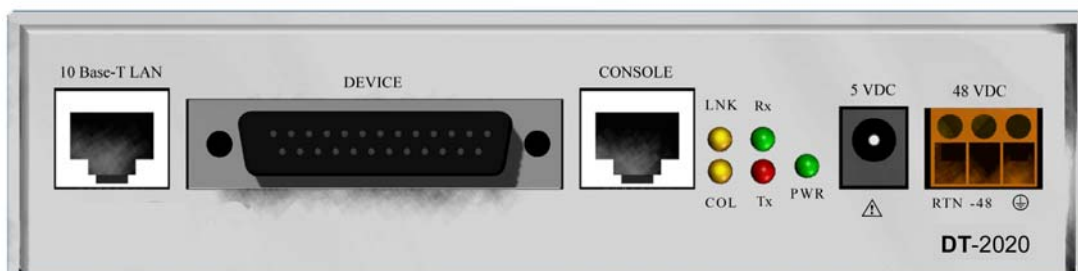




DT-2020

**INTER-NETWORKING MEDIATION
INTERFACE**

USER'S MANUAL



RELEASE 11.X

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Important Safety Instructions



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

When installing, operating, or maintaining this equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:

- Read and understand all instructions.
- Follow all warnings and instructions marked on this product.
- For information on proper mounting instructions, consult the User's Manual provided with this product.
- The telecommunications interface should not leave the building premises unless connected to telecommunication devices providing primary and secondary protection.
- This product should only be operated from the type of power source indicated in the User's Manual.
- This unit is intended to be powered from either -48 V DC or AC voltage sources. See User's Manual before connecting to the power source.
- The -48 V DC input terminals are only provided for installations in Restricted Access Areas locations.
- Do not use this product near water, for example, in a wet basement.
- Never touch uninsulated wiring or terminals carrying direct current or leave this wiring exposed. Protect and tape wiring and terminals to avoid risk of fire, electric shock, and injury to service personnel.
- To reduce the risk of electrical shock, do not disassemble this product. Service should be performed by trained personnel only. Opening or removing covers and/or circuit boards may expose you to dangerous voltages or other risks. Incorrect re-assembly can cause electric shock when the unit is subsequently used.
- For a unit intended to be powered from -48 V DC voltage sources, read and understand the following:
 - This equipment must be provided with a readily accessible disconnect device as part of the building installation.
 - Ensure that there is no exposed wire when the input power cables are connected to the unit.
 - Installation must include an independent frame ground drop to building ground. Refer to User's Manual.



This symbol is marked on the DT-2020, adjacent to the ground (earth) area for the connection of the ground (earth) conductor.

- This Equipment is to be Installed Only in Restricted Access Areas on Business and Customer Premises Applications in Accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA No. 70. Other Installations Exempt from the Enforcement of the National Electrical Code May Be Engineered According to the Accepted Practices of the Local Telecommunications Utility.
- For a unit equipped with an AC Wall Plug-In Unit, read and understand the following:
 - Use only the K'TRON, Model KA-52A Wall Plug-In Unit shipped with this product.
 - Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
 - Do not staple or otherwise attach the power supply cord to the building surfaces.
 - Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.
 - The socket outlet shall be installed near the equipment and shall be readily accessible.
 - The Wall Plug-In unit may be equipped with a three-wire grounding type plug, a plug having a third (grounding) pin. This plug is intended to fit only into a grounding type power outlet. Do not defeat the safety purpose of the grounding type plug.
- Do not allow anything to rest on the power cord. Do not locate this product where the cord may be abused by persons walking on it.
- Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - a) When the power supply cord or plug is damaged or frayed.
 - b) If liquid has been spilled into the product.
 - c) If the product has been exposed to rain or water.
 - d) If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by qualified technician to restore the product to normal operation.
 - e) If the product has been dropped or the cabinet has been damaged.
 - f) If the product exhibits a distinct change in performance.

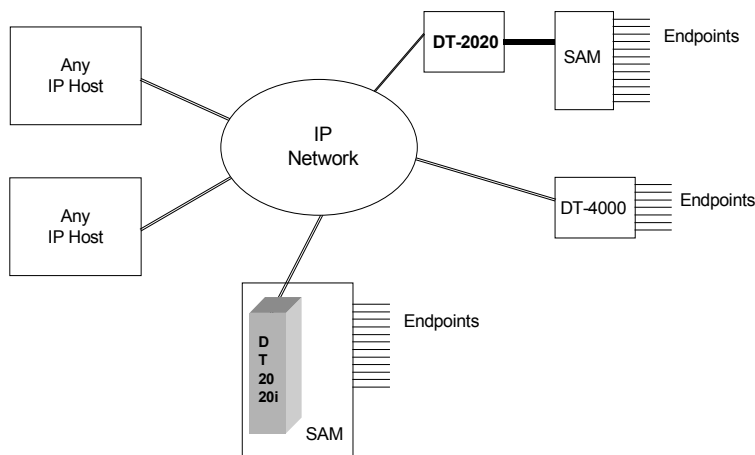
Save These Instructions

1 INTRODUCTION

The **DT-2020** is a mediation product that allows the re-use of SAM concentrator endpoints on an IP infrastructure without any BNS equipment presence. The **DT-2020** is an external unit and provides up to 64 ports of service. The **DT-2020** may be used for all types of SAM concentrators. The **DT-2020** supports all of the current SAM port options, and are compatible with the mediation function of the DT-4000¹.

These devices provide a TELNET over TCP path or a transparent TCP path for each user port on the SAM concentrator. These ports may then connect to an arbitrary IP host without an intermediary interface. While this is normally the case for asynchronous protocols, it is also true of synchronous protocols where the peer host has implemented the framing interface per the appropriate RFCs.

Consider the following diagram:



The above configuration is not the only possible one. However, it does depict some of the inter The **DT-2020** connection to the attached SAM is via a SAM trunk where SAM8/16 concentrators use the DDS protocol and a SAM64 uses either a SAMSL or Universal Trunk Module².

Trunk speeds between a **DT-2020** and SAM are SAM dependent. A SAM8 supports a 56Kbps trunk as does a SAMSL connected SAM64. A SAM16 supports a 128Kbps trunk. A Universal Trunk connected SAM could have this link operate up to E1.

¹ The DT-4000 is a product existing in BNS and IP, ATM, TDM or Frame Relay networks simultaneously. It looks like a SAM16, but supports IP inputs and higher port speeds. The DT-4000 communicates via Frame Relay, ATM, TDM or IP across the backbone network and becomes a standalone edge device in non-BNS networks.

² The Universal Trunk is a BNS Module that replaces all existing trunks in the Node, MPC and SAM. It interconnects BNS nodes over Frame Relay, ATM and IP networks.

The connection to the IP network is via a 10BaseT interface. The network interface is active when the **DT-2020** is in-service even if the connected SAM is not in service.

Other protocols on the 10BaseT such as SNMP, Telnet, ARP are supported as well.

The **DT-2020** supports the notion of *Closed User Groups* available in BNS networks. This is an important feature for protecting sensitive endpoints in a corporate wide network without the burden of special "security servers".

Most IP terminal servers provide no protection of any kind with regard to per-port security. Their use in a sensitive environment would require external and expensive "security servers". These external servers are themselves subject to failure because their protected network segment has multiple entry points. However, the **DT-2020** solves all those issues by implementing a form of *Closed User Groups* for IP networks to provide a similar level of security as the BNS Network.

The **DT-2020** supports the notion of *Hunt Groups* available in BNS networks. A Hunt Group is a set of ports that are arranged to receive calls to a common address.

The **DT-2020** can maintain a set of mnemonic host names. This is analogous to the `/etc/hosts` file on both UNIX and Microsoft Windows platforms. This allows the **DT-2020** to perform a translation between a user provided name and its associated IP address and TCP port number. It is used for non-PDD originating ports. The use of a mnemonic name is optional, and the DT-2020 will always accept an IP address in its base form.

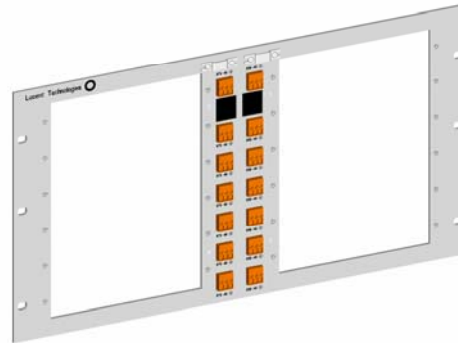
The **DT-2020** supports up to two TACACS+ RADIUS servers for login authentication. These are a primary, and a secondary, although each is individually enabled. The TACACS+ support is for either encrypted, or clear authorization. Encryption keys may contain spaces.

2 PHYSICAL DESCRIPTION

Stand-Alone DT-2020



Rack-Mount DT-2020 / IP-DSU panel



The compact **DT-2020** is available as a stand-alone unit and can also be configured to mount into an available rack-mount panel, to fit various space and configuration requirements. It can be configured as either a 115V/220V AC or 48V DC powered unit. It must be placed at a location with cable access to both the BNS trunk I/O board and the local IP network.

2.1 Device Interface

Through a DB25, RS530 connector the DT-2020 supports two, software selectable, device interfaces: V.35 and RS-232C. The connector is female in gender and electrically presents a data communication equipment (DCE) interface.

For V.35, a standard RS-530 to V.35 adapter is available. V.35 is a 34-pin electrical interface.

The DT-2020 DB25, RS530 connector supports RS-232C directly which in this case is a 25-pin electrical interface.

