

User Manual

Model

TM-2000 Trunk Master
MTM-2000 Mini-Trunk Master
SWP-2000 Switch Over Panel
ICP-2000 Interconnect Panel

Intelligent Trunking System



TM-2000



MTM-2000



ICP-2000



SWP-2000

RTS™

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Burnsville, MN 55337 USA
Telephone: (800) 392-3497
Fax: (800) 323-0498
Factory Service: (800) 553-5992

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Customer Service Department
Telex Communications, Inc.
Telephone: (800) 392-3497
Fax: (800) 323-0498
Factory Service: (800) 553-5992

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Factory Service Department
Telex Communications, Incorporated
8601 East Cornhusker Hwy
Lincoln, NE 68507 U.S.A.
Attn: Service

Upon completion of any repair the equipment will be returned via United Parcel Service or specified shipper collect.

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Introduction

This manual describes the installation and operation of the TM-2000/MTM-2000 Trunk Master and Mini-Trunk Master, SWP-2000 Switch Over Panel, and ICP-2000 Interconnect Panel.

TM-2000/MTM-2000 Description

The RTS Trunking System manages intercommunications between separate intercom systems using intercom ports that have been reserved and interconnected between the intercom systems. Keypanels or other data devices can then communicate with various destinations in other intercom systems via the reserved intercom ports. (This is different from bus expansion, in which the bus system of two or more frames are interconnected to form one larger system.)

The RTS Trunking System consists of an RTS Model TM-2000/MTM-2000 and one or more RTS Model ICP-2000 Inter-Connection Panels, depending on the number of intercom systems to be trunked. A backup TM-2000 / MTM-2000 may also be added to prevent downtime in the event of a failure of the main master control unit. When both main and backup control units are used, an RTS Model SWP-2000 Switch Over Panel is required.

Front Panel Features

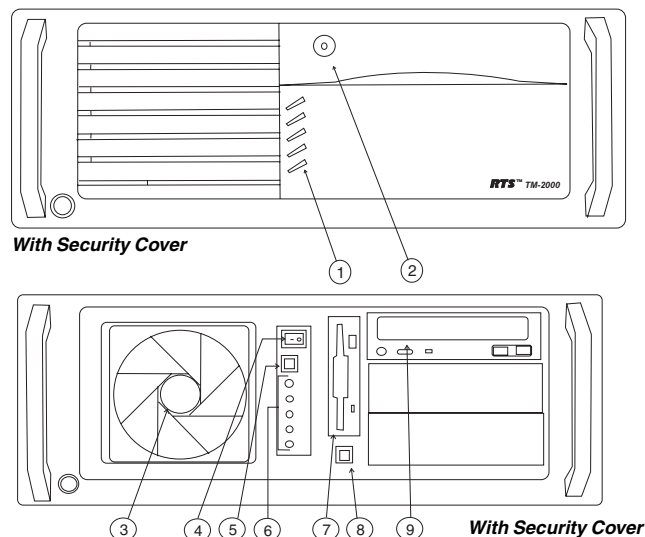


Figure 1. TM-2000 front panel features.

1. Status indicators for power, hard drive, fan, system temperature
2. Front security panel
3. Cooling fan
4. Power switch (front)
5. System reset switch
6. Status indicators (from top to bottom): Power, Hard Disk, Fan Failure, Over Temperature 1, Over Temperature 2
7. Floppy drive *
8. System over temperature alarm silence switch.
9. CD-ROM drive *

* Used only for factory service.

Rear Panel Features

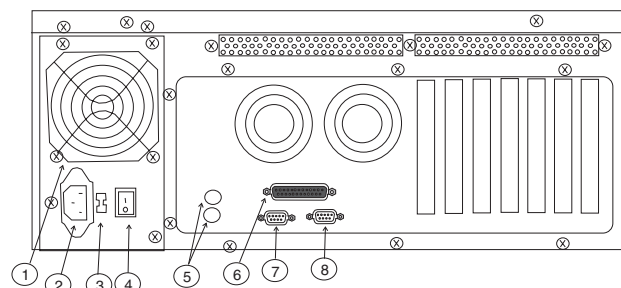


Figure 2. TM-2000 rear panel features.

1. Power supply fan.
2. AC power connector
3. AC voltage selector switch
4. Power switch (rear)
5. Keyboard and mouse connectors*
6. Parallel port connectors. See note below
7. Serial (COM) port connectors. See note below
8. Card slots containing: (a) RS-485 communication card(s) using SCSI type II connector. See note below. (b) Networking connector using RJ-45 connector. See note below. (c) Video monitor connector* using 15-pin D-Sub connector.

* Used only for factory service.

NOTE: The exact location of cards and connector designations can vary from unit to unit. The diagram provided is for general feature locations only. Follow the designated labels found on your particular unit(s).

ICP-2000 Description

The ICP-2000 is a 1RU breakout panel that converts the SCSI type II connection provided from the TM-2000/MTM-2000 communication card(s) into 9-pin D-Sub connections. Each RS-485 communication card on the TM-2000/MTM-2000 has 8 ports provided on the SCSI type II connector. The ICP-2000 breaks these 8 ports into individual 9-pin D-Sub connections. There are two SCSI type II connectors on the ICP-2000. These two connectors allow both a primary and redundant TM-2000/MTM-2000 to be connected. The connectors are wired in parallel, so it does not matter which connector the primary TM-2000/MTM-2000 and (if present) redundant TM-2000/MTM-2000 are plugged into. The ICP-2000's connectors are labeled from left to right J1, J2, J3....J8. These will correspond from low number to high number of ports associated with the cable plugged into the ICP-2000. For example: If the cable plugged into an ICP-2000 with ports 1-8 on it, then J1 would be port 1, J2 port 2, up to J8 being port 8. If the cable plugged into an ICP-2000 with ports 9-16 on it, then J1 would be port 9, J2 port 10, up to J8 being port 16. It is important to note that in systems using VDP panels, port 1 is reserved for connection to the VDP controller and should not be connected to an ADAM or ADAM CS.

Front Panel Features

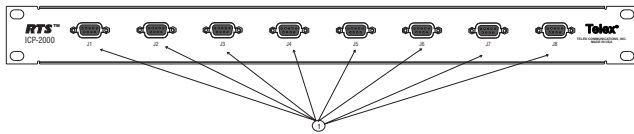


Figure 3. ICP-2000 front panel features

1. 9-pin female D-sub connector. Each connector is dedicated to an RS-485 communications port carried on the SCSI type II cable from the TM-2000/MTM-2000.

