User Manual

CANOGA PERKINS

**Canoga Perkins
2201 Rack Chassis
2200R Redundant
Modem Card**

NOTICE

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2201 Rack Chassis
2200R Redundant Modem Card

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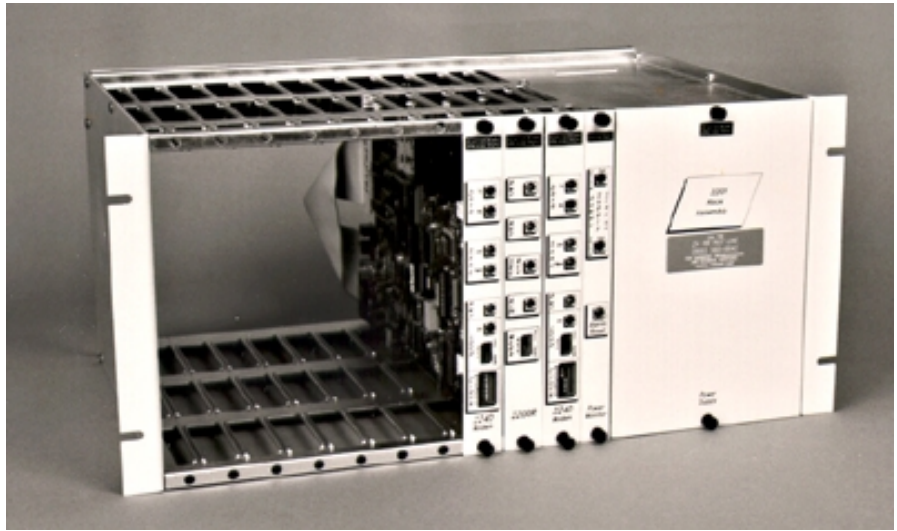
2201 Rack Chassis
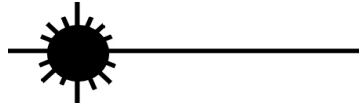
Caution!

This product may contain a laser diode emitter operating at a wavelength of 1300nm - 1600nm. Use of optical instruments (for example: collimating optics) with this product may increase eye hazard. Use of controls or adjustments or performing procedures other than those specified herein may result in hazardous radiation exposure.

Under normal conditions, the radiation levels emitted by this product are under the Class 1 limits in 21 CFR Chapter 1, Subchapter J.

ATTENTION!

Cet équipement peut avoir une diode laser émettant à des longueurs d'onde allant de 1300nm à 1600nm. L'utilisation d'instruments optiques (par exemple : un collimateur optique) avec cet équipement peut s'avérer dangereuse pour les yeux. Procéder à des contrôles, des ajustements ou toute procédure autre que celles décrites ci-après peut provoquer une exposition dangereuse à des radiations.

Sous des conditions normales, le niveau des radiations émises par cet équipement est en dessous des limites prescrites dans CFR21, chapitre 1, sous chapitre J.

Notice!

This device contains static sensitive components. It should be handled only with proper Electrostatic Discharge (ESD) grounding procedures.

NOTE!

Cet équipement contient des composants sensibles aux décharges électro-statiques. Il doit absolument être manipulé en respectant les règles de mise à la terre afin de prévenir de telles décharges.

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1. Description

This manual describes the 2201 Rack Chassis used to house card versions of the 2200-series modems and the 2200R Redundant Modem Card, used to facilitate a redundant modem link.

1.1 2201 Rack Chassis

The 2201 Rack Chassis is designed to accommodate up to ten 2200-series modem cards. However, if MC1 and MC2 interface cards are installed, the 2201 can only accommodate five modem cards. When full redundant modem links are set up, the chassis will accommodate three complete links.

The 2201 offers a variety of features and accommodates redundant modem cards with automatic switchover, local audible/visible and remote power failure alarms, optional redundant power supplies, and the ability to remove modems from the rack without powering down the entire system. See Section 2.1 for on installation details

1.2 2200R Redundant Modem Card

The 2200R Redundant Modem Card fits into the 2201, allowing users to configure a fully redundant fiber optic link. The 2200R is equipped with modem interface extender cards for easy installation. (See Section 2.2 for installation information.)

2. Installation

2.1 2201 Rack Chassis

The 2201 Rack Chassis (see Figure 2-1) is designed for installation in a standard 19-inch wide equipment rack. Tabs for standard spacing are provided on each side of the unit and are predrilled.

The blank panels, modem front panels, power monitor front panel, and power supply front cover are all equipped with Nylatch retainers.

When installing a modem or panel, the Nylatch should be in an outward or released condition. Slide the modem card into the rack until it engages fully with the PC board edge connector, then push the Nylatch retainers in.