2.2 10BaseT LAN Interface

This interface requires a standard RJ45-terminated Category 5 twisted-pair data cable. It connects to a 10BaseT hub or router on the local LAN segment.

2.3 Console interface

This interface requires a standard RJ45 terminated, twisted pair, data cable. It connects as a data terminating equipment (DTE) to an asynchronous device and uses RS-232C signaling. Connection to the **DT-2020** console is required for any **DT-2020** administration or StarKeeper® II NMS alarm collection. Otherwise, the console can be disconnected during normal operation.

The **DT-2020** also supports console access through a TCP telnet connection and makes use of the standard, telnet server port (port 1023). This service is available only when the unit is in-service.

2.4 Rack-mount Panel

The **DT-2020** rack-mount panel contains twelve slots to accommodate that number of **DT-2020** units. Each rack-mount panel fits in a 19 or 23 inch EIA standard-equipment rack (use extension ears when mounting in a 23-inch rack). The rack-mount panel supports 1 inch, 1.75 inch and 2 inch spacing between vertical rail mounting holes. Mounting ears for **DT-2020** placements in the rack-mount panel are available.

2.5 Power Interfaces

Dual power interfaces are present on the **DT-2020** faceplate. A circular interface labeled "5 VDC" mates with the barrel connector of a standard wall outlet AC to DC power transformer for 115V AC installations. A three position (accepting return, minus and ground power wires) terminal block labeled "48 VDC" is commonly used in central-office installations.

The **DT-2020** is factory configured for 115V AC usage. 48V DC operation requires a different jumper setting on the **DT-2020** system board. (See *Installation* Section)

2.5.1 Stand-alone AC Power

For this application, a separate AC power supply is available. The power supply has a six-foot cable that terminates with a barrel connector. The power supply plugs into a standard 115V AC outlet. The barrel connector plugs into the circular connector labeled "5 VDC" on the **DT-2020** faceplate.

2.5.2 Rack-mount AC Power

DT-2020 rack-mount AC power is the same as in the stand-alone case. This configuration requires one AC power supply for each **DT-2020** unit. However, it is recommended that your equipment rack be outfitted with sufficient power strips to accommodate all of the AC power supplies.

2.5.3 Stand-alone DC Power

The stand-alone **DT-2020** accepts DC power input directly from a 48V DC power source and connects into the three position (accepting return, minus and ground power wires) terminal block labeled "48 VDC" on the faceplate. The terminal-block connectors accommodate 14 awg to 24 awg (American Wire Gauge) wire. A strain-relief clamp is available separately for DC wire stabilization.

2.5.4 Rack-mount DC Power

The rack-mount **DT-2020** accepts DC power input directly from a 48V DC power source and connects into a main, three position (accepting return, minus and ground power wires) terminal block labeled "48 VDC" on the rack-mount panel faceplate. Power is distributed to six terminal blocks vertically below the main terminal block, where each individual terminal block powers a single **DT-2020**. Each rack-mount panel accepts two 48V DC power feeds. Twelve **DT-2020** units can be powered in this manner. The terminal block connectors accommodate 10awg to 14awg (American Wire Gauge) wire. A strain-relief clamp is available separately for DC wire stabilization.

2.6 LEDs

The **DT-2020** faceplate contains light emitting diodes (LEDs) used to report **DT-2020** activity and status.

LED Function	LED Color	LED Description
Transmit (Tx)	Yellow	10 Base-T Transmit Packet Indicator
Receive (Rx)	Yellow	10 Base-T Receive Packet Indicator
Link (LNK)	Green	10 Base-T Link Indicator
Collision (COL)	Red	10 Base-T Collision Indicator
Power (PWR)	Green	Unit Power Indicator

3 INSTALLATION

This chapter contains the steps needed to install and configure the **DT-2020**.

3.1 Equipment

Unpack and inspect the **DT-2020** unit and other components, and have on hand a #2 phillips and medium-sized flathead screwdriver.

3.1.1 Stand-alone DT-2020 Equipment

For stand-alone **DT-2020** installations, the following items are needed.

- For AC operation, a power supply for the **DT-2020** (DC is directly wired into the unit).
- A V.35 or DB25 (RS-232-C) cable for each connection between an **DT-2020** and a SAM. (V.35 requires a DB25 to Winchester-34 cable adapter)
- An RJ45-terminated twisted-pair data (RS232-C) cable for each connection between the **DT-2020** console port and an asynchronous device.
- A category 5 RJ45-terminated twisted-pair data cable for each connection between the **DT-2020** and the local 10BaseT LAN hub or router.
- 10BaseT LAN hubs or routers with 10BaseT access to the Intranet or Internet.
- For DC operation, a strain-relief clamp for wire stabilization

3.1.2 Rack-mount DT-2020 Equipment

When installing **DT-2020** units in a rack-mount configuration, it is necessary to gather the items listed above for stand-alone **DT-2020** installation, plus the following equipment.

An EIA-standard 19-inch or 23-inch equipment rack with internal, vertical mounting rails. Hole spacing on the vertical mounting rail may be 1 inch, 1.75 inch or 2 inch. Use the dimension specifications in the appendix to calculate how high the rack needs to be to support a specified number of rack-mount panels. For example, seven rack-mount panels measuring 10.5 inches each will fit in a data equipment rack with internal mounting rails 75 inches in height. This configuration would support a maximum of 84 **DT-2020** units.

A rack-mount panel for each set of twelve **DT-2020** units.

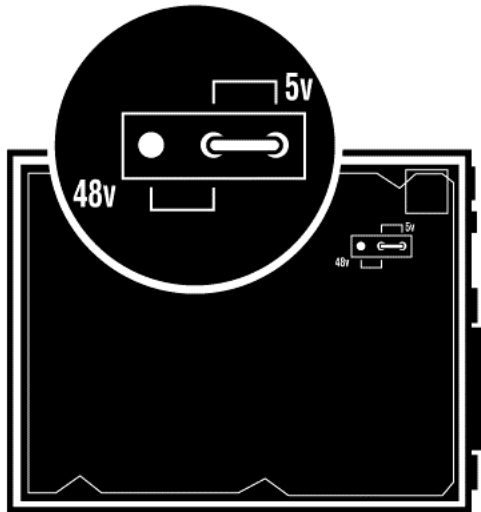
A pair of mounting ears for each **DT-2020**.

Strain-relief clamps for DC wire stabilization.

Power distribution module(s) (1 for every 6 **DT-2020** units)

3.2 Power Configuration Steps for 48V DC Operation

The **DT-2020** is factory configured for 115V AC usage. 48V DC operation requires a different jumper setting on the **DT-2020** system board.



Disconnect any power connectors to the **DT-2020**.

Remove the **DT-2020** cover, exposing the top portion of the system board

Locate the jumper connector and move the jumper to the 48V setting (*see adjacent figure*).

Replace the **DT-2020** cover.

The **DT-2020** is ready for 48V DC operation

3.3 Stand-alone Installation

3.3.1 AC ONLY

Attach the provided feet to the bottom of the unit.

Place the **DT-2020** in the desired location, such as a shelf in a data equipment rack.

Plug one end of the RJ45-terminated category 5 twisted-pair data cable into the **DT-2020** 10BaseT LAN interface, and the other into a 10BaseT LAN hub or router.

Plug one end of the RJ45-terminated twisted-pair data cable into the **DT-2020** console interface, and the other into the port of the asynchronous device that will be used to configure or manage the **DT-2020**.

Plug one end of the V.35 (requires DB25 to Winchester-34 adapter) or RS232-C device cable into the **DT-2020** device interface, and the other end into the existing SAM cable or SAM I/O board.

Plug the power supply into a standard 115V AC outlet and plug the barrel connector from the power supply into the circular connector on the **DT-2020** faceplate labeled "5 VDC".

3.3.2 DC ONLY

Attach the provided feet to the bottom of the unit.

Fasten the strain-relief bracket to the side of the **DT-2020**.

Place the **DT-2020** in the desired location, such as a shelf in a data equipment rack.

Plug one end of the RJ45-terminated category 5 twisted-pair data cable into the **DT-2020** 10BaseT LAN interface, and the other into a 10BaseT LAN hub or router.

Plug one end of the RJ45-terminated twisted-pair data cable into the **DT-2020** console interface, and the other into the port of the asynchronous device that will be used to configure or manage the **DT-2020**.

Plug one end of the V.35 (requires DB25 to Winchester-34 cable adapter) or RS232-C device cable into the **DT-2020** device interface, and the other end into the existing trunk cable or BNS trunk I/O board.

Run your 48V DC (return, minus and ground) wires from a central source through the strain-relief clamp for DC wire stabilization. On the **DT-2020** faceplate, attach the return, minus and ground wires to the return, minus and ground connections, respectively, of the terminal block labeled "48 VDC".

3.4 Rack-mount Installation

3.4.1 AC ONLY

Prepare each **DT-2020** for rack mounting by attaching the mounting ears to each side of the unit.

Fasten the twelve-slot rack-mount panel to a 19-inch equipment rack, or use extension ears for a 23-inch rack. Slide each **DT-2020** with mounting ears into one of the twelve rack-mount panel slots. Secure the **DT-2020** to the rack mount panel with screws.

For each **DT-2020**, plug one end of the RJ45-terminated category 5 twisted-pair data cable into the **DT-2020** 10BaseT LAN interface and the other end into a 10BaseT LAN hub or router.

For each **DT-2020**, plug one end of the RJ45-terminated twisted-pair data cable into the **DT-2020** console interface, and the other end into the asynchronous device.

