# TONE COMMANDER®

The NT1-220 Rack is designed to be used in conjunction with Tone Commander NT1U-220TC ISDN Network Terminations. A maximum of twelve NT1 units can be used in each rack.

The rack supplies power to the NT1 units, and terminal equipment connected to the NT1s, from a local 120 VAC outlet. An optional NT1-200 Battery Backup Power Supply can be added to the NT1-220 Rack to enable uninterrupted NT1 and ISDN terminal power during a power failure.

An expansion rack without a power supply is available for increased terminal capacity.
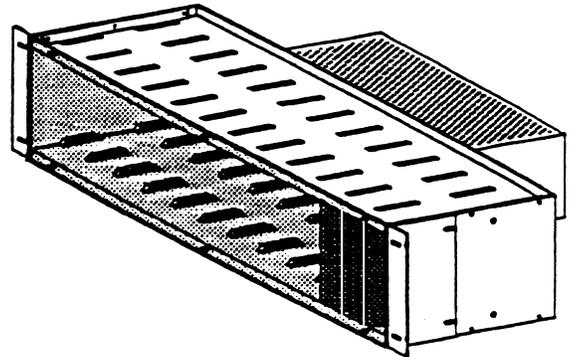
Specifications

NT1-220 Rack

Physical Dimensions .... 5.2" H x 17.3" W x 7.5" D
Weight .... 3 lbs.
Operating Temperature .... 0° - 50° C (32° - 122° F)
Humidity .... 5% to 95%, non-condensing
Short Circuit Protection .... individual self-resetting current limiting for each NT1; 20 W max. per NT1
Standards Compliance .... UL 1459, cUL

NT1-220 Rack Power Supply

Power Requirements .... 120 VAC, 60 Hz, 2 A max.
Output .... 42-55 VDC nominal 120 W max.
Physical Dimensions .... 3.5" H x 9.3" W x 4" D
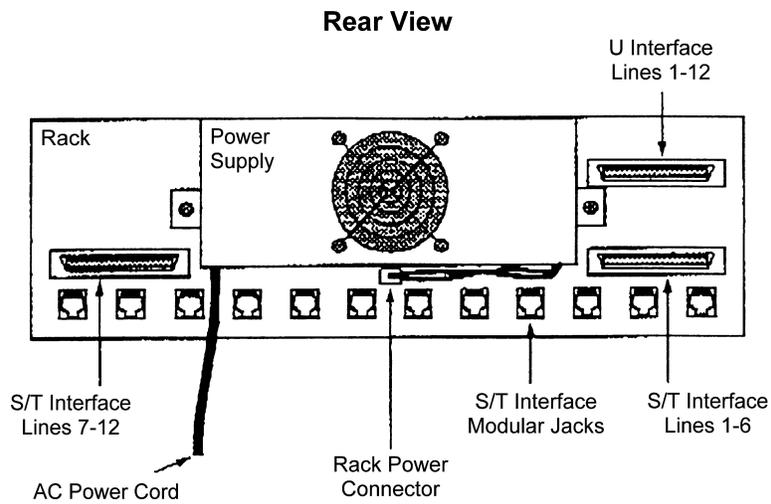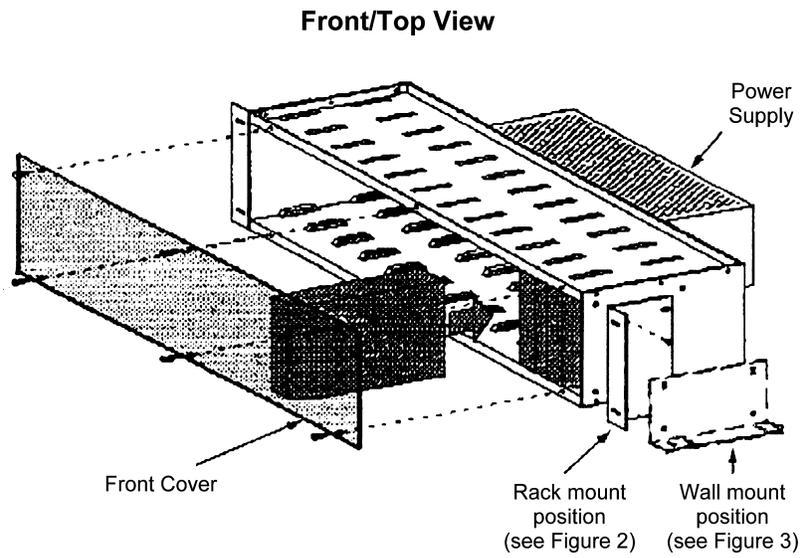Weight .... 3.35 lbs.

