ready

**T A P E ( S = D , D = T )**

**ENTER**

(Be sure to type a space between the **E** and the **(**).

Cass?

**ENTER**

Device = Disk to Tape -  
Filespec?

**S T U D E N T / C M D**

**ENTER**

Press ANY key when  
Cassette ready

**ENTER**

The recorder will come on and transfer the Student Station System Software to the cassette. When "TRSDOS Ready" reappears on the screen, the transfer is complete.