For each **DT-2020**, plug one end of the V.35 (requires DB25 to Winchester-34 cable adapter) or RS232-C device cable into the **DT-2020** device interface, and the other end into the existing SAM cable or SAM trunk I/O board.

Plug the power supply into a standard 115V AC outlet, and plug the barrel connector from the power supply into the circular connector on the **DT-2020** faceplate labeled "5 VDC".

3.4.2 DC ONLY

Prepare each **DT-2020** for rack mounting by attaching the mounting ears to each side of the unit.

Attach the power distribution panel(s) to the rack-mount plate.

Make sure the rack mount panel toggle switches are set to the **OFF** position.

To the rack mount panel faceplate, fasten the strain-relief clamp(s).

Fasten the twelve-slot rack-mount panel to a 19-inch equipment rack or use extension ears for a 23-inch rack. Slide each **DT-2020** with mounting ears into one of the twelve rack-mount panel slots. Secure the **DT-2020** to the rack mount panel with screws.

For each **DT-2020**, plug one end of the RJ45-terminated category 5 twisted-pair data cable into the **DT-2020** 10BaseT LAN interface, and the other end into a 10BaseT LAN hub or router.

For each **DT-2020**, plug one end of the RJ45-terminated twisted-pair data cable into the **DT-2020** console interface, and the other end into the asynchronous device.

For each **DT-2020**, plug one end of the V.35 (requires DB25 to Winchester-34 cable adapter) or RS232-C device cable into the **DT-2020** device interface and the other end into the existing SAM trunk cable or SAM module I/O board.

Run the 48V DC (return, minus and ground) wires from a central source through the strain-relief clamp used for DC wire stabilization. On the rack-mount panel, attach the return, minus and ground wires to the return, minus and ground connections on one of the main terminal blocks labeled "48 Vin". Power is distributed to six terminal blocks vertically below the main terminal block and labeled "48 Vout". Each individual 48 Vout terminal block below the main 48 Vin terminal block powers a single **DT-2020**. This is accomplished by jumping short return, minus and ground wires between the panel terminal block and the **DT-2020** terminal block. All terminal-block connectors accommodate 14 awg to 24 awg wire. Strain-relief clamps are used for DC wire stabilization.

Make sure the rack-mount panel toggle switches are set to the **ON** position.

3.5 Console Installation/Configuration

The **DT-2020** is managed through its console port by a terminal, PC, dial-up modem, or BNS asynchronous connection (see next figure).³ Network administrators can access the **DT-2020** console port through the StarKeeper® II NMS.

Specific instructions for configuration of SAM, TY12 and MSM asynchronous ports are available in the appropriate BNS-2000 *Module Reference Guide*. **DT-2020** specific configuration guidelines are as follows:

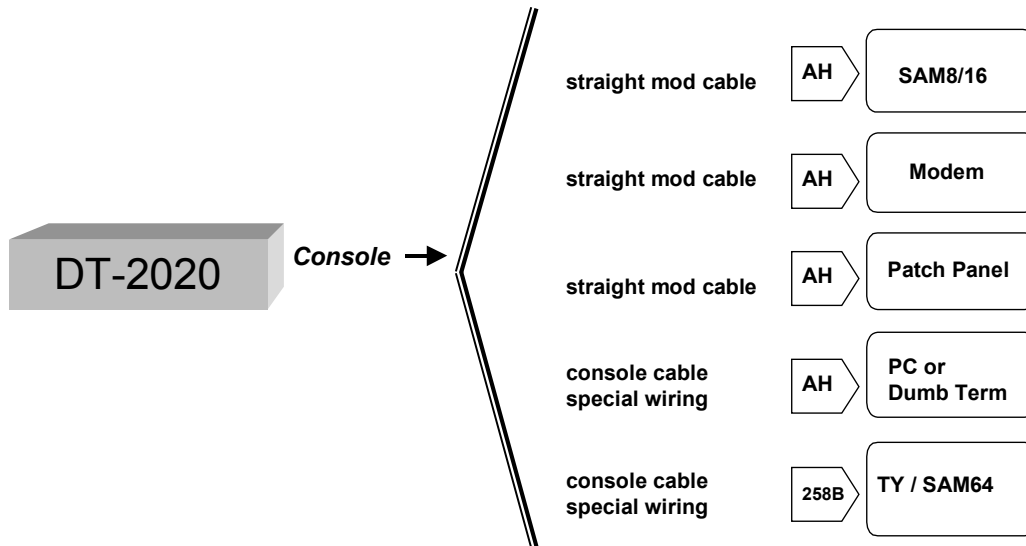
Configure SAM, TY12 or MSM console connections as 9600 bps with 8 bits and no parity, and use a DCE type cable.

³ Console cables required for connections to TY12 and MSM modules, Modems, SAM64/504 Multiplexors, **4000**, PCs, or terminals are available.

Configure SAM or MSM console connections as type "host" and as a "pap" (permanently active port).

Configure TY12 console connections as type "console".

See Section 10 for wiring diagrams for special console cabling.

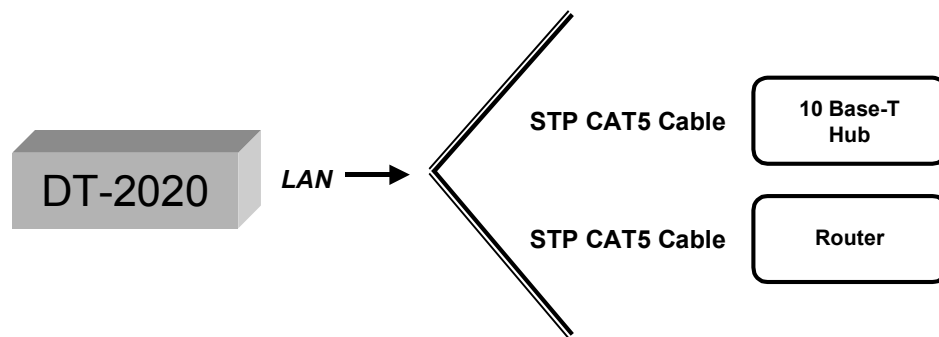


The following cables and adapters are available for console connections:

Cable or Adapter	Order Information (Lucent)	Order Information (TeleComp R&D Reseller)
modular cable (10')	407981646	modular cable (length)
modular cable (special wiring)	408198133	modular cable (special wiring)
AH male connector	ED5P055-31 G-139	AH male connector
Ortronics Patch Panel	406485755	Ortronics Patch Panel
258 Adapter	ED5P055-31 G(155)	258 Adapter

3.6 DT-2020 DATA (10 BASE-T LAN)

A Shielded Twisted Pair CAT5 cable is attached to the 10 Base-T LAN port of the **DT-2020**. This allows for cabling either into a 10BaseT hub or into router.



3.7 DT-2020 SAM Setup

The DT-2020 is easily configured. First, the DT-2020i/DT-2020 itself is configured. This involves giving it an IP address, a Gateway Router IP address (if required), an SNMP trap manager address (optional), and the trunk speed (DT-2020 only).

Refer to the command section for additional information

```
login passwd=initial
local ipaddr=135.17.59.206 submask=255.255.255.0
gateway ipaddr=135.17.59.1
trunk phy=v35 speed=56k
rs SAM mod
rs dt2020
```

Note:

In the initial configuration above, the SAM type was not entered. That is because the DT-2020i/DT-2020 will determine the type automatically from the attached SAM.

Suppose port 1 of the SAM is to be a port which can originate a call, attached to a device at 9600 baud, asynchronous, 8 bits, no parity with a "double break" disconnect.

The configuration of this sequence is as follows:

```
port 1 type=orig prot=async baud=9600 attn=2brk
rs SAM port 1
```

Note:

Many options were left at their default value. This is merely a sample configuration.

Suppose port 2 is to be a port which can receive a call. It too is attached to a device at 9600 baud, asynchronous, 8 bits, no parity. The call is to be received on a hunt group TCP port 51000.

The configuration of this sequence is as follows:

```
port 2 type=rcv prot=async baud=9600 hport=51000
rs SAM p 2
```

Now suppose that port 10 is to be added to the hunt group along with port 2. same parameters.

```
port 10 type=rcv prot=async baud=9600 hport=51000
rs SAM p 10
```

Other options, such as making the port "Permanently Active", synchronous options, Closed User Groups, Flow control, etc. are assigned by using their tag format as listed in the commands section.

3.8 Field Upgrade and Software Registration

The **DT-2020**, when initially delivered, is fully registered and does not need any keys to activate the software. Software keys are required when an optional individual feature packages is added to the device. Finally, when the **DT-2020** is upgraded with revised software, one or more software keys are required to register the installed software and any feature packages registered for the device.

When performing an upgrade, the revised software is initially downloaded by **upgrade**⁴ into a staging area and is not active. The software then is activated by a **reboot**. The new software will execute normally prior to registration. However, no backup, reloads, or upgrades can be performed. Module level parameters, such as the device IP address, may be changed and activated. If a user port is taken out of service, the port cannot be restored.

The procedure for performing a software registration has been mechanized. Manual procedures are error prone and not recommended. They are no longer covered in this user manual.

The mechanized Software Upgrade Registration procedure allows simplified administration of one or more devices. When a quantity of devices are upgraded, manual software registration of each device has the potential of becoming increasingly tedious. The mechanized software upgrade registration process was designed to alleviate the problems associated with multiple device upgrades. It is also preferred for single device upgrades as it eliminates any potential for error.