Rear Panel Features

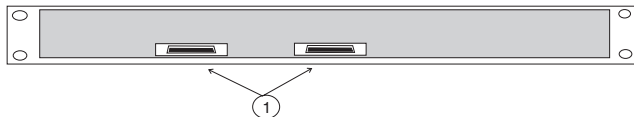


Figure 4. ICP-2000 rear panel features.

1. SCSI type II connectors. These are wired in parallel, so it does not matter which connector is used with a TM-2000/MTM-2000 even in redundant systems. The SCSI type II cables are included with the TM-2000/MTM-2000 or with an add-on RS-485 port card for the TM-2000/MTM-

SWP-2000 Description

The SWP-2000 is a 1RU switch over panel that provides common connections for TrunkEdit and TrunkSupervisor software packages (via serial connections to a Windows® based PC), status monitoring of both TM-2000/MTM-2000 units and control of both TM-2000/MTM-2000 units when used in a redundant configuration.

Front Panel Features

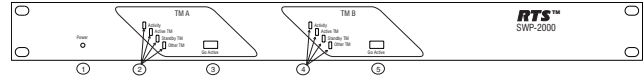


Figure 5. SWP-2000 front panel features

1. **Power LED.** Indicates that the SWP-2000 has power.
2. **TM/MTM A Status LEDs.** Indications for: Activity, Active TM/MTM, Standby TM/MTM, Other TM/MTM. The Activity LED indicates activity on the TM-2000/MTM2000 associated with the TM/MTM A inputs. Active TM/MTM LED indicates with TM-2000/MTM-2000 (either A or B) is active. Standby TM/MTM LED indicates which TM-2000/MTM-2000 (either A or B) is in standby. Other TM/MTM LED indicates green if TM/MTM B is talking, red if not, and off if the system is not configured for a backup TM-2000/MTM-2000.
3. **TM/MTM A Go Active control switch.** Forces the TM-2000/MTM-2000 associated with the TM A inputs to become the active trunk master.
4. **TM/MTM B Status LEDs.** Indications for: Activity, Active TM/MTM, Standby TM/MTM, Other TM/MTM. The Activity LED indicates activity on the TM-2000/MTM-2000 associated with the TM/MTM B inputs. Active TM/MTM LED indicates which TM-2000/MTM-2000 (either A or B) is active. Standby TM/MTM LED indicates which TM-2000/MTM-2000 (either A or B) is in standby. Other TM/MTM LED indicates green if TM/MTM A is talking, red if not, and off if the system is not configured for a backup TM-2000/MTM-2000.
5. **TM/MTM B Go Active control switch.** Forces the TM-2000/MTM-2000 associated with the TM/MTM B inputs to become the active trunk master.

Rear Panel Features

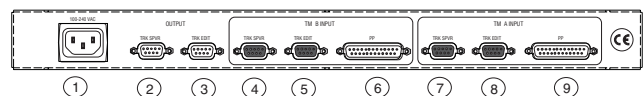


Figure 6. SWP-2000 rear panel features.

1. AC Power.
2. TrunkSupervisor connector. Provides connection to the COM port of the external PC running TrunkSupervisor software.
3. TrunkEdit connector. Provides connection to the COM port of the extra PC running TrunkEdit software.
4. Trunk Master A TrunkSupervisor connector. Connects to COM port 2 of the TM-2000/MTM-2000 assigned to be Trunk Master A.
5. Trunk Master A TrunkEdit connector. Connects to COM port 1 of the TM-2000/MTM-2000 assigned to be Trunk Master A.
6. Trunk Master A parallel port. Connects to parallel printer port of the TM-2000/MTM-2000 assigned to be Trunk Master A. Provides control from the SWP-2000 to the TM-2000/MTM-2000 and LED status monitoring of the TM-2000/MTM-2000 and LED status monitoring of the TM-2000/MTM-2000 on SWP-2000 front panel.
7. Trunk Master B TrunkSupervisor connector. Connects to COM port 2 of the TM-2000/MTM-2000 assigned to be Trunk Master B.
8. Trunk Master B TrunkEdit connector. Connects to COM port 1 of the TM-2000/MTM-2000 assigned to be Trunk Master B.
9. Trunk Master A parallel port. Connects to parallel printer port of the TM-2000/MTM-2000 assigned to be Trunk Master A. Provides control from the SWP-2000 to the TM-2000/MTM-2000 and LED status monitoring of the TM-2000/MTM-2000 on SWP-2000 front panel.

Understanding Trunking

In a trunking system, the audio lines (not data) of one or more intercom ports are interconnected between two separate intercom systems. The system administrator in each intercom system then places restrictions on these ports to prohibit them from being assigned to any keys. This reserves the ports for exclusive use as trunking lines. A special RS-485 data link is also connected from each intercom system to the trunk master for exchange of system control signals. The main difference between the TM-2000 and the MTM-2000 is the number of intercom systems it can communicate with. The TM-2000 supports up to 32 ports (see the last NOTE on page 10), whereas the MTM-2000 can support up to 16 ports. Once the interconnections are completed, the trunk master is programmed, using TrunkEdit, to recognize the individual intercom systems.

After the trunk master has been programmed, system administrators or keypanel users in each intercom system may request lists of persons, party lines, etc. from the other intercom systems for purposes of key assignment just as they would in their own intercom system.

After keys are assigned, keypanel operators can activate them or talk or listen just like in their own intercom system. There is no apparent difference to keypanel operators, but what actually occurs in the system electronics is slightly different. When a keypanel operator activates a key to talk to a destination located in another intercom system, the intercom system's master controller does not act itself to close any crosspoints, but rather, it sends this information to the trunk master via the data connection. The trunk master then checks for an available trunk line. If one is available it notifies the master controllers in the affected intercom systems to establish the communication path using the trunk line that it specifies. If no trunk lines are available, the trunking system will notify the master controller in the caller's intercom system, which will then send a "busy" signal to the calling keypanel.

If more than two intercom systems are interconnected, additional trunk lines must be reserved and interconnected between the systems. However, it is not always necessary that two intercom systems be directly interconnected as long as there is a path not more than one system away to connect the two systems. The trunking system can be programmed to permit "cascaded" trunking in which a pathway is established through an intermediate intercom system to connect two endpoints.

NOTE: The system and its software only support a single level of cascade. For example, System A wants to talk to System C, but it does not have a direct connection to System C. System B has both a connection to System A and to System C. System A can talk to System C by going through (cascading) System B. However, it would be impossible for System A to talk to System D if it had to go through both System B and System C to do so, because that would require two levels of cascade.

Installation

Unpacking

Please report any damage to the shipper or Telex immediately.