To remove a panel or modem, simply pull out on each Nylatch slightly until it clicks; then, holding onto both retainers, slide the modem from its card guides. The modem cards and power monitor circuit boards may be removed or installed while the power supplies are switched on.

The power supplies slide into their compartments in the 2201 from the front of the unit, after the access cover is removed. On the rear of the power supply is a 10-position connector which provides the power supply output connection to the backplane circuit boards (refer to Section 3 for pin configuration).
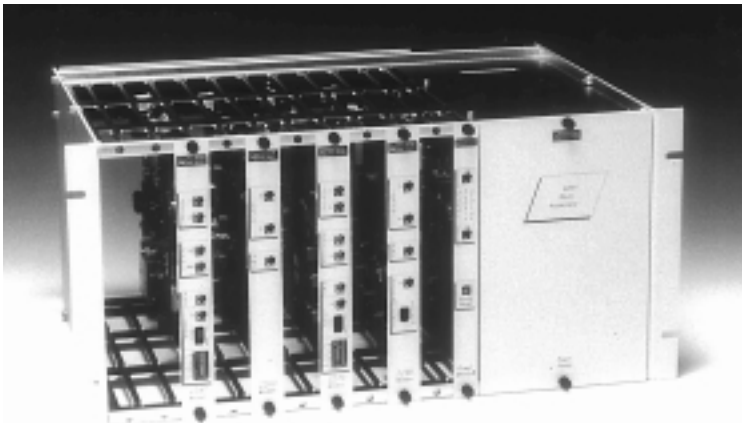
Figure 2-1.
Front View of 2201
Rack Chassis with
Modems Installed

Each supply is held in position with a short extension at the front, which in turn is held in place with a finger-tightened Allen type bolt. Position "A" (bottom) should be used when only one supply is being employed.

It will be necessary to first plug the power supply output cables into their respective sockets on the backplane circuit board. Then the 115/230VAC or ±48VDC power source should be connected into the rear of each supply.

The power supply monitor card must be installed in the card position farthest to the right when viewing from the front of the unit (closest to the power supply). A modem card cannot be installed in this card position, as the interface to the backplane is different (see Figure 2-2).

The supply-select slide switch (A / A + B) on the circuit board should be positioned for the number of power supplies used. (For each modem installed in the 2201 Rack Chassis, a compatible communication cable will be needed, as well as appropriate fiber optic cables terminated with the appropriate type connectors. Refer to Table 2-A for factory settings.)
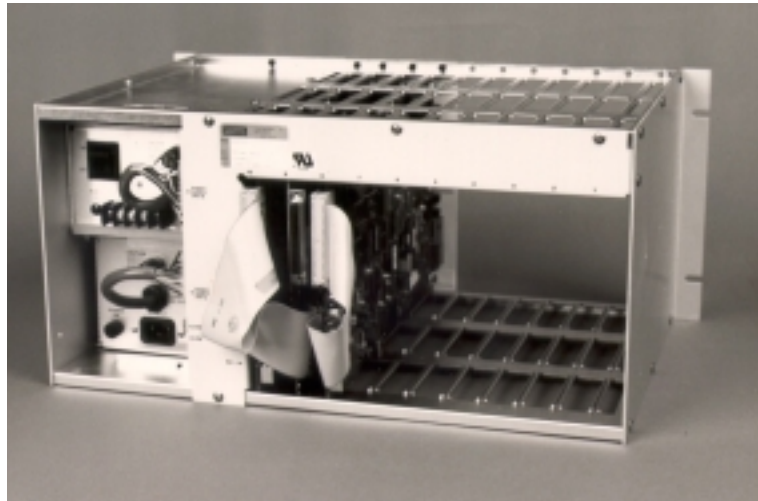
Figure 2-2.
Rear View of 2201
Rack Chassis with
Modems Installed

Unit	Setting
Chassis Backplane	W1: Installed
Power Monitor Board	S2: A if single power supply A+B if redundant power supply W2: Installed W4: Installed

Table 2-A.
2201 Rack Chassis
Factory Settings

2.1.1 FX-23 Extender Bracket

The Canoga Perkins Extender Bracket, FX-23, enables the 2201 Rack Chassis to be installed in a 23-inch equipment rack. Figure 2-3 shows the FX-23 Extender Bracket and the rack assembly.

To install the bracket, use the following steps :

Step 1:   Attach the FX-23 Extender Bracket on the left side of the rack assembly (as viewed from the front) with the appropriate screws. (The FX-23 must be installed on the opposite side of the power supplies due to weight considerations.)

Step 2:   Attach the rack assembly to the equipment rack frame with the appropriate screws.