The new software is downloaded to the **DT-2020** via the **upgrade** command. This may be performed for one or more devices. The “-r” option to the dtupgrade command will restart the device on the new software after the download completes successfully. It is highly recommended. In the alternative, the device may be downloaded without a restart and restarted at a later time during a scheduled maintenance window. Restarting the device on the new software prior to registration is required. After the restart, the devices will continue to operate normally on the new software without registration. Some operations interface functions are inhibited pending software registration. Below is an example of a typical **upgrade** invocation. Note the use of the “-r” option as it is recommended.

```
upgrade -v -d -r -i -m2020 10.0.1.42 dt_2020.11.1
```

⁴ The utilities may be renamed to any desired mnemonic. The names shown are those on the distribution.

Mechanized registration is performed in three steps. Each of which does not require user intervention.

The steps are as follows:

1. The **getinfo** utility is invoked on a file containing a list of devices to be administered. This file is called the master device list file and is typically named "dt_device.master". The master device list file may have any name and it is provided as an argument to the **getinfo** utility. The master device list may also contain devices that do not require registration. The **getinfo** utility makes inquiry of each device in the master device list and creates a device information file named "dt_device.info" in the current directory.
2. The "dt_device.info" file is then sent via email to keys@trdcusa.com for registration processing.
3. A file name "dt_device.register" file is returned via email to be used as input in the next step. A file named "dt_device.msgs" is a text file that may be displayed or printed showing the results of the registration function.
4. The **setreg** utility is invoked and uses the "dt_device.register" file provided as an argument. If no argument is provided, the file is assumed to be in the current directory. The **setreg** utility contacts each device that requires registration and have been assigned keys. One or more keys are installed during the dialogue.
5. The "dt_device.info" file and the "dt_device.register" file are deleted as they are transient and have no further value. Neither can be reused for the purpose of registration. However, the dt_device.info file may be used for inventory reports..

The source for the registration procedure is the inventory master device list file that is created, and maintained, by the administrator using their favorite text editor.

The master device list file contains one IP address per line, with an optional TCP port, and an optional password override, to access the device. The IP address is the console *connection address*, and not necessarily the actual device IP address. Registration via the serial console is explicitly supported. Comments are allowed between addresses, and after addresses. A password override is only required if the default password of "initial" has been changed.

The master device file line format is as follows:

```
<IP ADDRESS> [<TCP PORT>] [-P<Password>] # Comment
```

An example "device.master" file follows:

```
# This is a Sample master device list file "device.master".  
# Note that there is one device ( Connect IP Address ) per line.  
# TCP Port Override is allowed. Registration may use the serial console.  
# Password Override is allowed.  
# It is OK to have devices that do not need registration listed for inventory.  
# Comments in this file are preceded with a pound symbol.  
# Blank Lines are treated as comments.  
# Basic Line Format is as follows:  
10.0.1.80 # Device at Location 'A'  
192.168.7.82 # Device at Location 'B'  
192.168.7.155 50001 # Example of TCP port Override.  
192.168.7.156 50001 -pcustom1 # Example of Password Override.
```

Once the "dt_device.master" file is prepared, it is used as an input to the **getinfo** utility.

```
getinfo dt_device.master
```

This **getinfo** utility will collect information on each device in the master file. The **getinfo** utility will also make a determination if a registration is actually required. Consequently, the **getinfo** utility is also useful in performing inventory functions outside of the device registration. The output of the **getinfo** utility is a file named "dt_device.info" that is always created in the current directory.

The file "dt_device.info" is attached to an email and sent to the address keys@trdcusa.com. The registration procedure is performed and a file named "dt_device.register" is attached to return email to the original sender. A messages file named "dt_device.msgs" is also attached and may be printed as a report of the key generation function.

After receiving the “dt_device.register” file, the **setreg** utility is invoked with the relative path of the “dt_device.register” file as it's sole argument. The **setreg** utility will only contact the devices that actually need registration, and for which one or more keys were successfully generated. All of the appropriate keys, including a device key and multiple per port feature package keys, are installed by the **setreg** utility. The device is not restarted and this operation may occur during normal transport operation.

A report utility **devrep** is available. The **devrep** utility uses the “dt_device.info” file to display the inventory information. The usage is as follows:

```
devrep [-v] dt_device.info
```

If the file is not specified, the **devrep** utility attempts to use the “dt_device.info” file resident in the current directory.

4 DT-2020 COMMANDS REFERENCE

The following is the complete *DT-2020* command set. Except where noted, commands are visible only when the user is logged in to the console interface.

4.1 Module Level Commands

4.1.1 Login

Syntax #1: login passwd=<password> (default password is: initial)

Syntax #2: login

This command is a security command required for accessing the bulk of the command set. It is only available when the user is logged off. The command has two forms, and three modes of operation.

The first syntax example provides legacy compatibility for operations systems that use that form. The password must contain between one and seven alphanumeric characters. The typed password is case sensitive.

In the second example, the password is not provided on the command line. The login command will then prompt for a password. A password given at the prompt will not be echoed. There is a timeout of approximately 30 seconds on the password prompt.

If one or more **TACACS+** RADIUS Servers are defined, the *second* form is used to log into the device. When used, a connection is made to the first available server. Prompts for "Username" and "Password" are requested. These Usernames and Passwords are administered on the **TACACS+** RADIUS server; and not on the device.

4.1.2 Logout

Syntax: logout

The **logout** command returns the **DT-2020** to its logged-out mode, thus preventing unauthorized access.

4.1.3 Change Password

Syntax: chpasswd old=<password> new=<password> confirm=<password>

The **chpasswd** command allows the user to change a previously-configured password. The old password is the one currently in effect. The new and confirm passwords should be identical. The password must contain between one and seven alphanumeric characters. The typed password is case insensitive. All arguments are required to complete the command.

4.1.4 Local

Syntax: `local [ipaddr=<IP address>]
[submask=<submask>]
[tcpunreach=< ICMP | RESET >]`

This command sets up IP networking for this unit. The **mac** (address) parameter is a fixed attribute for each unit that is set at the factory. The **ipaddr** parameter is the IP address of this unit. The **submask** parameter is the subnet mask of the LAN segment on which this unit is located, with a default value of 255.255.255.0.

The operation of the unit, when it is called to an invalid TCP port, is specified with the **tcpreach=<ICMP | RESET>** parameter. When set to **ICMP**, the caller is sent an "ICMP Port Unreachable" message. When set to **RESET**, the TCP connection is sent a TCP reset to the initiator.

4.1.5 Gateway

Syntax: `gateway ipaddr=<IP address>`

The **gateway** (or **ga**) command specifies the IP address of the local gateway router, if any. If the remote **DT-2020** resides on a different LAN, the gateway is the first hop data travels through to reach it.

4.1.6 ADMINISTER SECURITY BANNER

Syntax: `banner [clear] [L#="Line # Message"]`

The **banner** command is only visible when the unit is logged. It is used to administer the security banner. The default is a NULL banner. If a security banner is configured, it is displayed at each user login. The **clear** option is a shortcut to erase the entire message.

4.1.7 TACACS+ RADIUS Servers

Syntax: `tac < PRI | SEC > [ipaddr=<IP Address>]
[port=<TCP Port>]
[key="Encryption Key" | NONE]
[ENABLE]
[DISABLE]`

The **tacplus** command is only visible when the unit is logged in. The **tac** command allows the configuration of up to two **TACACS+ RADIUS** servers for the device. the servers are used as a primary server and a secondary server, although they may be individually disabled.

The **< PRI | SEC >** syntax specifies which server is to be configured. A server may not be configured while enabled

The **[ipaddr=<IP Address>]** specifies the IP address of the configured server.

The **[port=<TCP Port>]** specifies the TCP port to use when communicating with the server. The TACACS+ service defaults to TCP port 49, but any port may be specified.

The **[key="Encryption Key" | NONE]** specifies an encryption key to use. The Encryption key must be enclosed in double quotes, and the double quotes are not part of the key. If no encryption is desired, the value of **NONE** is used to designate unencrypted service.

The **ENABLE** command allows this server to be used for service, and prevents further configuration.

The **DISABLE** command prevents this server from being used for service, and subsequently allows configuration.

4.1.8 HELP

Syntax: help

This command produces a display of the entire command set and syntax available for the mode (logged out or logged in) the unit is currently in.

4.1.9 VERSION

Syntax: ver

This command displays the current software and database revisions of the unit and is only visible when the user is logged in. The **ver** command also displays the authorization level of the user currently logged into the administrative console. The command has no arguments. If new software has been downloaded and no reboot has been performed; the new software version is also displayed.

4.1.10 REBOOT

**Syntax: reboot [newip=<New IP Address>]
[newmask=<New Network Mask>]
[newgate=<New Gateway Address>]**

This command resets the unit, which allows configured physical attributes to take effect. The command is only visible if the user is logged in. The command has optional arguments to allow the remote alteration of the network configuration. If any network configuration change is required, the user is prompted for the password as a verification check before the reboot is actually executed. After the reboot, the console interface returns to the logged-out mode.

4.1.11 ICMP "PING"

Syntax: ping <IP address>

The ping command verifies the ability of the DT-2020I to communicate with a remote device, by sending Internet Control Message Protocol (ICMP) echo packets to the specified IP address and listening for echo reply packets.

4.1.12 REMOVE DT-2020 MODULE

Syntax: `remove dt2020`

The **remove dt2020** command is only visible when the unit is *logged in*. The command has no additional arguments. The command takes the unit out of service. This command must be performed before any module level configuration changes can occur.