Installing Software

There are two software packages that can be used with an external PC connected to the TM-2000/MTM-2000. The TrunkEdit software package is included with the TM-2000/MTM-2000 system. This package provides the user with the ability to program (configure) and monitor the TM-2000/MTM-2000. The other software package is called TrunkSupervisor is available as a separate add-on at an additional cost. TrunkSupervisor is an advanced monitoring package for trunked systems.

Both packages require the following minimum system:

- Windows® 95 with Internet Explorer 4.01 SR2
- 64 MB Memory
- 20 MB Free Hard Disk (not including swap file)
- TrunkEdit: One free serial (COM) port.
- TrunkSupervisor: One free serial (COM) port, or two free serial (COM) ports if an AutoTIMS unit is to be monitored.

NOTE: A minimum of two serial ports are required to run both software packages at the same time on the same computer. Three serial ports are required if an AutoTIMS unit is to be monitored by TrunkSupervisor.

TrunkEdit works with a PC attached to COM port 1 of the TM-2000/MTM-2000 or via the TRK EDIT port of the SWP-2000.



Figure 7. Serial (COM) port labels on TM-2000.

TrunkSupervisor works with a PC attached to COM port 2 of the TM-2000/MTM-2000 or via the TRK SPVR port of the SWP-2000. See Figure 7 for an example of how COM port 1 and 2 are labeled on the TM-2000/MTM-2000.

Rack Mounting

Install the TM-2000(s)/MTM-2000(s), ICP-2000(s), and SWP-2000 (if used) in the equipment rack. The units do not have special ventilation requirements. If a redundant system is being configured it is recommended that the SWP-2000 be installed between the two TM-2000(s)/MTM-2000(s). Mount the ICP-2000 panel(s) either above or below the TM-2000(s)/MTM-2000(s).

Trunking Connections and Setup

1. Identify the correct wiring diagram for your system. For non-redundant TM-2000/MTM-2000 systems use example system in Figure 10. For redundant TM-2000/MTM-2000 systems use the example in Figure 11. Connect the trunking system components using the appropriate wiring diagram. Consult the appropriate figures as indicated in Figures 10 and 11 for specific cable wiring diagrams.

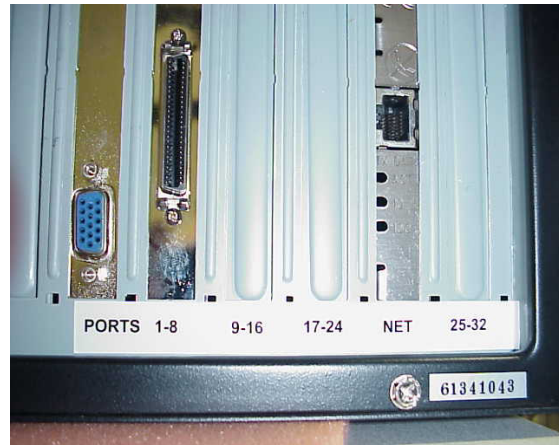


Figure 8. TM-2000 RS-485 port and networking tables.

NOTE: Follow the labels as placed on the TM-2000/MTM-2000 for the specific locations of network cards and RS-485 communication cards/port numbers. See Figure 8 for an example of card/port labeling. Figure 9 depicts how the ports are mapped to the ICP-2000 panels. Caution: On most systems Port 1 can be used for trunking. On special systems that use Video Delegate Panels (VDP), Port 1 is reserved for use with VDP panels. Standard systems ship from the factory without VDP support, so Port 1 is safe to use for trunking.

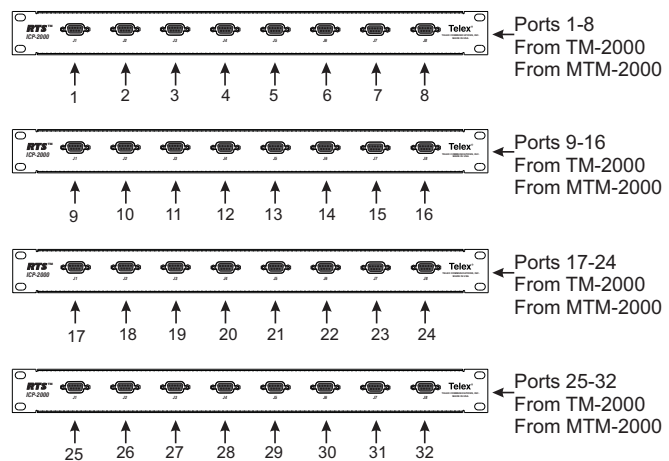


Figure 9. ICP-2000 port mapping from TM-2000/MTM-2000

2. Interconnect one or more intercom audio ports between the intercom systems. These ports will be used for trunking communication only. Figure 10 and 11 indicate the specific cable wiring diagrams.

NOTE: The number of trunk lines that you setup should be based on the number of persons that need to communicate with other intercom systems, and on the critical nature of their communication. On the other hand, there may be additional expense involved with running trunk lines (when using leased lines for example) and you will want to keep the number of lines to a minimum. You may be able to get by with fewer trunk lines than the number of potential users. For example: If two keypanels need to have access to another intercom system, but only one of those keypanels has a critical need, you may be able to get by with one trunk line. You can just set the trunk priorities for the two users (as described in the following paragraphs) so that the one with the critical need has a higher priority. Also, keep in mind the trunking system can create a communication path by “cascading” through a third intercom system if that system has trunk lines to the other two systems. If frequent busy signals are encountered during normal use, you may have to allocate more trunk lines. A busy signal is normally indicated by an alphanumeric key assignment and a double asterisk indication.

3. Within each intercom system, run the **AZedit** intercom configuration software. Do the following:

Enable Trunking Support

To enable trunking support place a check mark in the box next to Enable Trunking Support option. This option is located under *Options>Preferences>Advanced tab.*

Send the changes to the frame and save the file.

Shut down **AZedit**.

Repeat this for every intercom system that is to be trunked.

4. Once **AZedit** is restarted, click the **KP** button on the toolbar. Then select the port that you want to set as a trunking port: either enter the port number in the “**Port**” box and press Enter, or select the name of the port in the “**Alpha**” box. When the keypanel setup screen appears for that port, deselect all of the **Scroll Enable** check boxes. Then, send your changes to the intercom system. For further assistance with keypanel setup, click the **KP** button on the toolbar, then press the F1 key on the computer keyboard and select “**Get Help on Keypanel Setup**”.

Also using **AZedit** within each intercom system, select which intercom ports, party lines, etc. will be scrollable and assignable in other intercom systems. To make intercom ports scrollable and assignable, click the **KP** button on the toolbar, select an intercom port, then check the **Scroll Enable** check boxes as desired. (Press F1 to get further help with the keypanel setup, including additional scroll enable information.) To make other types of functions (party lines, IFBs, etc.) scrollable, click the appropriate button on the **AZedit** toolbar as indicated, then select a specific destination and check its **Scroll Enable** check boxes. For further assistance setting up any of these destinations, press the F1 key while viewing the appropriate setup screen

PL button	Party Lines
IFB button	IFBs
SL button	Special Lists
GPI Out button	General Purpose outputs
ISO button	Camera ISOs

Be sure to send you changes to the intercom system and save the file before exiting **AZedit**.