Contents of Shipping Box

(1) NT1 -220 Rack
(2) Mounting brackets
(4) 10-24 x ¼" mounting bracket screws
(1) Installation Instructions (this document)

⚠ Important Safety Instructions

- This equipment is intended for installation in a restricted access location (dedicated equipment rooms, equipment closets, or the like) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA No. 70.

- Never install telephone wiring during a lightning storm.

- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations

- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

- Use caution when installing or modifying telephone wires.

- Do not mount the NT1-220 Rack within 12" of a heat source.

- The socket-outlet shall be installed near the equipment and shall be easily accessible.

Installation

Front/Top View

Power
Supply

Front Cover

Rack mount
position
(see Figure 2)

Wall mount
position
(see Figure 3)

Rear View

U Interface
Lines 1-12

Rack

Power
Supply

S/T Interface
Lines 7-12

AC Power Cord

Rack Power
Connector

S/T Interface
Modular Jacks

S/T Interface
Lines 1-6

All 50-pin rack connectors are female.

Figure 1

Rack Mounting

The NT1-220 Rack can be mounted in an EIA standard 19" commercial or 23" telco rack.

1. Attach the mounting brackets to the rack in a 19" or 23" mounting position as needed, using the supplied mounting bracket screws.

2. Mount the rack to the 19" or 23" rack standards using suitable fasteners.

Rack Mounting Bracket Positions

19" Rack
Position

Top View

23" Rack
Position
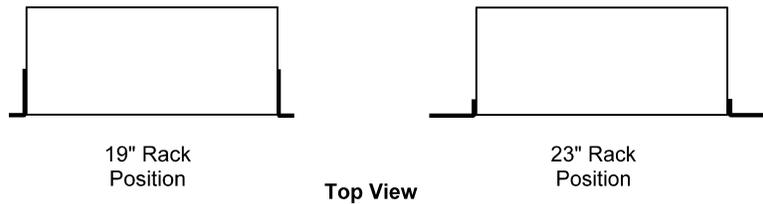
Figure 2

Wall Mounting

Note – ***When mounting the NTI-220 Rack in conjunction with a Battery Backup unit, refer to the NT1-200 Battery Backup/NT1-200 Add-on Battery Installation Instructions (doc. #13-102688) for proper mounting positions.***

1. Attach the mounting brackets to the rack in the wall mounting position using the supplied mounting bracket screws, as shown in Figure 3.

2. Fasten a plywood sheet to the wall.

3. Mark and pre-drill the mounting holes for the rack. Refer to Figure 3 for hole locations.

   Make sure that the power cord can reach a local 120 VAC, 60 Hz grounded power outlet.

4. Attach the rack to the plywood using four suitable fasteners (such as #10x¾" pan head self-tapping screws). **A fully loaded NT1-220 Rack weighs 15 lbs.**

   When mounting the rack to the wall, ensure that the power supply vents are not obstructed or flush against the wall.

Front View

Side View
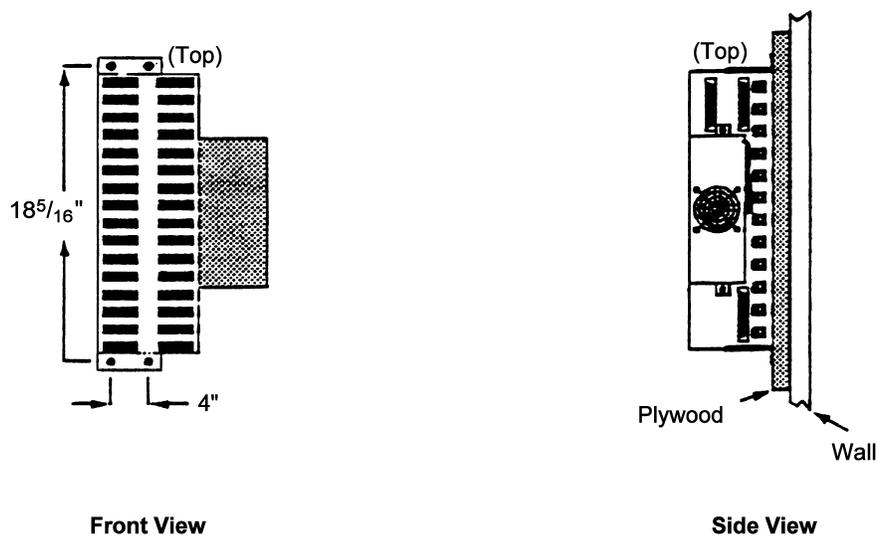
Figure 3

Cable Connections

U Interface

Connect the male-ended U interface cable from the network interface block to the 50-pin U interface connector on the rack rear panel. See Figure 5 and Table 2 for connector pinout.