4.1.13 REMOVE SAM MODULE

Syntax: `remove SAM MOD`

The **remove SAM MOD** command is only visible when the unit is *logged in*. The command has no additional arguments. The command takes the SAM out of service.

4.1.14 RESTORE DT-2020 MODULE

Syntax: `restore dt2020`

The **restore dt2020** command is only visible when the unit is *logged in*. The command has no additional arguments. It returns the unit to service. If any physical attribute was changed on the unit, including the MAC address, the unit will be automatically rebooted by this command.

4.1.15 RESTORE SAM MODULE

Syntax: `restore SAM MOD`

The **restore SAM MOD** command is only visible when the unit is *logged in*. The command has no additional arguments. It returns the SAM to service.

4.1.16 CLEAR

Syntax: `clr`

The **clear** command is only visible when the unit is *logged in*. There are no arguments. It sets all the measurements and error counters to zero.

4.1.17 DT-2020 MODULE DISPLAY MEASUREMENTS

Syntax: `dmeas dt2020`

The **dmeas (dm) dt2020** command displays the current measurements for the unit and is only visible when the user is logged in. The command has no arguments.

The report displays Packet, Frame, Error and Ethernet counters, plus specific per-protocol counters. Refer to the Measurements section.

4.1.18 SAM MODULE DISPLAY MEASUREMENTS

Syntax: **dmeas SAM MOD**

The **dmeas SAM MOD** command displays the current measurements for the SAM and is only visible when the **DT-2020** is logged in. The command has no arguments.

The report displays counts of packets processed by the SAM, as well as protocol errors in each direction.

4.1.19 VERIFY DT-2020 MODULE

Syntax: **vfy dt2020**

The **vfy** command is only visible when the unit is *logged in*. The command displays the **DT-2020** configuration in a formatted report on the console.

4.1.20 VERIFY SAM MODULE

Syntax: **vfy SAM MOD**

The **vfy SAM MOD** command is only visible when the unit is *logged in*. The command displays the SAM configuration and service state in a formatted report on the console.

4.1.21 HOST NAME ADMINISTRATION

Syntax: **host <host #> [name=<host name>] [ipaddr=<IP address>] [port=<TCP port>] [del]**

The **DT-2020** supports mnemonic destination name translation for non-PDD originating user ports. These mnemonic names are translated into an IP address and TCP port during call setup. The **host** command is used to configure the translation table.

The **name** field is a mnemonic for a destination up to nine characters in length. The **ipaddr** (of the host) and TCP **port** (on the host) parameters specify the translation to be performed during call setup. If the parameter **del** is used, the entry is deleted.

4.1.22 VERIFY HOST

Syntax: **vfy host**

This command is only visible when the unit is logged in. It displays host-address configuration in a formatted report on the console.

4.1.23 SNMP

Syntax: **snmp [ipaddr= < trap mgr addr >] [port= < trap mgr port >] [PUBLIC=< YES | NO >]**

[CUG=<<+|-> CUG Number]
 [COMM="Double Quoted String" | NONE]
 [SYSCONTACT="Double Quoted String" | NONE]
 [SYSNAME="Double Quoted String" | NONE]
 [SYSLOC="Double Quoted String" | NONE]

This command is used to configure the IP address of the SNMP trap manager. Since traps are unsolicited alarms, an agent can take the initiative to inform the manager of the occurrence of a predefined condition. Typical conditions include the cold-start or warm-start of equipment and a link-down or link-up condition.

A single and multiple SNMP managers can access the **DT-2020**. However, only one SNMP manager can be defined as the trap manager. As a result of this command, all traps will be directed to the chosen trap manager.

The **ipaddr** field defines the IP address of the SNMP manager to which the traps are to be sent.

The **port** field indicates the UDP port on that SNMP manager and defaults to the standard value of 162.

Any combination of closed user group membership may be assigned to the SNMP interface using the parameter of **cug=[+|-]<CUG Number>**. The closed user group membership is displayed on the "verify module" output. Packets which have failed the SNMP Closed User Group Test are discarded. An alarm is not presented, but the failure is counted. The number may be displayed with the "dmeas mod" command.

The **DT-2020** allows setting of an SNMP community in addition to the *public* community. The *public* community is recognized when the [**PUBLIC=YES**] option is selected. Recognition of the public community is the default operation. When [**PUBLIC=NO**] is selected, the *public* community is not recognized.

The **DT-2020** allows setting of an SNMP community in addition to the *public* community. When configured, the **DT-2020i** will respond to SNMP manager requests in that community. The **DT-2020i** will always respond to a request in the *public* community. The settable SNMP community is configured with the [**COMM="Double Quoted String" | NONE**] option. The community may be in any case. The double quote encapsulation is not part of the community string. The settable community may be cleared by setting it to the keyword **NONE**.

The MIB-II variables sysName, sysContact, and sysLocation may be initialized from the **DT-2020i** non-volatile database using the **SNMP** command. These variables are volatile in that they may be over-written by an SNMP manager. However, any change made by the SNMP manager will not impact the **DT-2020** non-volatile database. Setting the value to **NONE** will clear the entries in the **DT-2020** non-volatile database. Each field may be of 31 characters or less. The double quote encapsulation is not part of the respective variable. Any of the variables may be cleared by setting it to the keyword **NONE**.

4.1.24 CONSOLE TIMEOUT

Syntax: **timeout [OFF | <number of minutes>]**

The **DT-2020** console uses a three-wire interface (RD, TD, GND), and the lead state of other signals is not relevant. This would imply that the only way to change the state of

the console is to explicitly log in or log out, or via a reboot or reset, which forces the console to be logged out.

For users who wish the console to automatically log off after a period of inactivity, there is a console timer. The console timer defaults to the disabled condition, and may be activated by the **timeout** command. This command is only visible when the console is logged in. The **<number of minutes>** value must be between 1 and 255, inclusive. When the **DT-2020** determines a period of inactivity of the specified time, it automatically forces the console to log off. An INFO-level alarm (see sec. 7) is issued at that time.

4.1.25 INSTALL SOFTWARE

**Syntax: install [key=<software key>]
[fpkey=<software key>]**

The **DT-2020** has a unique device software key, and multiple per port feature package keys. This section is included in the user manual for completeness. Under normal circumstances, only the mechanized utilities utilize this command. It may be executed manually under an emergency situation. Depending on the device, the keys may or may not be installed by the factory. The per port feature package keys may be added at any time, and do not affect the operation of the unit. The registration procedure does not require a restart to take effect on a device running the registered software.

When executed without arguments, the **install** command will display the significant information needed to manufacture the device software key. The device IP address may also be required. No additional information is needed to create the feature package keys.

The **key=<software key>** argument allows the entry of an eight-character alphanumeric software registration that is unique to this **DT-xx8x** device. If an invalid key is entered, a MINOR alarm is generated to that effect. The passwords are not altered. The **rstpass** command has been created to reset the passwords should that become necessary.

The **fpkey=<software key>** argument allows the entry of an eight-character alphanumeric software registration that is unique to a port, and software feature package, on this **DT-2020** device for the current software build. The specific feature package referenced by the software key becomes immediately available on the port without subsequent download. The **<software key>** has effect on only one port. Other ports on the device are not affected. If the same software feature package is needed on multiple ports, then multiple feature package keys are applied.

The **install** command is always available. Please note that manual software installation is not recommended. The mechanized procedures in the section titled "Field Upgrade and Software Registration" should be used to install software.

4.1.26 RSTPASS (Resetting the Password)

Syntax: `rstpass [key=<Password Key>]`

The **rstpass** command is a command whose function is to reset the password(s) of the device to factory default values. This function was formerly performed as part of the software registration. Breaking it out into a separate command allows the software to be registered without password updates to take place.

When invoked without arguments, the **rstpass** command will display the relevant information needed to generate the **<Password Key>**. This information is relayed to the technical support staff. The generated key is then used with the **key=<Password Key>** argument. The **rstpass** command should not be run between the time the key data is generated and the **<Password Key>** is utilized. Similarly, if the device is restarted, the resultant **<Password Key>** will not perform its intended function.

4.2 User Port Commands

The User Port interface commands are used to configure the operation of the individual RS-232 ports on the SAM. Their operation may be changed by commands in this section.

4.2.1 Port Command

**Syntax: `port <PortNum> [type=<ORIG|RCV>]
[dest=<ipaddr>]
[dport=<Dest tcp_port>]
[hport=<Hunt Group tcp_port>]
[prot=<protocol>]
[dxe=<DCE|DTE>]
[baud=<baud_rate>]
[enc=<NRZ|NRZI>]
[ccar=<ON|OFF>]
[fill=<MARK|FLAG>]
[dbits=<5|6|7|8>]
[pap=<ON|OFF>]
[parity=<EVEN|ODD|NONE>]
[stop=<1|1.5|2>]
[attn=<1BRK|2BRK|NONE|char>]
[flow=<XON|HW|NONE>]
[cug=<+|-><CUG_Num>]
[crfix=<TRANS|NONULL>]`**

This command configures an individual user port on the SAM.

The **<PortNum>** is a number in the range from 1 to 128, inclusive, corresponding to the RS-232C end-user port being configured.

A port either waits for an incoming call (**type=RCV**), or is an originator of a call (**type=ORIG**). The (optional) PDD for an **ORIG-type** port is defined by **dest=<ipaddr>** and **dport=< Dest tcp_port>**. A caller on an originating port without PDD information configured will be presented a user interface for “dialing”.