5. Run the **TrunkEdit** software and configure the trunking system. Click on the bar labeled **Intercom** on the left side of the screen and then click on the **Setup** icon. A table displaying setup information for each intercom system will be displayed. On initial setup this table will be empty. Do the following:

Enter a unique four character name for each trunked intercom system under the **Name 4** column of the setup table. You can also enter unique six and eight character names under the **Name 6** and **Name 8** columns, but these are optional.

Select the baud rate for each intercom system. The baud rate can be changed by right clicking anywhere along an intercom system’s entry in the table. A pop-up menu will display. Select the correct baud rate by moving the pointer to the **Select Baud Rate** entry and clicking on the correct rate. For locally trunked systems (i.e. connected via cable only), **38.4K** should be selected. For remote trunked systems (i.e. connected via leased line, fiber, etc...), **9600** should be selected.

Select the RS-485 COM port to be used from the TM-2000/MTM-2000 to each intercom system. The COM port can be changed by right clicking anywhere along an intercom system's entry in the table. A pop-up menu will display. Select the correct COM port by moving the pointer to the **Select COM Port** entry and clicking on the desired COM port.

Send the changes to the TM-2000/MTM-2000 and save the file.

6. Click the bar labeled **Trunk** on the left side of the screen and then click the Definitions icon. A table displaying trunk definitions will be displayed. On initial setup this table will be empty. Do the following:

Right-click on a trunk entry under the **Icom 1** column. Select **Choose New Assignment** from the pop-up menu that appears. Select the intercom system that is desired for this end of the trunk line. Repeat the same for the **Icom 2** column in the same line except choose an intercom system different than that selected for **Icom 1**. This defines which two intercom systems (**Icom 1** and **Icom 2**) will be trunked via this entry in the table.

Right-click in either the **Port** or **Alpha** entry associated with the **Icom 1** entry you just made and select the **Choose New Assignment** from the pop-up menu that appears. Select the **Port** or **Alpha** to be used for the audio trunk line from the system named in the **Icom 1** column. Do the same for the **Port** or **Alpha** entry associated with the **Icom2** entry except select the **Port** or **Alpha** from the **Icom 2** system for the audio trunk line.

If this particular trunk line is to be cascable (i.e. usable to connect two other adjacent systems), then be sure to set the **Cascade** flag. To set or clear the **Cascade** flag, right-click on the **Cascade** entry for the trunk line and select **Set Cascade Flag** or **Clear Cascade Flag** from the pop-up menu that appears.

Repeat this procedure for each intercom system audio trunk line that will be needed. When finished send the changes to the TM-2000/MTM-2000 and save the file.

7. Run **AZedit**. Within each intercom system, assign keypanel keys as required to communicate with destinations in other intercom systems. This is similar to assigning keys in the local intercom system, except that you will have to select an intercom system first when making assignments. Click the **KP** button on the toolbar to access keypanel setup. Then, select the intercom port where you want to add a key assignment that will communicate with a remote intercom system. If you use the **Key Assignment Select** screen to assign keys, proceed as for normal key assignment, except that you should select an intercom system before selecting a scroll list. Press the F1 key on the computer keyboard to get help on keypanel setup.

Be sure to send your changes to the intercom system and save the file before exiting **AZedit**.

Specifications

TM-2000

Height: 5.25" (133.35mm)
 Width: 19.0" (483mm)
 Depth: 18.5" (470mm)
 Weight: 48.7lbs (22.1kg)
 Power: 115/230 VAC
 (switch selected),
 50/60 Hz. 2.6A

MTM-2000

Height: 3.50" (88.9mm)
 Width: 19.0" (483mm)
 Depth: 19.5" (495.3mm)
 Weight: 23.12 lbs (10.48kg)
 Power: 115/230 VAC
 (switch selected),
 50/60 Hz. 2.6A

SWP-2000

Height: 1.75" (44mm)
 Width: 19.0" (483mm)
 Depth: 5.3" (133mm)
 Weight: 5.2lbs (2.4kg)
 Power: 100-240 VAC, 47-63
 Hz, 0.4 A

ICP-2000

Height: 1.75" (44mm)
 Width: 19.0" (483mm)
 Depth: 1.0" (25.4mm)
 Weight: 5.2lbs (2.4 kg)

Environment

Operating Temperature 0° C to 50° C (32° F
 to 122° F)
 Storage Temperature -20°C to 75°C (-4° F
 to 167° F)
 Humidity 0 to 95% non-
 condensing

Approvals

UL, FCC, CE

Licensing for the TM-2000/MTM-2000

In order for the TM-2000/MTM-2000 software to operate you must have either a signed license file or a USB dongle.

If the dongle is used it must always be present and connected to the TM-2000/MTM-2000. When installing the TM-2000/MTM-2000 software, the computer will check for the presence of the a USB dongle. If the dongle is not found, the computer will require the license file. If it is removed for more than a few minutes, the TM-2000/MTM-2000 will automatically shut down.

If a license file is used, the license file is hard-coded to a specific piece of hardware (ie, TM-2000/MTM-2000). This means the software cannot be used on any other machine than the one it is assigned.

To update the license file separately, put the *tm2000.lic* license file on a DOS-format floppy disk, along with the *update_tm.sh* file which is provided with the license. For further information on updating the license see page x.

Software Organization

The TM-2000/MTM-2000 consists of a PC running on Linux with real-time extensions. Once the TM-2000/MTM-2000 software is loaded on the PC, some of the kernel load modules become part of the Linux operating system. All of the TM-2000/MTM-2000 software is installed in the */tm* directory (unlike DOS and Windows®, Linux uses the forward slash “/” as a directory separator).

NOTE: It should not normally be necessary to log on to the TM-2000 computer to do anything from Linux. Configuration of the TM-2000/MTM-2000 is done by running the TM-2000 software, which automatically starts when the computer is booted.

Hardware Requirements

Serial Ports - The TM-2000/MTM-2000 requires the standard COM1 and COM2 devices

COM1 used for TrunkEdit

COM2 used for TrunkSupervisor

One or more serial card must be installed in order to communicate with the intercoms. If serial cards are not installed, the TM-2000 will still run, but cannot connect to any intercoms.