S/T Interface

The S/T interface for each terminal can be connected one of two ways:

1. Modular jacks – for terminal equipment or patch panel connection via an 8 position modular phone cord. Connecting cords must be Category 3 or higher with T568 A or T568 B wiring. See Figure 4 and Table 1 for jack pin-out.

    Connect the terminal wall jacks to 4-pair cables as shown in Table 1. Punch down the cables to the crossconnect blocks in the order shown in Table 1. Note that pairs 1-2 and 3-6 for T568 A jacks are reversed from T568 B jacks.

Pin #	Signal	Wire Color	
		T568 A	T568 B * (AT&T)
5	Tx -	WHT-BLU	WHT-BLU
4	Tx+	BLU	BLU
1	N/C	WHT-GRN	WHT-ORN
2	N/C	GRN	ORN
3	Rx+	WHT-ORN	WHT-GRN
6	Rx -	ORN	GRN
7	-48V	WHT-BRN	WHT-BRN
8	GRD	BRN	BRN

Table 1 – **Modular Jack Pinout**

Figure 4

1 (*unused*)
2 (*unused*)
3 (Rx+)
4 (Tx+)
5 (Tx -)
6 (Rx -)
7 (-48V)
8 (GRD)
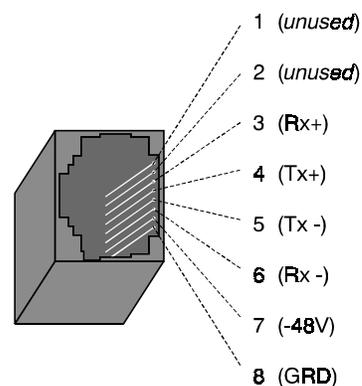
* **T568 B (AT&T 258A) jacks are recommended**; they allow conventional station pair ordering when connecting to S/T punchdown blocks.

2. 50-pin connectors – for terminal equipment connection via a punch-down block. Use cables with male connectors. See Figure 5 and Table 2 for connector pinout.

Pin 25 ← → Pin 1
Pin 50 ← → Pin 26
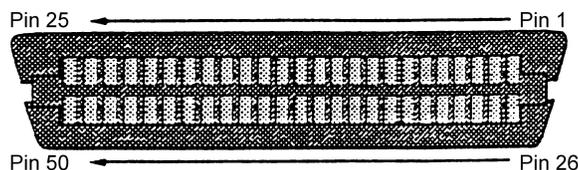
Figure 5 – **"U" and "S/T" Interface 50-pin Connectors**

Pin No.	Wire Color	U Interface Lines 1-12	S/T Interface Lines 1-6	S/T Interface Lines 7-12
26	WHT-BLU	U1 -	Tx1 -	Tx7 -
1	BLU-WHT	U1+	Tx1+	Tx7+
27	WHT-ORN	U2 -	–	–
2	ORN-WHT	U2+	–	–
28	WHT-GRN	U3 -	Rx1+	Rx7+
3	GRN-WHT	U3+	Rx1 -	Rx7 -
29	WHT-BRN	U4 -	-48V1	-48V7
4	BRN-WHT	U4+	GRD1	GRD7
30	WHT-SLT	U5 -	Tx2 -	Tx8 -
5	SLT-WHT	U5+	Tx2+	Tx8+
31	RED-BLU	U6 -	–	–
6	BLU-RED	U6+	–	–
32	RED-ORN	U7 -	Rx2+	Rx8+
7	ORN-RED	U7+	Rx2 -	Rx8 -
33	RED-GRN	U8 -	-48V2	-48V8
8	GRN-RED	U8+	GRD2	GRD8
34	RED-BRN	U9 -	Tx3 -	Tx9 -
9	BRN-RED	U9+	Tx3+	Tx9+
35	RED-SLT	U10 -	–	–
10	SLT-RED	U10+	–	–
36	BLK-BLU	U11 -	Rx3+	Rx9+
11	BLU-BLK	U11+	Rx3 -	Rx9 -
37	BLK-ORN	U12 -	-48V3	-48V9
12	ORN-BLK	U12+	GRD3	GRD9
38	BLK-GRN	–	Tx4 -	Tx10 -
13	GRN-BLK	–	Tx4+	Tx10+
39	BLK-BRN	–	–	–
14	BRN-BLK	–	–	–
40	BLK-SLT	–	Rx4+	Rx10+
15	SLT-BLK	–	Rx4 -	Rx10 -
41	YEL-BLU	–	-48V4	-48V10
16	BLU-YEL	–	GRD4	GRD10
42	YEL-ORN	–	Tx5 -	Tx11-
17	ORN-YEL	–	Tx5+	Tx11+
43	YEL-GRN	–	–	–
18	GRN-YEL	–	–	–
44	YEL-BRN	–	Rx5+	Rx11+
19	BRN-YEL	–	Rx5 -	Rx11 -
45	YEL-SLT	–	-48V5	-48V11
20	SLT-YEL	–	GRD5	GRD11
46	VIO-BLU	–	Tx6 -	Tx12 -
21	BLU-VIO	–	Tx6+	Tx12+
47	VIO-ORN	–	–	–
22	ORN-VIO	–	–	–
48	VIO-GRN	–	Rx6+	Rx12+
23	GRN-VIO	–	Rx6 -	Rx12 -
49	VIO-BRN	–	-48V6	-48V12
24	BRN-VIO	–	GRD6	GRD12
50	VIO-SLT	–	–	–
25	SLT-VIO	–	–	–