Figure 2-3.
FX-23 Extender
Bracket and 2201
Rack Chassis
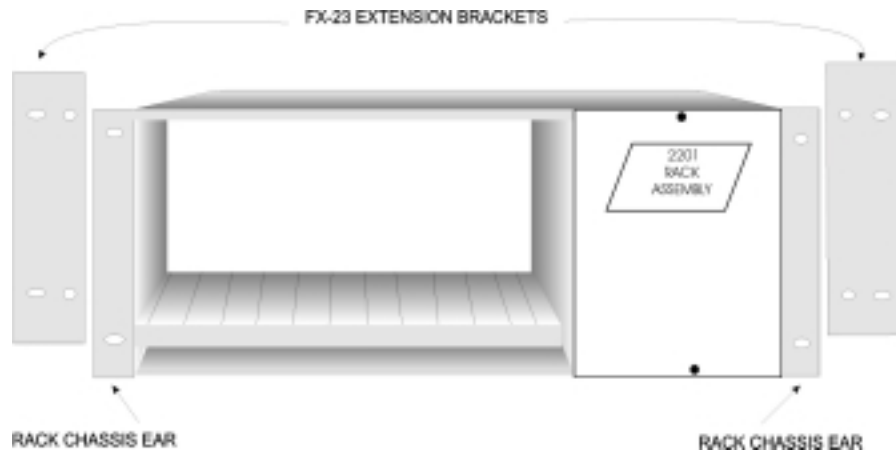
2.1.2 2201 Power Supplies

The 2201 employs either one or two 250 Watt power supplies. They are available in either 115, 230VAC or ±48VDC configurations.

The optional second power supply (in the B or Upper position) for the 2201 is redundant with, or a backup for, the standard supply and is a duplicate in terms of power output. When dual power supplies are employed, both supplies provide power to the modem PC cards at the same time. This reduces the operating load on each supply. If one power supply fails, the other will continue to power the system and an audible and/or visual alarm will come on the Power Monitor Card.

2.1.3 2201 Chassis Ground Option

The chassis ground is provided by the AC inlet center pin or the DC input terminal, labeled GROUND.

The power supply signal ground circuit can be tied together with the 2201 chassis ground by applying a jumper plug at position W2 on the power distribution circuit board (see Figure 2-4).

Figure 2-4.
Chassis Ground
Option for 2201
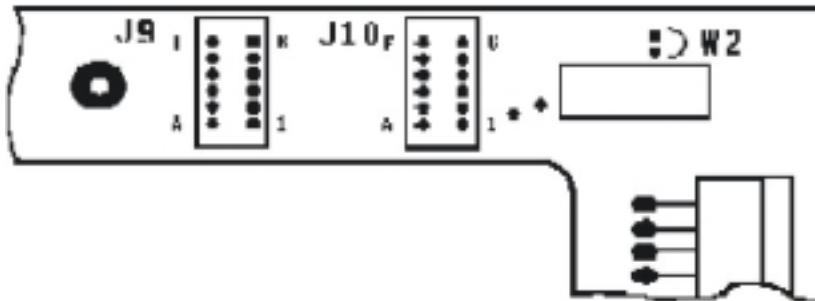
VIEW OF 2201 POWER DISTRIBUTION
CIRCUIT BOARD FROM FRONT OF
RACK ASSEMBLY

2.2 2200R Redundant Card

NOTE: **The 2200R can be used with all 2200 series modems except the 2245 and 2262 modem cards. When used with the 2270 or 2290, flow control operation is not possible.**

Redundant fiber-optic links can be established with any of the applicable modem types. Two modem cards are interconnected to a third plug-in card called the 2200R Redundant Modem Controller Card (see Figure 2-5). Special Interface boards, Redundant Paddle Boards (Model designation RPB for 2260s, 2270s and 2290s; 4PB for 2240s), are substituted for the normal I/O boards in the two modems. These RPBs simply buffer the I/O signals between each modem and the 2200R board. The I/O board which would otherwise have been plugged into the modem is instead mounted in the 2200R card. Thus, while the fiber-optic link is redundant, the I/O card function is not. The 2200R Modem Controller card connects to the two modem cards through the edge connector on the RPB interface cards via ribbon cables. See Figure 2-6. The 2200R Modem Controller Card provides all the multiplexing, buffering and switchover logic to implement the redundant fiber optic link. (Refer to Table 2-B for 2200R factory settings.)