If a VDP (VTR Delegate Panel) controller is used, it must be connect to the first serial port on the first Acces card, otherwise this serial port can be used for intercom communications. The choice to enable VDP is made during the software installation.

Ethernet Adapters - The TM-2000 supports the use of a single Ethernet adapter. This is used for active/standby communications and for TrunkEdit communications via Ethernet.

NOTE: If TrunkEdit via Ethernet is used, the computers must be connected by a switch or a hub; otherwise, a single CAT-5 crossover cable can be used between the active and standby computers.

Supported Ethernet Adapters

3COM 3c501/3/5/9, 3c529, 3c579, 3c49x, and 3c9xx

Intel EtherExpressPro/100

Intel 815E chipset (e.g. Intel 82801)

National Semiconductor DP8381x

NetGear FA-311

AMD PCnet32 PCI

NOTE: There are many Ethernet Adapter cards that are listed as being supported by Linux; however, in order to support any other cards, the Linux kernel included with the TM-2000/MTM-2000 software must first be

TM-2000/MTM-2000 Software Installation Configuration Options

When the option to install the software is selected, the computer prompts for different pieces of information:

Is the computer to be part of an active/standby configuration? There are three choices:

Stand-alone operation:	This option sets the computer name to tm_solo; the IP address to 10.201.202.203; and no standby computer.
Active/standby operation (Active by default):	This sets the computer name to tm1; the IP address to 10.201.202.204; and the active/standby computer to tm2/ 10.201.202.205.
Active/standby (Standby by default):	This sets the computer name to tm2; the IP address to 10.201.202.205; and the active/standby computer to tm1/10.201.202.204

In addition the following parameters are set by default:

Domain or Workgroup Name:	WORKGROUP This is significant if you want to be able to access the TM-2000's hard disk from a Windows® machine.
Network Number:	10.0.0.0. This value may need to change if the IP address is set to something other than 10.x.x.x.
Subnet Mask:	255.0.0.0. This value may need to change if the network number is changed.
Broadcast Address:	10.255.255.255. This value may need to change if the network number is changed.

When installing the software, it attempts to determine the hard disk drive size and partition information. You have a two choices:

- The user has control on how the hard disk is partitioned.
- The software will generate the partitions.
If the default partitioning is chosen, 2 partitions will be generated: one at 5MB (containing essential boot files) and one at 250MB

Updating the TM-2000/MTM-2000 Software

In order to update the TM-2000/MTM-2000, the following files are required:

update_tm.sh
one or more update files, typically with a name such as to_v830.tgz

These must be copied to a DOS-formatted floppy disk.

To perform an update, do the following:

1. Log on to the console as the user root. (A password may have been set for this user when the software was initially installed.)
*A line or two of information displays followed by a prompt, similar to **root@tm1 ~ #**.*
2. Shut down the TM-2000/MTM-2000 by running **/tm/stop_tm all**.
Several lines of output will appear followed by another prompt.
3. Put the floppy disk containing *update_tm.sh* and the first update file in the disk drive.
4. Enter the command
sh /tm/new_ver.sh
This will copy the files to the hard drive. If multiple floppy disks are required, the PC will prompt you to change the disks..
5. When the update is complete, remove the disk, and reboot the computer.

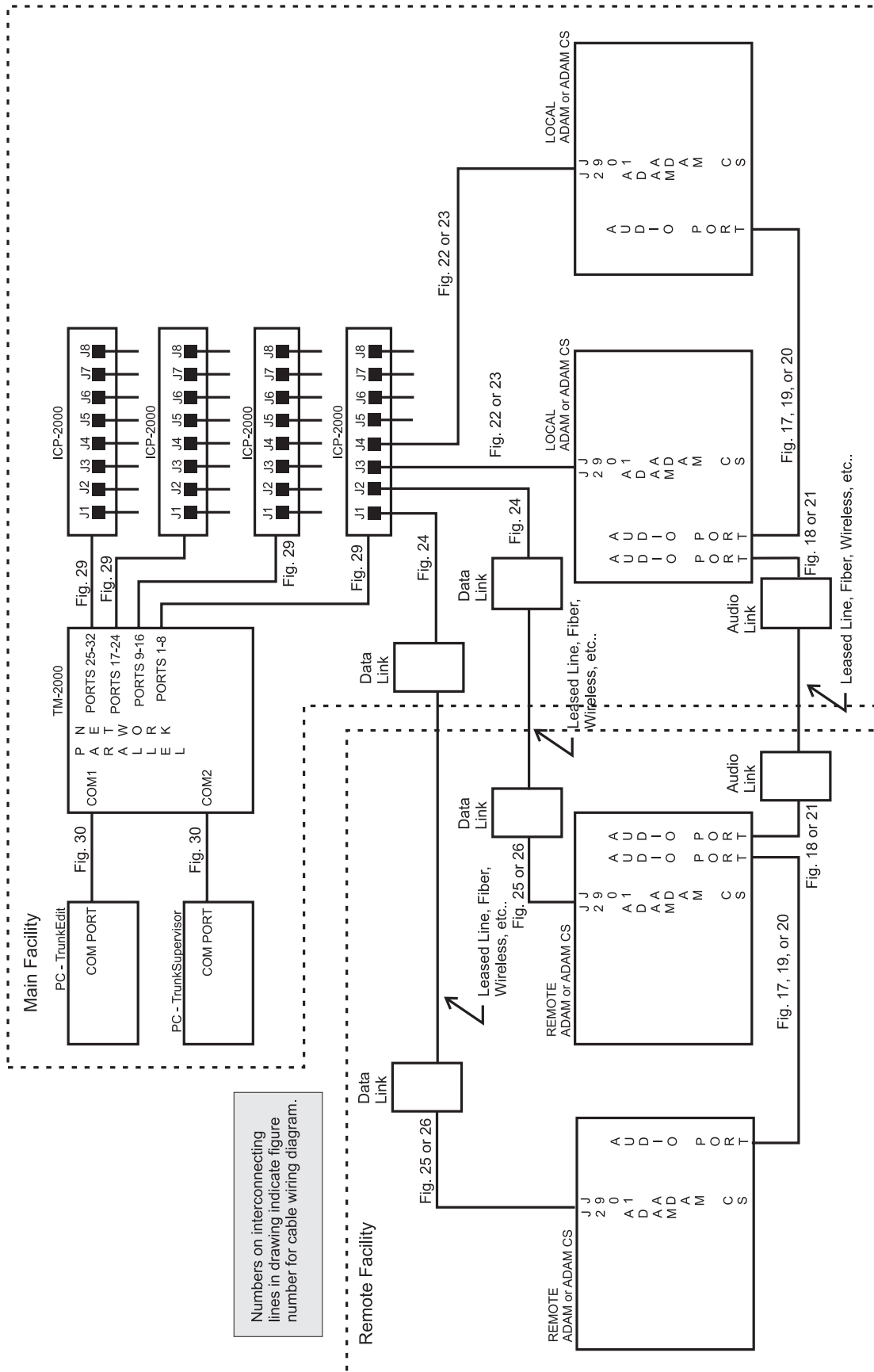


Figure 10. Example of a non-redundant TM-2000 system.