When a port is a call receiver (*listener*), it is assigned a default port number value of 50,000 + SAM port number. The port may then be individually addressed at that address. However, when a specific TCP port is specified via the **hport=<Hunt Group tcp_port>** option, it is used in lieu of the default value. Multiple ports may share the same TCP port value. This is used to define a hunt group of ports. A connection that is directed to this TCP port value would select the next available physical port. The **hport** option may only be used with call receiver ports.

The **prot=<protocol>** option defines the protocol used by the port. It may take on the values of **Raw**, **Async**, **HDLC**, **SDLC**, **EBSC** (EBCDIC BiSync), **ABSC** (Ascii BiSync), **UNI** (Uniscope BiSync), **ALC** (ALC BiSync), **DDCMP**, or **VIP** (VIP 7600 BiSync). The **Raw** protocol is asynchronous without the benefit of Telnet encapsulation. It is used for direct TCP connections to the user ports. Contact your sales representative with any other protocol requests.

The **dx=< DCE | DTE >** option specifies the clocking and signaling mode of the port.

When the protocol is asynchronous, a **dx** value of **DCE** implies that the port is operating as a modem device. It will assert CTS when presented with RTS. A value of **DTE** for the asynchronous protocol implies that the port is operating as a 2-wire DTE. When there is data available to send, it shall assert RTS and wait for CTS before sending the data. Please note that a four-wire DTE interface should be configured as **DCE** even though it uses a DTE asynchronous connector.

When the protocol is synchronous (*e.g. SDLC*), a **dx** value of **DCE** implies that the port should generate the clock signals. This would require the standard synchronous DCE cable adapter. A **dx** value of **DTE** implies that the port should accept the clock signals presented. This would require the standard synchronous DTE cable adapter.

When the protocol uses a recovered clock instead of a separate clock *lead* (*e.g. SDLC NRZI two wire*), the **dx** value operates like the asynchronous protocol described above, since external clocking is not necessary. The appropriate asynchronous adapters should be used.

The **enc=<NRZ|NRZI>** option specifies the physical encoding of the line. The default is Non-Return to Zero (*NRZ*).

The **ccar=<ON|OFF>** field defines constant carrier. This is an option in which the CD (*or DTR if the port is a DTE*) EIA signal is maintained asserted regardless of call status.

The **pap=<ON|OFF>** field defines a permanently active port. Setting this flag on means that the port is ready to communicate regardless of its DTR (*or DCD if the port is a DTE*) EIA signal.

The **fill=< MARK | FLAG >** option indicates what kind of line fill should be applied between frames in the **HDLC**, or **SDLC** protocols.

The **baud=<baud_rate>** determines the speed of the line. It is not required for synchronous DTE ports since the clocking is derived from the line. For asynchronous ports, the allowed values are 75, 110, 150, 300, 1200, 1800, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 48000, 57600, or 115200. For synchronous DCE ports, the same rates apply up to and including 57600 (56K) baud.

The **dbits=<5|6|7|8>** option specifies the number of data bits in an asynchronous port word. It excludes start, stop, and parity bits.

The **parity=<EVEN|ODD|NONE>** option specifies the parity of an asynchronous port word.

The **stop=<1|1.5|2>** option determines the number of stop bits for asynchronous ports.

The **attn=<1BRK|2BRK|NONE|char>** sets the attention character. This is a character that when typed will interrupt the call to a local session. The **1BRK** option specifies a single break. The **2BRK** option specifies two breaks within a short period. The **NONE** option specifies that no attention character is defined. Finally, any ASCII character may be used as the attention. It should be entered in decimal ASCII representation.

The **flow=<XON|HW|NONE>** option determines the flow control for the port. The **XON** option uses XON/XOFF in-band flow control characters. The **HW** option uses the CTS and RTS leads for flow control. Finally, indicating **NONE** may disable flow control.

The **cug=<+|-><CUG_num>** option allows the inclusion or deletion of a Closed User Group in the list of CUGs assigned to the user port. The "+" will add the **<CUG_num>** to the CUG list. The "-" is used to delete the **<CUG_num>** from the list.

The **crfix=< TRANS | NONULL >** option accommodates an anomaly in some early variants of telnet implementation on UNIX systems, which insert a NULL character in the data stream after a carriage return. Most end devices are not affected by this NULL character. However, some devices (e.g. the BNS control computer) have erroneous operation if these characters are received. The value **TRANS** indicates transparent operation, where all data received by the DT-2020, including a NULL after a carriage return, is forwarded to the end device. The value of **NONULL** removes a NULL character immediately following a carriage return. No other NULL characters are affected. The default operation is transparent, and the **crfix** option may only be specified if the protocol selected is asynchronous.

4.2.2 REMOVE SAM PORT

Syntax: remove SAM port <PortNum>

The **remove sam port** command is only visible when the unit is *logged in*. **<PortNum>** may be a number in the range 1 through 128, and corresponds to a physical RS-232 port on the SAM. The command takes the port "Out of Service". This command must be performed before any port-level configuration changes can occur.

4.2.3 RESTORE SAM PORT

Syntax: restore SAM port <PortNum>

The **restore** command is only visible when the unit is *logged in*. **<PortNum>** may be a number in the range of 1 through 128, and corresponds to a physical RS-232 port on the SAM. The command returns the port to service.

4.2.4 ADMINISTER CLOSED USER GROUP (CUG)

**Syntax: cug <CUG_Num> [ipaddr=<IP address>]
[mask=<IP submask>]**

The **cug** command is only visible when the unit is logged in. The **<CUG_num>** parameter is the closed user group identifier used to assign the CUG to a user port (with the **port** command), and may be a value between 1 and 16, inclusive.

A single IP address and subnet mask pair specifies each CUG. The **ipaddr** parameter is an address of an endpoint (or base address of a group of endpoints) to be allowed into the group. The **ipaddr** value *ANDed* with the **submask** value must agree with the caller's or destination's IP address *ANDed* with the same **submask** for a call to be allowed to or from a user port to which the CUG is assigned. Depending on the **submask** value, this allows an individual (submask=255.255.255.255), intermediate, or network-wide level of authorization.

Setting the **ipaddr** value to 0.0.0.0 deletes any prior configuration for the **<CUG_num>**. A **<CUG_num>** may not be deleted if it is currently assigned to any user port.

A list of all configured CUGs is reported via the **vfy cug** command. The list of closed user groups associated with a given user port is presented in response to the **vfy SAM port** command.

4.2.5 DISPLAY PORT MEASUREMENTS

Syntax: dmeas SAM port <Port_num>

The **dmeas** command is only visible when the unit is *logged in*. It displays the current port level measurements for the specified RS-232 port **<Port_num>** in a formatted report on the console. The value of **<Port_num>** is between 1 and 128, inclusive.

4.2.6 VERIFY SAM PORT CONFIGURATION

Syntax: vfy SAM port <Port_Num>

The **verify** command is only visible when the unit is *logged in*. The command displays the configuration of the port number specified. The range of **<Port_Num>** is between 1 and 128, inclusive.

4.2.7 VERIFY CLOSED USER GROUP

Syntax: vfy CUG

The **verify** command is only visible when the unit is *logged in*. The command displays the configuration of the *Closed User Groups*.

4.2.8 DISPLAY CONNECTIONS

Syntax: dconn

The **dconn** command is only visible when the unit is *logged in*. The command displays the connections between the user ports and their destinations. Only the user ports which are “talking” are displayed. The command takes no arguments.

4.2.9 DIAGNOSE PORT

Syntax: diag port <port_num> <INT | EXT | ALL>

The **diag** command is only visible when the unit is *logged in*. The command accepts arguments to specify a port on which to perform diagnostics. Two types of diagnostics are available. An internal port diagnostic checks the operation of the hardware exclusive of the cabling, connectors, and drivers. The external port diagnostic checks the operation of everything including the attached cable. The **<port_num>** is the RS-232 user port in the range of 1 through 128, inclusive. The port must be out of service to diagnose. The type of diagnostic is either **INT** for the internal tests, **EXT** for the external tests, or **ALL** for both the internal and external tests.

4.2.10 DISCONNECT PORT

Syntax: disc SAM PORT <Port_num>

The **disc** command is only visible when the unit is *logged in*. If the port is ‘in service’; any existing circuit established to the port will be dropped. This is useful in IP networks when the remote peer vanishes due to a remote reboot or a network error. It is essentially equivalent to a “remove/restore” command sequence. The value of **<Port_num>** is between one and the number of actual ports on the SAM.

4.2.11 DISPLAY EIA LEAD STATUS

Syntax: deia SAM PORT <Port_num>

The **deia** command is only visible when the unit is *logged in*. It displays EIA lead status for the selected RS-232 port. The value of **<Port_num>** is between one and the number of actual ports on the SAM.

5 SNMP

The **DT-2020** SNMP V1 agent supports a multitude of SNMP MIB variables, trap, set, and get operations.

5.1 SNMP Version 1 Commands

Command	Operational Results
Get	Requests the values of one or more Management Information Base (MIB) variables.
GetNext	Enables MIB variables to be read sequentially, one variable at a time.
Set	Permits one or more MIB values to be updated.
GetResponse	Used to respond to a Get, GetNext, or Set.
Trap	Indicates the occurrence of a predefined condition.