When using the 2200R in the 2201, up to three redundant fiber optic links can be used. For each fiber redundancy, two modem cards and one 2200R card are required. Modems must be installed adjacent to the 2200R being used in that link and the 2200R in a slot between the two modem cards it serves. Keyed ribbon cables are provided for modem connection.
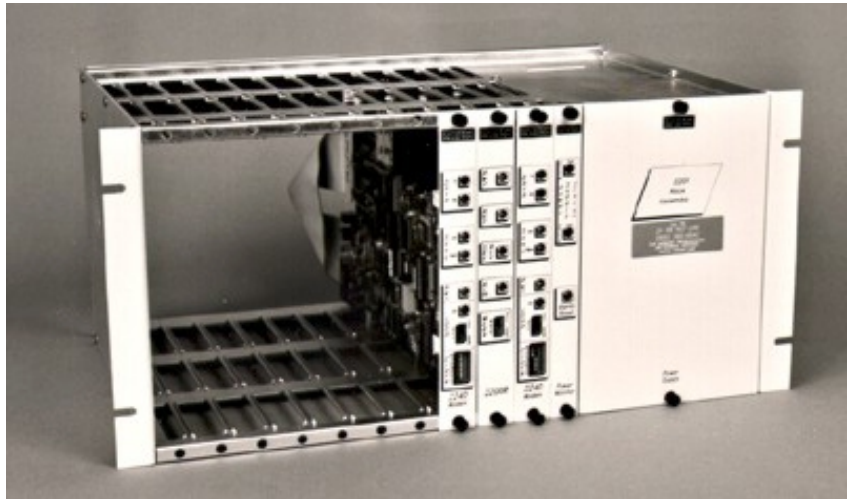
Figure 2-5.
2200R Card
Positioning

Figure 2-6.
Redundant Modem
Card Ribbon Cable
Routing
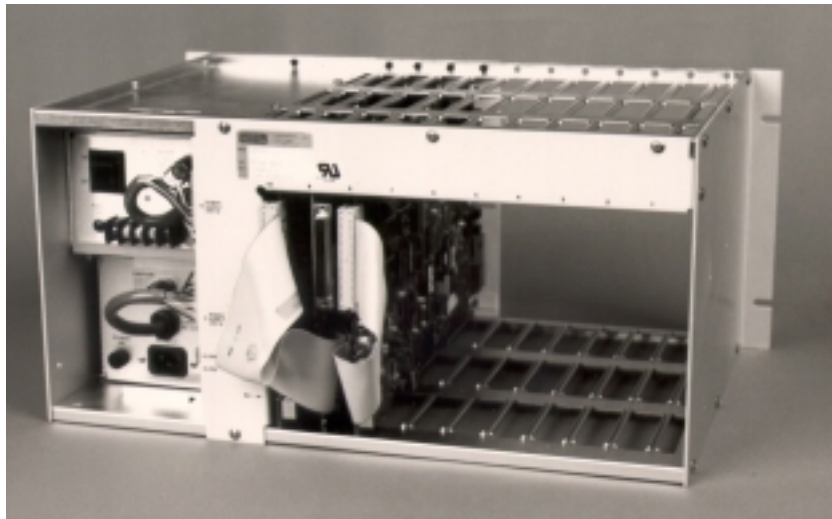
			2240	OTHER MODEMS
SW2-1	SIMPLEX		OPEN	OPEN
SW2-2	EXT CLK		OPEN	OPEN
SW2-3	SYNC		CLOSED	OPEN
SW2-4	SP1		OPEN	OPEN
W2:			INSTALLED	INSTALLED
W3:			INSTALLED	INSTALLED
W8:			INSTALLED	INSTALLED

Table 2-B.
2200R
Redundant Card
Factory Settings

The primary modem should be connected to the J-1 ribbon cable, and the secondary modem should be connected to the J-2 ribbon cable.

The ribbon cables are keyed to provide proper pin alignment. They will connect properly with folds, and can be tucked between cards.

Connect the fiber optic cables from the local primary transmitter to the remote primary receiver and from the remote primary transmitter to the local primary receiver. Do the same for the secondary modem optics.

2.2.1 2200R Remote Control and Failure Alarm

The remote alarm connector (J5) provides both remote control switching and optical link failure alarm contacts (see Figure 2-7). The automatic mode can be remotely overridden between the primary and secondary link by utilizing these contacts.

Two jumpers are provided (W1 through W4) for configuring different alarm modes (see Figure 2-8). W2 and W3 are factory installed for a normal alarm condition and reflect either a fiber or modem failure. This jumper combination sets the alarm relay into a normally open condition. It will close on alarm or power loss.

If a switchover occurs while in automatic mode, the alarm indicator on the modem front panel will light. The jumper combination of W1 and W3 will configure the alarm relay into a "normally closed" condition. A contact for a remote indication of this condition is supplied at positions J5-1 and J5-2.