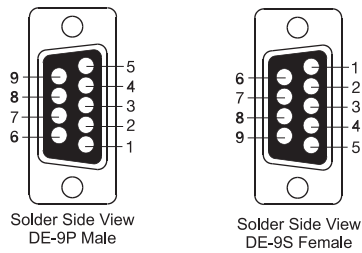


Figure 12. 9-pin D-sub connector pinouts.

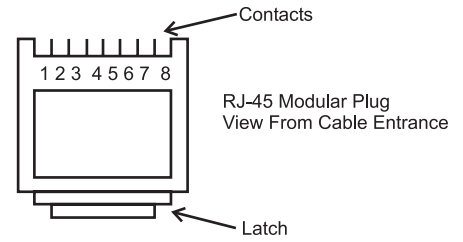


Figure 16. RJ-45 Connector pinout.

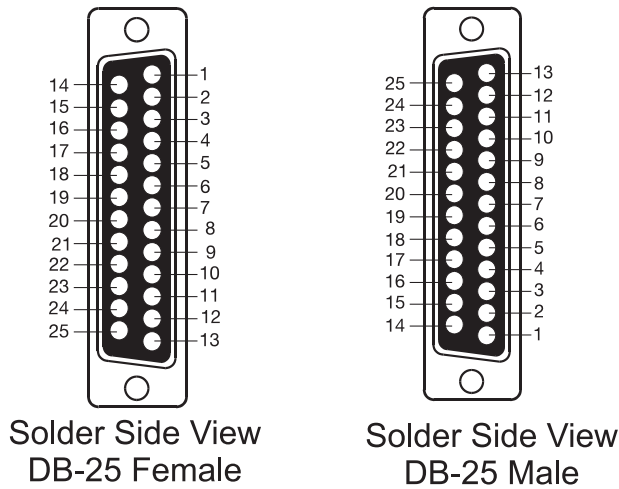


Figure 13. 25-pin D-sub connector pinout

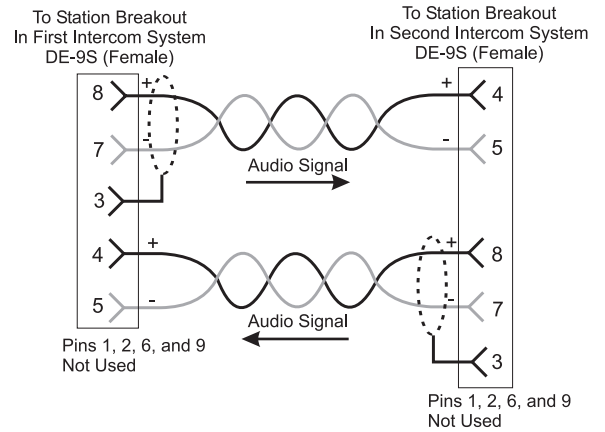


Figure 17. DE-9S to DE-9S audio cable

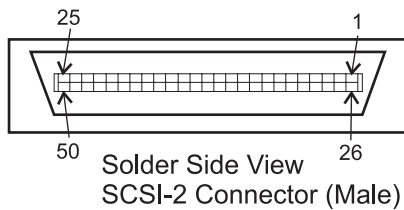


Figure 14. 50-pin SCSI type II connector pinout

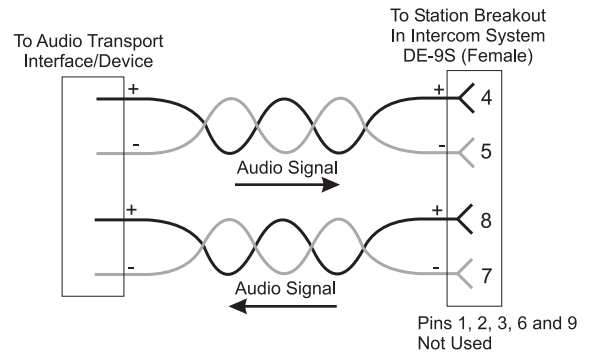


Figure 18. DE-9s to unspecified device audio cable.

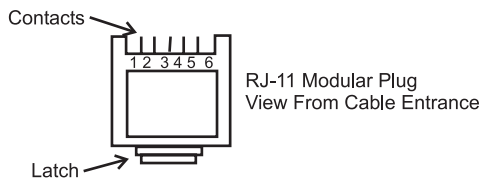


Figure 15. RJ-11 connector pinout.

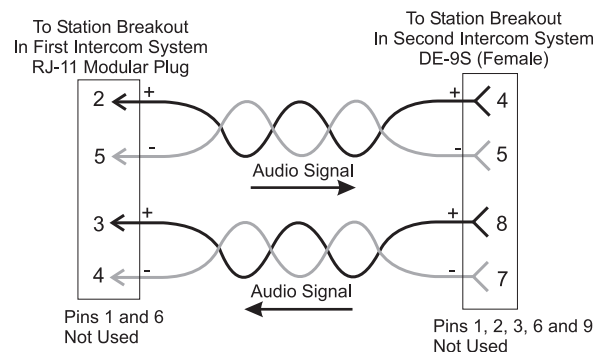


Figure 19. RJ-11 to DE-9S audio cable.

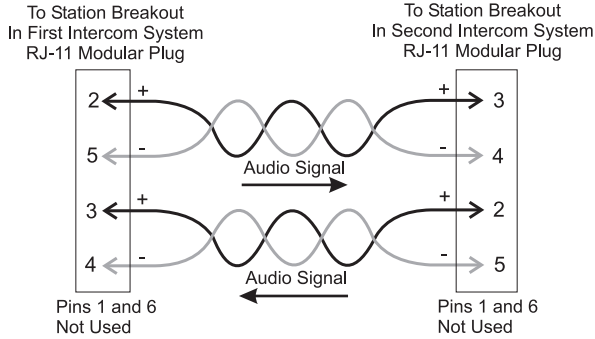


Figure 20. RJ-11 to RJ-11 audio cable.