5.2 DT-2020 SNMP MIB Variable Database

RO = Read Only Variable

R/W = Read Variable / Write Variable

MIB Variable Number	Name	MIB	Console Equivalent	Access	Notes
1.3.6.1.2.1.1.1.0	SysDescr	MIB-II	Banner Message	RO	
1.3.6.1.2.1.1.2.0	SysObjectID	MIB-II	None	RO	
1.3.6.1.2.1.1.3.0	SysUpTime	MIB-II	None	RO	
1.3.6.1.2.1.1.4.0	SysContact	MIB-II	None	R/W	Storage is Volatile
1.3.6.1.2.1.1.5.0	SysName	MIB-II	None	R/W	Storage is Volatile
1.3.6.1.2.1.1.6.0	SysLocation	MIB-II	None	R/W	Storage is Volatile
1.3.6.1.2.1.1.7.0	SysServices	MIB-II	None	RO	
1.3.6.1.2.1.4.1.0	IpForwarding	MIB-II	None	RO	
1.3.6.1.2.1.4.2.0	IpDefaultTTL	MIB-II	None	RO	
1.3.6.1.2.1.4.3.0	IpInReceives	MIB-II	Number of Ethernet Pkts Rcvd	RO	

MIB Variable Number	Name	MIB	Console Equivalent	Access	Notes
1.3.6.1.2.1.4.4.0	IpInHdrErrors	MIB-II	Nbr of Packets w/Header Errs	RO	
1.3.6.1.2.1.4.5.0	IpInAddrErrors	MIB-II	Nbr Rx Packets w/Wrong Addr	RO	
1.3.6.1.2.1.4.6.0	IpForwDatagrams	MIB-II	None	RO	
1.3.6.1.2.1.4.7.0	IpInUnknownProtos	MIB-II	Nbr of Packets w/Unk Protocol	RO	
1.3.6.1.2.1.4.8.0	IpInDiscards	MIB-II	Nbr of Packets Disc due to Resource	RO	
1.3.6.1.2.1.4.9.0	IpInDelivers	MIB-II	Inferred from DMEAS counters	RO	
1.3.6.1.2.1.4.10.0	IpOutRequests	MIB-II	Number of Device Frames Transmitted	RO	
1.3.6.1.2.1.4.11.0	IpOutDiscards	MIB-II	Nbr of Port frames Disc due to Resource	RO	
1.3.6.1.2.1.4.12.0	IpOutNoRoutes	MIB-II	None	RO	
1.3.6.1.2.1.4.13.0	IpReasmTimeout	MIB-II	None	RO	
1.3.6.1.2.1.4.14.0	IpReasmReqds	MIB-II	None	RO	
1.3.6.1.2.1.4.15.0	IpReasmOKs	MIB-II	None	RO	
1.3.6.1.2.1.4.16.0	IpReasmFails	MIB-II	None	RO	
1.3.6.1.2.1.4.17.0	IpFragOKs	MIB-II	None	RO	
1.3.6.1.2.1.4.18.0	IpFragFails	MIB-II	None	RO	
1.3.6.1.2.1.4.19.0	IpFragCreates	MIB-II	None	RO	
1.3.6.1.2.1.4.21.0	IpRoutingDiscards	MIB-II	None	RO	
1.3.6.1.2.1.5.1.0	IcmpInMsgs	MIB-II	None	RO	
1.3.6.1.2.1.5.2.0	IcmpInErrors	MIB-II	ICMP Errors	RO	

MIB Variable Number	Name	MIB	Console Equivalent	Access	Notes
1.3.6.1.2.1.5.3.0	IcmpInDestUnreach	MIB-II	None	RO	
1.3.6.1.2.1.5.8.0	IcmpInEchos	MIB-II	Nbr of Pings	RO	
1.3.6.1.2.1.5.9.0	IcmpInEchoReps	MIB-II	None	RO	
1.3.6.1.2.1.6.1.0	TcpRtoAlgorithm	MIB-II	None	RO	
1.3.6.1.2.1.6.2.0	TcpRtoMin	MIB-II	None	RO	
1.3.6.1.2.1.6.3.0	TcpRtoMax	MIB-II	None	RO	
1.3.6.1.2.1.6.4.0	TcpMaxConn	MIB-II	None	RO	
1.3.6.1.2.1.6.5.0	TcpActiveOpens	MIB-II	None	RO	
1.3.6.1.2.1.6.6.0	TcpPassiveOpens	MIB-II	None	RO	
1.3.6.1.2.1.6.7.0	TcpAttemptFails	MIB-II	None	RO	
1.3.6.1.2.1.6.8.0	TcpEstabResets	MIB-II	None	RO	
1.3.6.1.2.1.6.9.0	TcpCurrEstab	MIB-II	None	RO	
1.3.6.1.2.1.6.10.0	TcpInSegs	MIB-II	None	RO	
1.3.6.1.2.1.6.11.0	TcpOutSegs	MIB-II	None	RO	
1.3.6.1.2.1.6.12.0	TcpRetransSegs	MIB-II	None	RO	
1.3.6.1.2.1.6.13.X	TcpConnTable Entries	MIB-II	None	RO	
1.3.6.1.2.1.6.14.0	TcpInErrs	MIB-II	None	RO	
1.3.6.1.2.1.6.15.0	TcpOutRsts	MIB-II	None	RO	
1.3.6.1.2.1.7.1.0	UdpInDatagrams	MIB-II	Derived from other Counts.	RO	
1.3.6.1.2.1.7.2.0	UdpNoPorts	MIB-II	Non-Peer and Spurious UDP errors	RO	
1.3.6.1.2.1.7.3.0	UdpInErrors	MIB-II	Frame Errors	RO	
1.3.6.1.2.1.7.4.0	UdpOutDatagrams	MIB-II	Frames Sent, Keep Alive Messages sent, etc.	RO	
1.3.6.1.2.1.7.5.X	udpEntry Table	MIB-II	None	RO	
1.3.6.1.2.1.11.1.0	SnmpInPkts	MIB-II	None	RO	
1.3.6.1.2.1.11.3.0	SnmpInBadVersions	MIB-II	None	RO	
1.3.6.1.2.1.11.4.0	SnmpInBadCommunityNames	MIB-II	None	RO	

MIB Variable Number	Name	MIB	Console Equivalent	Access	Notes
1.3.6.1.2.1.11.5.0	SnmpInBadCommunityUses	MIB-II	None	RO	
1.3.6.1.2.1.11.6.0	SnmpInASNParseErrs	MIB-II	None	RO	
1.3.6.1.2.1.11.30.0	SnmpEnableAuthenTraps	MIB-II	None	R/W	Storage is Volatile
1.3.6.1.2.1.11.31.0	SnmpSilentDrops	MIB-II	None	RO	
1.3.6.1.2.1.11.32.0	SnmpProxyDrops	MIB-II	None	RO	

5.3 Supported Traps

Alarm Text	Severity	Trap Type	Notes
None	N/A	ColdStart	Generated when the unit starts up
None	N/A	AuthFail	SNMP Authorization Failure

6 ALARMS

The following table reflects new alarm types generated by the *DT-2020*. Alarms are visible at the console and via StarKeeper® II NMS.

Alarm	Severity
Tx Error on 10BaseT. Check Physical Connection.	MAJOR
User Requested Reboot in Progress	INFO
Invalid Login Attempt.	MINOR
Invalid Password Change Attempt.	MINOR
*** TERM32 in SAM Slot #X Inserted. ***	MINOR
*** TERM32 in SAM Slot #X Removed. ***	MINOR
** SAM504 detected – supported only as a SAM64 **	MINOR
*** Unsupported SAM attached. Cannot restore ***	MINOR
Connectivity to SAMx has failed.	MINOR
---> SAM Download Complete. <---	INFO
Port XXX received a call from XXX.XXX.XXX.XXX outside CUG list.	MINOR
Installation Attempt Failed.	MINOR
Console session in-activity timeout.	INFO
Port XXX call disconnected. Half Open TCP error.	INFO

6.1 Major Alarms

A major alarm indicates a serious, service-degrading condition.

6.2 Minor Alarms

A minor alarm indicates a secondary or transient error that is not likely to affect overall service unless multiple minor alarms are issued, in which case a serious condition exists that may affect overall system performance

6.3 Info alarms

An information alarm is a message that does not necessarily require attention. It typically is important for network administration, but does not adversely affect service.

7 MEASUREMENTS

The following table lists the measurements available using the *display measurements (dm)* command. The base measurements are always displayed, while the error and exception counters are only displayed if nonzero.

Interface	Type	Object	Description
10BaseT	Base	DT2020	Number of 10BaseT Packets Received
10BaseT	Base	DT2020	Number of 10BaseT Packets Transmitted.
V.35, RS-232	Base	DT2020	Number of SAMx Frames Received.
V.35, RS-232	Base	DT2020	Number of SAMx Frames Transmitted.
10BaseT	Except	DT2020	Number of ICMP Echo Requests Received.
10BaseT	Except	DT2020	Number of ARP Requests Received (total).
10BaseT	Error	DT2020	Number of Ethernet Discards (Resource).
V.35, RS-232	Error	DT2020	Number of Port Discards (Resource).
10BaseT	Error	DT2020	Number of Late Collisions (TX).
10BaseT	Error	DT2020	Number of Under-run. (TX).
10BaseT	Error	DT2020	Number of packets which exceeded the Retry Limit (TX).
10BaseT	Error	DT2020	Number of Carrier Sense Lost (TX).
10BaseT	Error	DT2020	Number of Frame Collisions (RX).
10BaseT	Error	DT2020	Number of Receiver Overruns (RX).
10BaseT	Error	DT2020	Number of Receive CRC Errors. (RX).
10BaseT	Error	DT2020	Number of Short Frame Errors. (RX).
10BaseT	Error	DT2020	Number of Non-Aligned Frame Error. (RX).
10BaseT	Error	DT2020	Number of Frame Length Violations. (RX).
10BaseT	Error	DT2020	Number of Unsupported Protocol Frames. (RX).
10BaseT	Error	DT2020	Number of Invalid UDP frames. (RX).
10BaseT	Error	DT2020	Number of Rx Frames w/IP Header Checksum Errors. (RX).
10BaseT	Error	DT2020	Number of Rx Frames w/ICMP Checksum Errors. (RX).
10BaseT	Error	DT2020	Number of ICMP Unreachable Destination Messages (RX).
10BaseT	Error	DT2020	Number of Rx Frames from Non-Peer Entity.