Secondary Remote Selection

Signal Ground

Figure 2-7.
Alarm Connector   Primary Remote Selection   J5
Pin Assignments
                                  To Relay Contacts

                                  To Relay Contacts
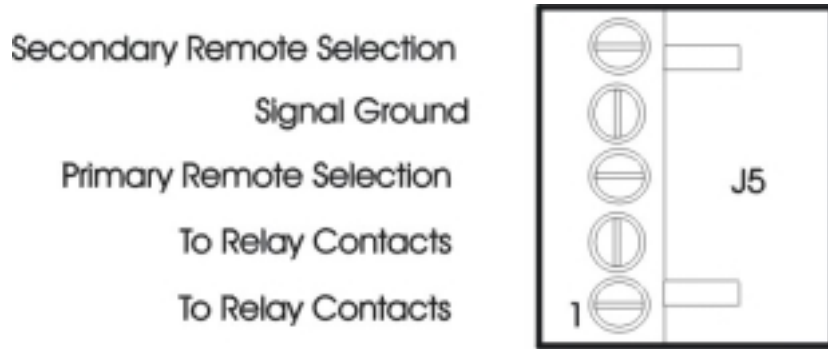
To reset the alarm, switch to the active link (Pri or Sec) and switch it back to the AUTO Mode position.

Switch SW2 is used to configure the redundant switching logic to deal with various modes of system operation.

Figure 2-8.
Factory Settings for
Internal Jumpers and
Switches

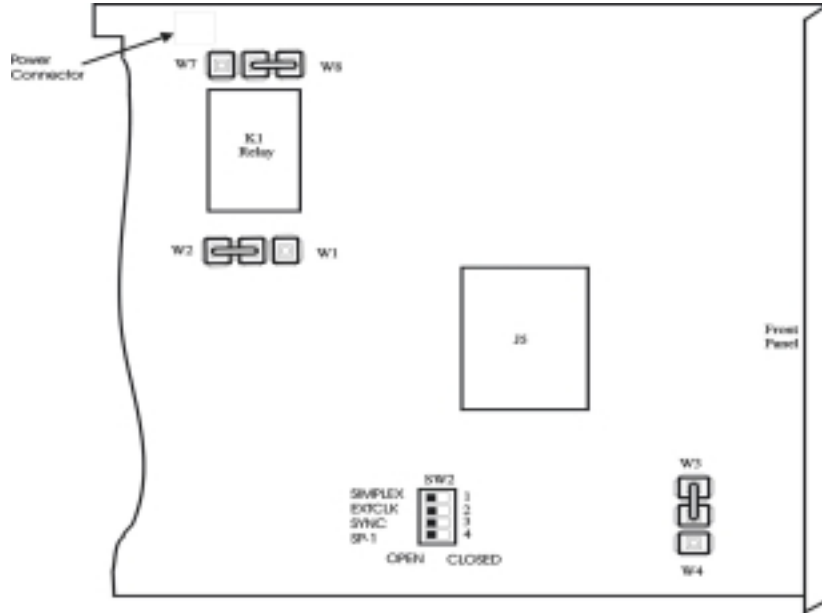|	
SW2-1 (SIMPLEX)	This switch is only closed when the system is set up for Simplex operation (data transmission in one direction only). *Only* the switch at the transmit end is closed.
SW2-2 (EXTCLK)	This switch determines whether both directions of data flow will be switched together or not. When SW2-2 is OPEN, both directions of data flow switch together (operations on both primary modems or both secondary modems). With the switch closed, the primary modems can be sending data in one direction while the secondary modems are sending data in the other direction. If the modems are configured for INTERNAL CLOCK, SW2-2 *must be open*. Either position of this switch may be used for EXTERNAL CLOCK operation with the resulting switching differences described above. For the sake of simplicity, it is recommended that this switch be left in the OPEN position.
SW2-3 (SYNC)	This switch must be set to the OPEN position for all modem types *except* the 2240. For use with 2240s, SW2-3 must be CLOSED.
SW2-4 (SP-1)	This is a spare switch.

> **NOTE:** **For Models 2270 and 2290, if the internal clock mode is configured, the flow control option on the modems must be en abled. The flow control operation of the modem is required for proper redundant switching.**

Two jumpers are provided, W7 and W8, for configuring chassis ground connections. Jumper W7 connects signal ground to chassis ground. Jumper W8 allows the signal ground to float. Note that the W2 jumper on the power distribution board can override the W7/W8 jumper. Refer to Section 2.1.2 for more information.

2.2.2 Redundant Card Operation

The 2200R Series Redundant Card allows a single data electrical interface to be shared between two fiber links.

This model can be operated in three modes: Remote control, Manual control, and Automatic. In the Remote control mode, two inputs are provided to permit forcing the modems to receive on either the primary or secondary link. Transmission occurs only over the selected link.

The Remote control mode will override either the Manual or Automatic mode. If Remote operation is not desired, leave the remote inputs unconnected.

To force operation to the primary link, connect the secondary input LOW (LOW = short to ground, TTL low or RS-232 OFF [negative voltage]) while leaving the primary input HIGH (HIGH = leave floating, TTL high or RS-232 ON [positive voltage]). To force operation to the secondary link, connect the primary input LOW, while leaving the secondary input HIGH.