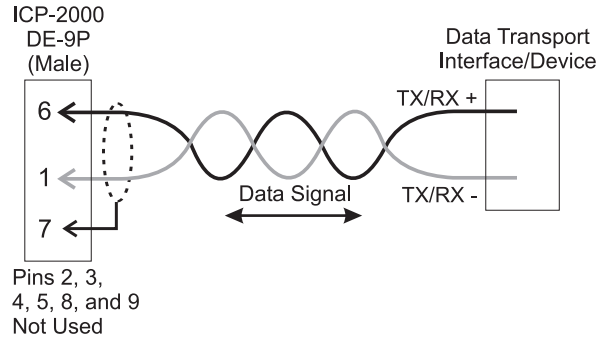


Figure 24. ICP-2000 to unspecified device RS-485 data cable.

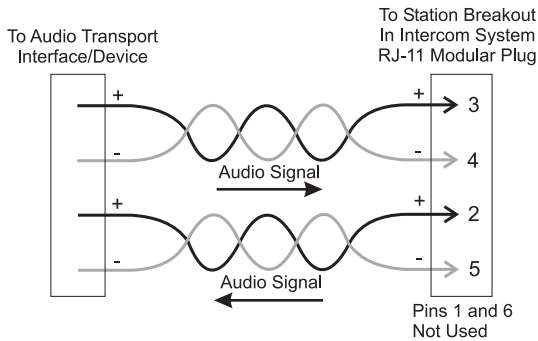


Figure 21. Unspecified device to RJ-11 audio cable.

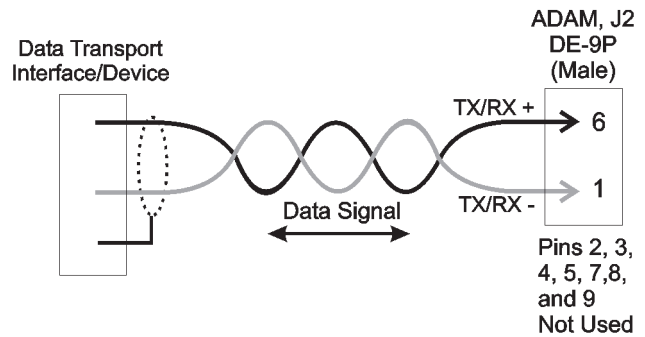


Figure 25. ADAM to unspecified device RS-485 data cable.

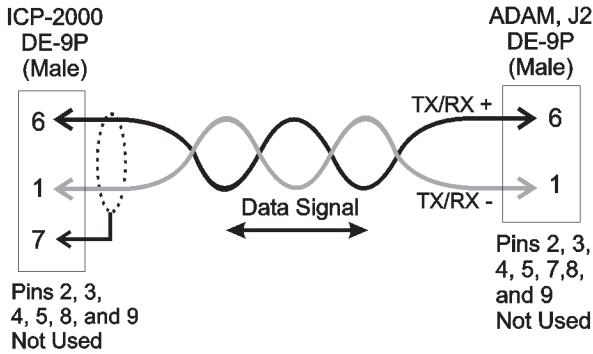


Figure 22. ICP-2000 to ADAM RS-485 data cable.

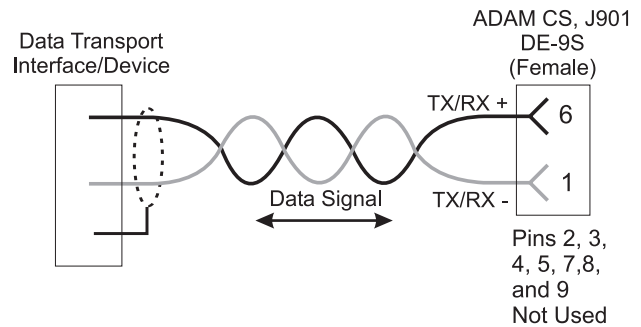


Figure 26. ADAM CS to unspecified device RS-485 data cable.

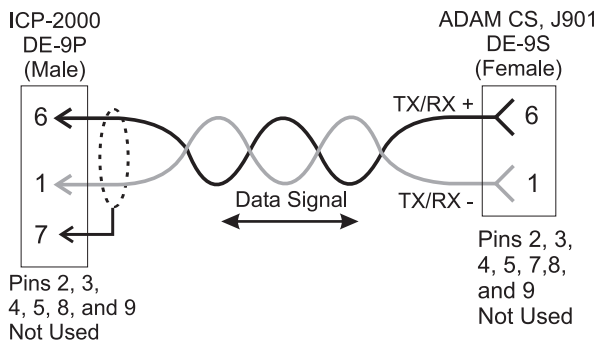


Figure 23. ICP-2000 to ADAM CS RS-485 data cable.

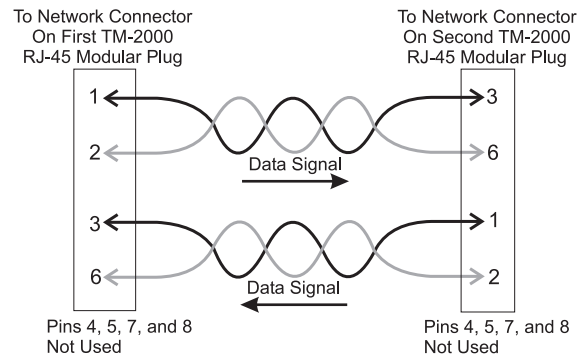


Figure 27. TM-2000 to TM-2000 network linking (standard networking crossover) cable.