Table 2 –50-pin Connector Pinouts

Power

Rack Power Supply

1. Verify that the power output cable (red and black wires) is connected to the rack.

2. Plug the power cord into a local 120 VAC, 60 Hz power outlet.

Battery Backup Power Supply

Refer to the NT1-200 Battery Backup Installation Instructions (doc. #13-102688) for Backup Battery power supply installation.

ISDN Terminal Power

ISDN terminals connected to the NT1s installed in the rack are powered from the NT1-220 Rack power supply. Terminal power can be provided by either of the following methods:

PS-2 – Direct power feed on Terminal jack pin 7 `(-)` and pin 8 (+), 10 watts average per NT1 circuit (120 watts maximum per rack).

PS-1 – Phantom power feed over the transmission pairs, Terminal jack pins 3/6 (+) and pins 4/5 `(-)`, 4 watts maximum per NT1.

Mixed power can be used if maximums are not exceeded. Power connections to each NT1 are individually short circuit protected.

Power Up Test

Refer to the NT1U-220TC installation manual (doc. # 13-102307) for power up test information.

NT1U-220TC Installation

Insert each NT1U-220TC into the appropriate slot in the NT1-220 rack. Alignment bumps on the rack ensure correct case orientation. NT1s may be inserted or removed from an operational rack without affecting the performance of other NT1 units. Make sure all NT1s are fully seated in their rack connectors before replacing the front cover.

Service

Repair of the NT1-220 Rack must be done by Tone Commander. Prior to equipment removal, call Tone Commander Customer Technical Support for assistance in determining the source of the problem. This critical action can often prevent needless removal of equipment and subsequent customer inconvenience.

Tone Commander
Customer Technical Support Department
11609 49th Place West
Mukilteo, WA 98275-4255 USA

Phone: (425) 349-1000
         (800) 524-0024
Fax: (425) 349-1010

E-mail: tech@tonecommander.com

Web: www.tonecommander.com

Tone Commander is committed to meeting the product needs of our customers. Please write or call us with any suggestions for improvement.

FCC Requirements

The Tone Commander NT1U-220TC has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guaranty that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Where it can be done safely, re-orient the receiving television or radio antenna.

- To the extent possible, increase the separation between the telephone equipment and the television, radio, or other equipment.

- If your telephone equipment runs on AC power, plug your product into an AC outlet that is not on the same circuit as the one used by your radio or television receiver.

Tone Commander Product Warranty

For a period of one year from date of dealer purchase, but not to exceed 16 months from date of manufacture, Tone Commander Systems, Inc. (Tone Commander) warrants its products to be free from defects in material and workmanship under conditions of normal use and service. Tone Commander shall, at its option, repair or replace any defective product which, in its opinion, has not been misused, damaged, or improperly installed.

Repair or replacement under this warranty will be performed at Tone Commander's factory. Authorization must be obtained from Tone Commander prior to returning a product for repair. Freight must be prepaid for all units returned to Tone Commander. Units repaired under warranty will be shipped UPS Ground (or equivalent), freight prepaid by Tone Commander.

Products that are older than the warranty period, but less than 7 years old, or still manufactured by Tone Commander may be repaired at the factory for a flat rate charge. Repaired out-of-warranty units are warranted for 90 days from the date of repair.

The repair or replacement of a product under this warranty represents the entire obligation of Tone Commander; Tone Commander shall not be liable for any special or consequential damages resulting from or caused by any defect, failure, incapacity or malfunction of any of its products.

> *The foregoing express warranty is in lieu of all other warranties, express or implied, including, but not limited to any implied warranty of merchantability, fitness, or adequacy for any purpose or use, quality, productiveness or capacity; Tone Commander, to the extent permitted by law, hereby disclaims all such other warranties.*