When not in the Remote control mode, the operating mode is selected by a three position switch: Primary, Secondary, and Automatic.

The "Primary" and "Secondary" switch positions represent the **Manual** mode, which functions exactly as does the Remote control mode. In the Manual mode, the modem will transmit and receive only on the link selected.

The "Automatic" switch position forces the Automatic mode of operation, the **default** operating mode.

> **NOTE:** **For use with the Model 2240 Modem only, the Automatic mode requires the CD/DCD switch on the Modem card to be OFF and the CD/SYNC to be ON. These are the factory defaults for the 2240.**

In this mode transmit optical energy is applied to **both** links while the link chosen for reception is arbitrary, as the active link is determined by the last link selected in the Manual or Remote control modes immediately before switching to the Automatic mode.

Thereafter, each end will independently switch links (receive only if EXTCLK [SW2-2] = CLOSED and modem is in EXTCLK mode) when its Carrier Detect signal turns off (indicating a link failure). If SW2-2 is in the OPEN position, both directions of the link will switch. If SW2-2 is in the CLOSED position, only the receive link will switch. The carrier detector is a function of receive optical power and presence of clock from the other end. If both links exhibit significant interruptions of Carrier Detect, the modems will switch back and forth between the primary and secondary links until one modem turns on its Carrier Detect.

2.2.2.1 2200R Indicator Lights

Four LEDs are provided on the 2200R to indicate the activity state of the redundant link.

Pwr   The first LED is Power ON.

Aut   The second LED is an operating mode indicator. "ON" indicates operation in the Auto mode. When this LED is off, the mode is indicated by the mode select switch position.

Sec Rcv   The third LED defines the link being used for receiving (Secondary receiver "ON" represents the secondary link).

Alm   The fourth LED is an alarm indicator and is turned ON if an automatic switchover occurs while the 2200R is in the Automatic mode. This implies trouble on the other link. A dry relay contact for a remote alarm is also provided to indicate this occurrence. This LED and alarm relay contact are reset whenever the modem is switched into the Remote control or Manual mode.

3. Troubleshooting

The following procedures are intended for use in the event of a system failure, not during the initial installation of a Modem optical link. For initial installation checkout, refer to Section 2 of this manual. Refer also to Section 4 for detailed diagnostics.

3.1 2201 Main Power Supply Fuse

To replace the main power supply fuse, remove the unit's Main power cord from its socket or terminal block at the base of the supply. The fuse cartridge is located directly above the low voltage output cable. It is of the bayonet type, so a slight inward pressure and a counter clockwise twist will release the fuse. Replace a blown main power supply fuse with a same rate "Slo-Blo" type as indicated by the fuse rating label on the blown fuse holder.

3.2 2201 Secondary Voltage Check

When making a voltage check of the supply's secondary circuit, use the AC setting for AC power supply or DC setting for DC power supply on your voltage meter. See Figure 3-1 for secondary power connector and slot assignments. The measured voltage between the two contacts for a specific group of card slots, positions 3 and 4 for example, should be 18VAC or 18VDC. The measured voltage between pin 1 (or pin 9 or pin 10), the return circuit, and any other pin position should be 9VAC , +9VDC or -9VDC. All the measured voltages can be within $\pm 10\%$.
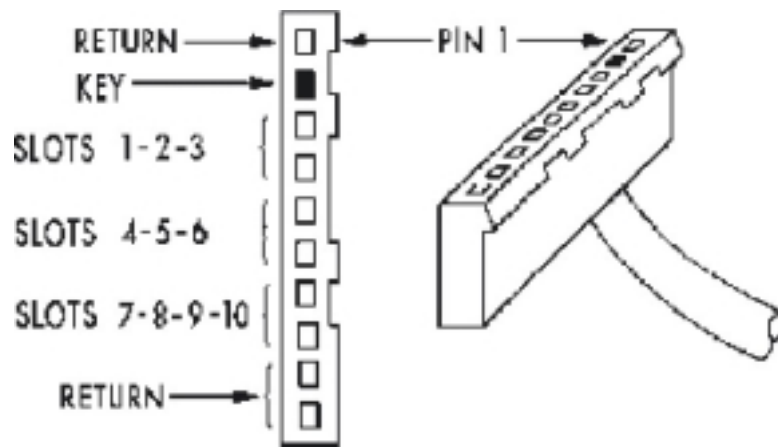
Figure 3-1.
2201 Secondary
Power Connector
and Slot Assignments

> **NOTE:** **On older units, only eight pins (pin 1-8) were used. However, old connectors are compatible with new plugs, and vice versa, due to the location of the key.**

3.3 2201 Secondary Circuit Fuses

There are six fuses employed inside each rack chassis power supply. Each protects one of the secondary circuits leading to the modem positions.