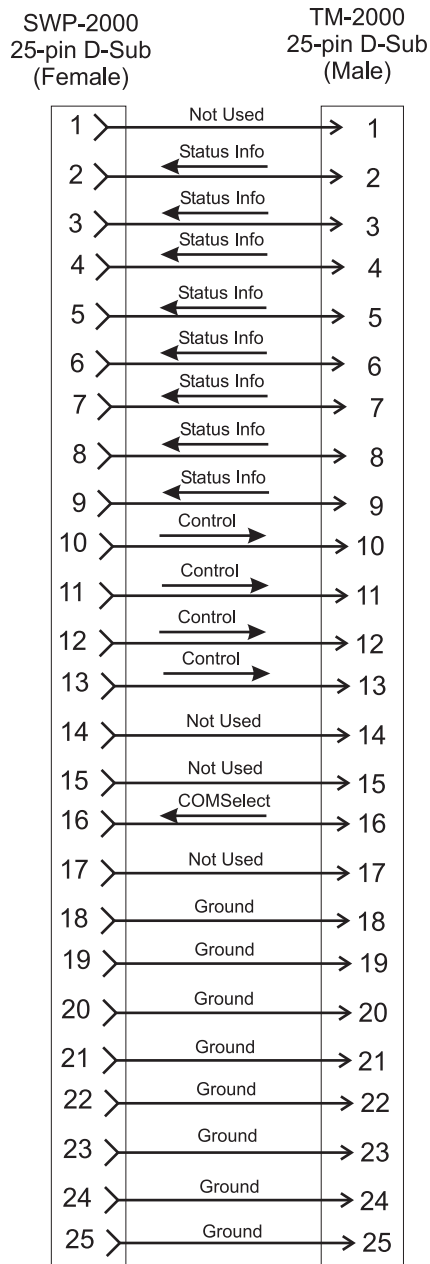
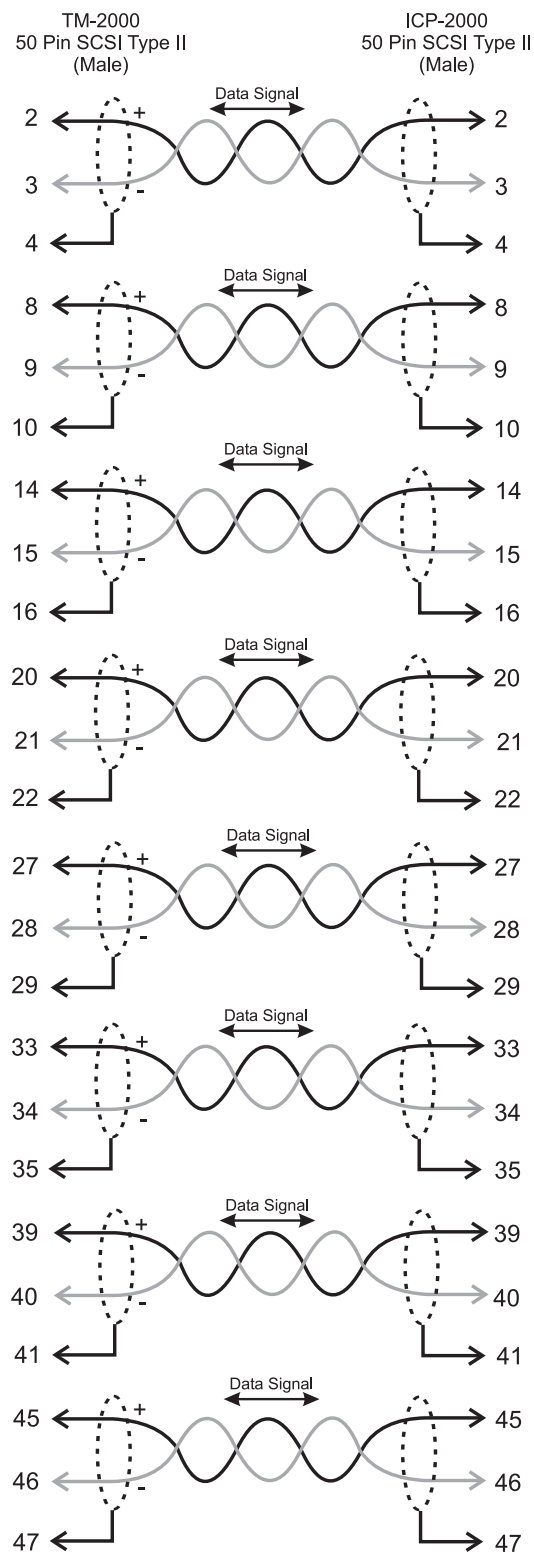


Figure 28. TM-2000 to SWP-2000 parallel port status and control cable.



Pins 1, 5-7, 11-13, 17-19, 23-26, 30-32, 36-38, 42-44, and 48-50 Not Used

Figure 29. TM-2000 to ICP-2000 RS-485 COM ports.

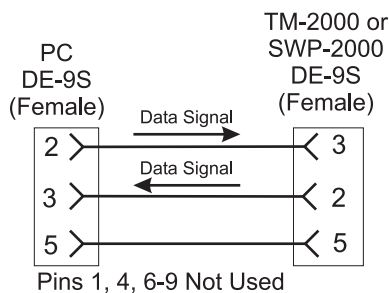


Figure 30. PC (TrunkEdit/TrunkSupervisor) to TM-2000 or SWP-2000 RS-232 data cable.

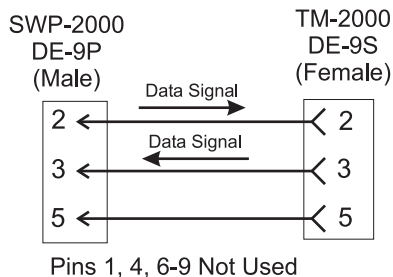


Figure 31. SWP-2000 to TM-2000 (TrunkEdit/TrunkSupervisor) RS-232 data cable.

Recommended Cables

1. For cables using RJ-11 connections use Category 5 (CAT5) network cable.
2. For RJ-45 connectors use Category 5 network cable. RJ-45 Crossover (TM-2000 to TM-2000 network) cables can be purchased pre-made from a computer dealer.
3. For audio cables, use Belden 8723 or similar type with two twisted pairs with shield/drain wires.
4. For individual RS-232 or RS-485 data cables, use Belden 8451 or similar type with single twisted pair with shield/drain wire. **DO NOT EXCEED 50 FEET RUN LENGTH WITH RS-232 CABLES!** RS-232 cables can be purchased pre-made from a computer dealer. Use an RS-232 wired "Straight Through" for SWP-2000 to TM-2000 connections. Use a RS-232 wired "Null Modem" for PC to TM-2000/SWP-2000 connections.
5. For TM-2000 to ICP-2000, RS-485 cables use the supplied cables.
6. For TM-2000 to SWP-2000 status/control cables use 25 conductor shielded cable. **DO NOT EXCEED 10 FEET RUN LENGTH WITH CABLE.**

Appendix A

Useful Linux Tricks

On the computer console, Shift-Page Up and Shift-Page Down can be used to scroll through the last 6 or so screenfuls of text. Each keystroke scrolls forward and back by half of a screen.

The TM-2000/MTM-2000 is configured with 2 virtual consoles. Normally, everything is done on the first virtual console. However, Alt-F2 can be used to switch to a second virtual console (the first time you do this, you will be at another login prompt); Alt-F1 can be used to switch back to the first virtual console. This can be useful if you are logged in and doing something, and need to look something up without disturbing your first session.

The computer can be rebooted by typing Control-Alt-Del. You do not have to be logged in to do this. Alternatively, if you are logged in as *root*, you can type the command “shutdown -r0”. To halt the computer, rather than reboot it, type the command shutdown -h0”, and wait for the “Power down.” message to appear.

If you are logged in, you can log out by typing the command “exit”, or by pressing Ctrl+D.

If the computer is restarted without shutting it down properly (e.g. there is power failure), the computer will automatically run *fsck* (“file system check”, similar to DOS’s *chkdsk*). However, this will normally only take a few seconds, since there is not that much data stored on the hard disk.