10BaseT	Error	DT2020	Number of Unknown ICMP Messages. (RX).
10BaseT	Error	DT2020	Number of Packets lost from TTL Network Error. (RX).
10BaseT	Error	DT2020	Number of Packets with wrong IP Destination Address (RX).
10BaseT	Error	DT2020	Number of Rx Packets with Unknown ARP Operations. (RX).
10BaseT	Error	DT2020	Number of Bad ARP Reply Packets Received.
10BaseT	Error	DT2020	Number of RFC894 Packets with an Unknown protocol type field. (RX).
10BaseT	Error	DT2020	Number of 802.3 Frames with an Unknown protocol type field. (RX).
RS-232,V.35	Error	SAM Trunk	Number of Frames aborted by CTS lost (TX).
RS-232, V.35	Error	SAM Trunk	Number of Frames Under-Run. (TX).
RS-232,V.35	Error	SAM Trunk	Number of Rx Frames Over-Run.
RS-232,V.35	Error	SAM Trunk	Number of Rx Frames with CRC Errors.
RS-232,V.35	Error	SAM Trunk	Number of Non-Aligned Frame Errors (RX).
RS-232,V.35	Error	SAM Trunk	Number of Frame Length Violations. (RX).
RS-232,V.35	Base	SAM Trunk	Number of DDS Packets Received from SAMx.
RS-232,V.35	Base	SAM Trunk	Number of DDS Packets Sent to SAMx.
SAMx	Base	SAM TCON	Number of SAMx Module Protocol Errors (Rx).
SAMx	Base	SAM TCON	Number of SAMx Module Protocol Errors (Tx).
SAMx	Base	SAM Port	Number of Intervals w/Ingress data.
SAMx	Base	SAM Port	Number of Intervals w/Egress data.
SAMx	Base	SAM Port	Number of Intervals with Port Errors.
SAMx	Error	SAM Port	Number of Intervals w/URP Receiver Errors.
SAMx	Error	SAM Port	Number of Intervals w/URP Retransmissions.

8 SAMPLE CONFIGURATION

Originate Ports Example

For this sample, consider the following requirements:

IP Address	135.17.59.205
Subnet Mask	255.255.255.0
Gateway Address	135.17.59.1
SAM Ports 1-8	Originate, Not PAP, Not PDD, 9600 Baud, No Parity, 8 Data Bits, NRZ encoding, Asynchronous Protocol, Double Break Attention Sequence.

The above requirements are implemented by the following commands:

Local ipaddr=135.17.59.205 submask=255.255.255.0

Gateway ipaddr=135.17.59.1

Rs dt2020

Rs sam mod

Port 1 type=orig prot=async baud=9600 dbits=8 parity=none attn=2brk

Port 2 type=orig prot=async baud=9600 dbits=8 parity=none attn=2brk

Port 3 type=orig prot=async baud=9600 dbits=8 parity=none attn=2brk

Port 4 type=orig prot=async baud=9600 dbits=8 parity=none attn=2brk

Port 5 type=orig prot=async baud=9600 dbits=8 parity=none attn=2brk

Port 6 type=orig prot=async baud=9600 dbits=8 parity=none attn=2brk

Port 7 type=orig prot=async baud=9600 dbits=8 parity=none attn=2brk

Port 8 type=orig prot=async baud=9600 dbits=8 parity=none attn=2brk

Rs sam p 1

Rs sam p 2

Rs sam p 3

Rs sam p 4

Rs sam p 5

Rs sam p 6

Rs sam p 7

Rs sam p 8

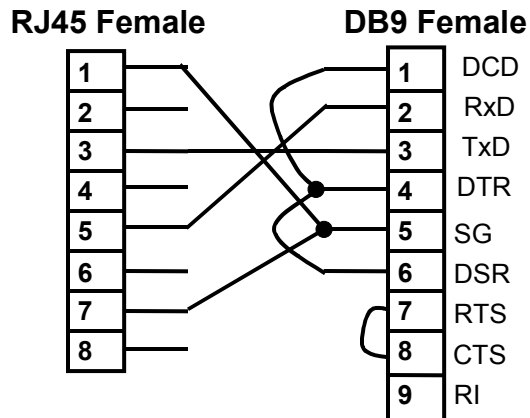
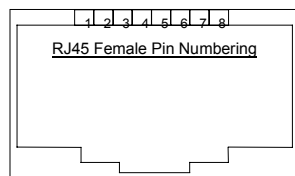
9 CONSOLE CABLING

9.1 The DB9 Console Adapter

Some Personal Computers use a 9 pin DB9 interface for serial communications. The terminal emulation programs may require certain lead status. Since console connections are generally implemented as three wire interfaces (i.e. RxD, TxD, and SG); this may pose a problem for the terminal emulation programs.

Below is depicted the wiring of a DB9 adapter which eliminates the problems associated with these terminal emulation programs. It is used with a standard **straight** category 5 RJ45 cable.

DB9 Async DCE Console Adapter



Note: This cable for use on console ports only.

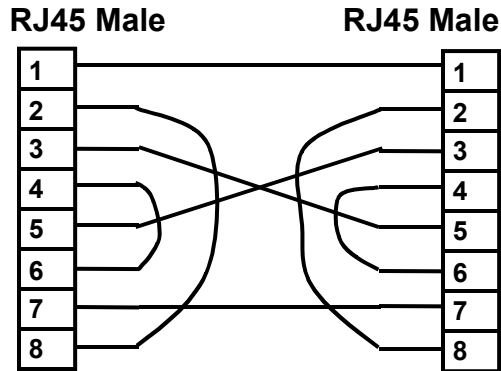
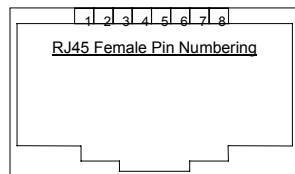
Use with a straight CAT-5 RJ45 cable.

9.2 The RJ45 to RJ45 Crossover Console Cable

The RJ45 to RJ45 console cable implements the three wire interface for consoles with signal looping at either end. It is used to connect a serial console directly to a **4000** port, a SAM port, or a Datakit TY port. No adapter is required. It may also be used in conjunction with an Asynchronous DCE or DTE adapter to provide console interfaces for personal computers or terminals where looped signals are required.

The diagram for the console cable is as follows:

RJ45 to RJ45 Console Cable



Note: This cable for use on console ports only.

Comcode: 408198133

10 APPENDIX A:DT-2020 SPECIFICATIONS

10.1 Device Interfaces

10.1.1 CCITT V.35

The V.35 interface uses a 34-pin Winchester connector and operates at data rates up to 2.048Mbps.

10.1.2 EIA RS-232-C

The RS232-C interface uses a 25-pin (DB25) connector and up to 21 signal leads, and operates at data rates from 75 to 19200 bits per second (bps).

The DT-2020 RS232-C device interface has been tested to run at rates up to 56 Kbps.

10.2 10BaseT LAN Interface

This is an eight-pin, 10BaseT modular connector for a 10 Mbps baseband CSMA/CD local-area network.

10.3 EIA RS-232-C Console Interface

This RS-232-C interface uses an RJ45 connector and operates at 9600 bits per second (bps).

10.4 Physical Dimensions

DT-2020:	L=6.0" x W=1.4" x D=7.5"
Rack-mount Panel:	L=19" x W=10.5" D=. 125"
Stand-alone AC/DC Power:	L=3.5" x W=1.75" x D=2.5"
Power distribution Panel:	L=10.4" x W=. 8" x D=. 823"

10.5 Environmental Operating Range

Operating Temperature:	5° to 40°C (41°F to 104°F)
Operating Humidity:	5% to 85%
Altitude:	From 60m (197 ft.) below sea level to 1800m (5905 ft.) above sea level

10.6 Power Requirements

DT-2020 Operating Voltage:	5V @ 800 mA Nominal
-----------------------------------	---------------------

Stand-alone AC power supply: 115V @ 48mA Nominal
115V @ 90 mA Maximum

Stand-alone DC power supply: 48V @ 104 mA Nominal
48V @ 195 mA Maximum

Rack-mount DC (six units): 48V @ 624 mA Nominal
48V @ 1.17 A Maximum

10.7 Regulatory Information

Safety:	UL, CSA, VDE GS
EMC:	FCC Part 15B Class A, ICES-003 Class A
European EMC:	CE
NEBS:	Level 3

This Class A digital apparatus complies with Canadian ICES-003.

Note:

This equipment has been tested and found to comply with limits for Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warning!!

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Special Accessories Note

In order to comply with the limits for Class A, Radio Frequency Devices, Subpart B- Unintentional Radiators (digital devices) Part 15 Rules, the user must use the cables available with this product, a RJ45 terminated shielded console cable and a DB25 to V.35 shielded adapter.

11 HARDWARE WARRANTY

The warranty period for hardware shall be ninety (90) days from the date of shipment from TeleComp R&D or a designated manufacturer. Replacements and repairs are guaranteed for the longer of the remaining original warranty period or 30 days.

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