<div align="center">

WARNING!
Be certain that the main power cord is disconnected when accessing the internal fuses.

</div>

To access these fuses, remove the retaining screws that hold the power supply cover in position. The fuses are positioned on each side of the supply in groups of three. They may be removed for inspection, and/or replacement. Replace with the same rating of fuses.

3.4 2201 Monitor Board

3.4.1 Single Power Supply Failure Alarm

If the 2201 employs only one power supply monitor board (in the A or Lower position), and one of its output circuits fails, an audible warning will sound. This will cause the failure indicator for power supply "A" to light.

The audible warning will continue until the "Alarm Reset" button is pressed. This does not cure the problem, so the power supply should be repaired or replaced. The failure indicator will continue to be lit until the supply failure is corrected.

When the above type failure occurs, the entire system may be partially affected. Note which modems in the rack do not have "Power On" indicators lit then identify the card positions. Every power supply contains three secondary output circuits to feed the 2201 backplane (card positions 1, 2 and 3 are on one circuit; 4, 5 and 6 on another; and positions 7 through 10 are on yet another).

If the 2201 has empty card positions, modems residing in the affected positions may be moved to non-affected positions. If extra card positions are not available, the modems affected should be put out of service until the supply is replaced.

3.4.2 Dual Power Supply Failure Alarm

When dual power supplies are employed in the 2201, the backup supply will continue to power the modems after a failure of the other supply. Press the "Alarm Reset" button to disable the audible alarm; the "Unit A Fail" or "Unit B Fail" indicator will stay lit until the defective power supply is removed from the system and replaced.

The failed supply may be removed from the 2201 and replaced without taking the modems out of service. The power supply line cord must be removed, as well as the secondary supply lines to the power supply monitor PC card. The failed power supply may then be removed from the front of the rack mount unit.

3.4.3 Power Supply Remote Failure Alarm Contact

The 2201 provides an external alarm contact. This floating relay contact is incorporated into the power supply monitor PC card. Access to this circuit is via a two-position pluggable terminal strip directly below the power input connectors on the 2201 backplane circuit board.

The standard factory configuration for this alarm relay is a "normally open" condition. There is a jumper setting on the power supply monitor board to provide a "normally closed" condition (W1 for "normally closed," W2 for "normally open").

The standard factory setting of the remote alarm function is to activate the relay contacts whenever a power supply (either "A" or "B") has failed, or if power is completely lost. This relay will not return to normal until the problem is corrected.

4. Diagnostic Procedures

The following diagnostic procedures assume that at least one modem is installed in the 2201 to be able to troubleshoot and isolate a defective modem, power supply or monitor card.

Required Equipment
• Multimeter - (for voltage, resistance and continuity tests)

Step	Symptom	Possible Cause(s)	Action
1	No power indicator on front panel(s). Power indicator out on R/M supply.	No Main power	Check Main power source.
2	Same as Step 1	Blown Main fuse	Remove power and check Main fuse at rear of power supply.
3	No power indicator on front panel(s). Power indicator lit on R/M supply. Failure indicator lit on 2201 Power Monitor Board.	Blown secondary fuses	Check secondary fuses. See section 3.3.
4	Same as Step 3, but fuses are good.	Low voltage output	Go to Step 7.
5	If any fuse is bad, replace it with a good fuse of the proper rating. If the power supply still blows the fuse, unplug all the cards from the chassis, replace the defective fuse, and turn on the power. If the fuse still blows, replace the chassis.		

Step	Symptom	Possible Cause(s)	Action
6	Replace any bad fuses with good fuses of the proper rating. With the power on, insert the cards into the chassis, one at a time. Replace any cards that cause the power supply to fail. Replace power supply fuses as necessary. Proceed to Step 7.		
7	Check the secondary power supply voltages as described in Section 3.2 of the manual. If any voltage is bad, replace the power supply.		
8	Same as Step 4, but output voltage is normal.	Bad modem	Return modem for repair.
9	Failure indicator lit on 2201 power monitor card. All front panel power indicators lit. All units functioning.	Low input voltage	Check main power source.
10	" " "	Output low voltage caused by bad modem.	Perform Step 6.
11	" " "	2201 monitor card switch set wrong	
12	" " "	Bad monitor card	Replace supply monitor card.

5. Technical Specifications

5.1 Power Requirement:

2201 Rack Chassis   115VAC +10%, 2.2 Amps, 47-63Hz

Optional:
- 230VAC +10% @ 1.1 Amps, 47-63Hz
- ±48VDC, 5 Amps

5.2 Physical Dimensions:

2201 Rack Chassis Enclosure   19" W x 12.8" D x 8.8" H

5.3 Unit Shipping Weights:

2201 Power Supply Monitor Card   0.50 pounds
2201 AC Power Supply   9.00 pounds (each)
2201 DC Power Supply   3.00 pounds (each)
2201 Rack Chassis   7.70 pounds (empty)

5.4 Operating Environment:

Temperature 0° to 50° C
Humidity   0 to 95% (non-condensing)

Appendix A

Limited Warranty

A.1   Products

Canoga Perkins warrants that, at the time of sale, its products will be free from defects in material and workmanship, and if properly installed and used will substantially conform to Canoga Perkins' published specifications. Subject to the conditions and limitations set forth below, Canoga Perkins will, at its opinion, either repair or replace any part of its product(s) that prove defective by use of improper worksmanship or materials. This warranty does not cover any damage to products that have been subjected to lightning damage or other Acts of Nature, misuse, neglect, accident, damage, improper installation or maintenance, or alteration or repair by anyone other thanCanoga Perkins or its authorized representative. Customer must notify Canoga Perkins promptly in writing of any claim based on warranty. Canoga Perkins is not liable for, and does not cover under warranty, any costs associated with service and/or the installation of its products of for any inspection, packig or labor costs in connection withreturn of goods. In the event Canoga Perkins breaches its obligation of warranty, customer sole and exclusive remedy is limited to replacement, repair, or credit of the purchase price, at Canoga Perkins' option.

A.2   Duration of Warranty

Three-year Warranty: This product is covered by this warranty for a period of three (3) years from the date of shipment.

A.3   Limitations

Canoga Perkins may at its sole discretion modify its Limited Warranty at any time and from time to time.

Other than those expressly stated herein, THERE ARE NO OTHER
WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, AND
SPECIFICALLY EXCLUDED BUT NOT BY WAY OF LIMITATION,
ARE THE IMPLIED WARRANTIES FOR FITNESS FOR A PARTICU-
LAR PURPOSE AND MERCHANTABILITY. IT IS UNDERSTOOD
AND AGREED CANOGA PERKINS' LIABILITY WHETHER IN
CONTRACT, IN TORT, UNDER ANY WARRANTY, IN NEGLI-
GENCE OR OTHERWISE SHALL NOT EXCEED THE AMOUNT OF
THE PURCHASE PRICE PAID BY THE PURCHASER AND UNDER
NO CIRCUMSTANCES SHALL CANOGA PERKINS BE LIABLE
FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL
DAMAGES. THE PRICE STATED FOR THE EQUIPMENT IS A
CONSIDERATION IN LIMITING CANOGA PERKINS' LIABILITY.
NO ACTION, REGARDLESS OF FORM, ARISING OUT OF THE
TRANSACTIONS OF THIS AGREEMENT MAY BE BROUGHT BY
PURCHASER MORE THAN ONE YEAR AFTER THE CAUSE OF
THE ACTION HAS ACCRUED. CANOGA PERKINS' MAXIMUM
LIABILITY SHALL NOT EXCEED AND CUSTOMER'S REMEDY IS
LIMITED TO EITHER (i) REPAIR OR REPLACEMENT OF THE
DEFECTIVE PART OF PRODUCT, OR AT CANOGA PERKINS'
OPTION (ii) RETURN OF THE PRODUCT AND REFUND OF THE
PURCHASE PRICE, AND SUCH REMEDY SHALL BE
CUSTOMER'S ENTIRE AND EXCLUSIVE REMEDY.

A.4   Customer Service Department Repair Warranty

Repairs performed by the Canoga Perkins Customer Service Department
will be free from defects in material and workmanship for a period of ninety
(90) DAYS from the date the repaired product is shipped, or until the
expiration of the original factory warranty, whichever is longer.
Shipping charges to Canoga Perkins will be at customer's expense. Units
will be returned to the customer FOB origin. Repaired units will be returned
to the customer by standard ground shipment unless otherwise specified,
with any additional costs for customer specified expedited delivery at the
customer's expense.

A.5   Return Policy

Customer must obtain an RMA (Return Material Authorization) number from the Canoga Perkins Customer Service Department (818) 718-6300 prior to returning a product for service or repair.

If the product's warranty has expired, customer must provide the Canoga Perkins Customer Service Representative with a Purchase Order to authorize the repair.

Whenever possible, products should be returned in the original shipping carton or packaging with a description of the failure and results of any diagnostic testing included.

CANOGA PERKINS CORPORATION
Customer Service Department
20600 Prairie Street
Chatsworth, California 91311-6008
Business (818) 718-6300
(Monday through Friday 7 a.m. - 3:30 p.m. Pacific Time)
FAX (818) 718-6312 (24 hrs.)

24 Hour Emergency Repair Hot Line
(800) 360-6642