

Part #	Description	CLEI Code	Kit Part #	Description
AK400C	CO Ethernet line card, 50 Mbps at CSA, Line powering	VAUIAG8J	AK4000C	CO Ethernet Kit (AK400C & AK100S)
AK401C	CO Ethernet line card, 50 Mbps at CSA	VAUIAG9J	AK4001C	CO Ethernet Kit (AK401C & AK100S)
AK400R	RT Ethernet line card, 50 Mbps at CSA	VAUIAHAJ	AK4000R	RT Ethernet Kit (AK400R & AK100S)
AK410C	CO Ethernet line card, 25 Mbps at CSA, 45 Mbps max, Line powering	VAUIACWJ	AK4010C	CO Ethernet Kit (AK410C & AK100S)
AK411C	CO Ethernet line card, 25 Mbps at CSA, 45 Mbps max	VAUIACXJ	AK4011C	CO Ethernet Kit (AK411C & AK100S)
AK410R	RT Ethernet line card, 25 Mbps at CSA, 45 Mbps max	VAUIACYJ	AK4010R	RT Ethernet Kit (AK410R & AK100S)
AK420C	CO Ethernet line card, 10 Mbps at CSA, 20 Mbps max, Line powering	VAUIAFZJ	AK4020C	CO Ethernet Kit (AK420C & AK100S)
AK421C	CO Ethernet line card, 10 Mbps at CSA, 20 Mbps max	VAUIAF0J	AK4021C	CO Ethernet Kit (AK421C & AK100S)
AK420R	RT Ethernet line card, 10 Mbps at CSA, 20 Mbps max	VAUIAF1J	AK4020R	RT Ethernet Kit (AK420R & AK100S)
AK100S	1RU Shelf (w/ AK100F fan module)	VAMB410F		

The AK4000 Ethernet product family enables point to point transport of Ethernet services over bonded pairs of copper, optimized for CSA distances (9kft 26AWG or 12kft 24AWG). The AK4000 family consists of Ethernet Central Office and Remote cards that plug into a 1RU high housing for 19" and 23" racks and for wall mounting. The remote card is either line powered by the Central Office card or locally powered. Aktino products utilize a technology "MIMO on DMT" which uses coordinated signal processing over multiple transceivers to achieve significant performance improvements over standard DSL technology. Refer to the AK4000 Ethernet Technical Practice (180-0007-001) for more comprehensive information and troubleshooting.

Installation is identical for both the CO and RT ends.

#1 Mounting (see Figure 1)

The AK4000 Family's shelf (AK100S) can be mounted in either 19 inch or 23 inch racks. The AK100S chassis includes flanges for both 19 and 23 inch mounting. Screws for mounting to both the chassis and the rack are included. Mounting holes are provided for flush or mid mount. The unit can also be mounted on a wall using either 19 or 23 inch flanges. An optional hinged bracket (AK100B) is available for easier wall mounted access.

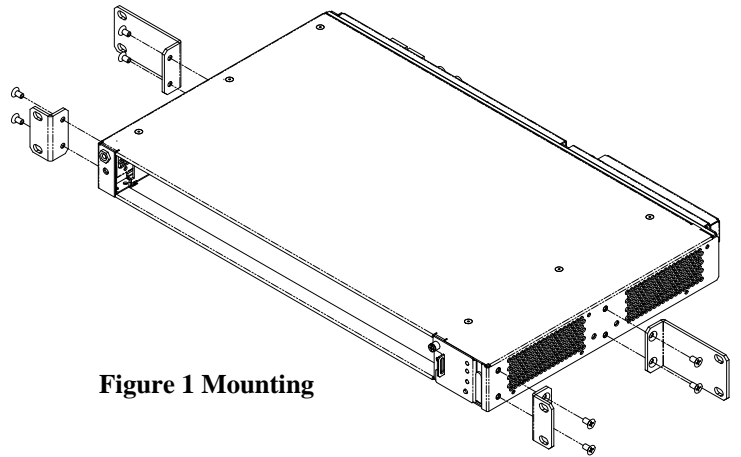


Figure 1 Mounting

#2 Connections

Frame Ground Connection (see Figure 2)

The Ground Lug located on the right hand side of the back panel can accommodate up to 6 AWG wire. Use a wire gauge for grounding at least as heavy as the power wiring. Attach the grounding wire to the AK100S Ground Lug to a nearby grounding screw on the equipment rack or facility ground. **Note that the ground connection is required for proper system operation.**

Power Connection (see Figure 2)

A 7.5A to 10A UL listed fuse/circuit breaker must be installed ahead of this unit. To access the power block, the Protective Cap located on the left hand side of the back panel must be removed. Unscrew the captive screw on the right side of the Protective Cap, slide the cap to the left and lift off. Labels of the power block and wirewrap connections are silk screened on the Protective Cap as well as the back panel. Two redundant power buses are provided (A and B). The two power inputs are identical and can be used for redundant power configurations. Insert the ends of the -48 Vdc and Return power wires (16 AWG wire is recommended) into

the A and B holes on the left side of the power block. Route the power wires towards the left of the back panel so that the Protective Cap can be reinstalled.

Alarm Connections (see Figure 2)

The alarm wirewrap connections are located under the Protective Cap. Unscrew the captive screw on the right side of the Protective Cap, slide the cap to the left and lift off. Labels of the wirewrap connections are silk screened on the Protective Cap as well as the back panel. Each alarm consists of a three pin wire wrap header. These are generally only used on the CO end.

Ethernet Data Connections (Figure 3)

Attach Ethernet data cables to any of the four 10/100BaseT RJ45 plugs on the front panel.

Caution To order to comply with the intrabuilding lightning surge requirements, intrabuilding Ethernet wiring must be shielded, and the shield for the wiring must be grounded at both ends.

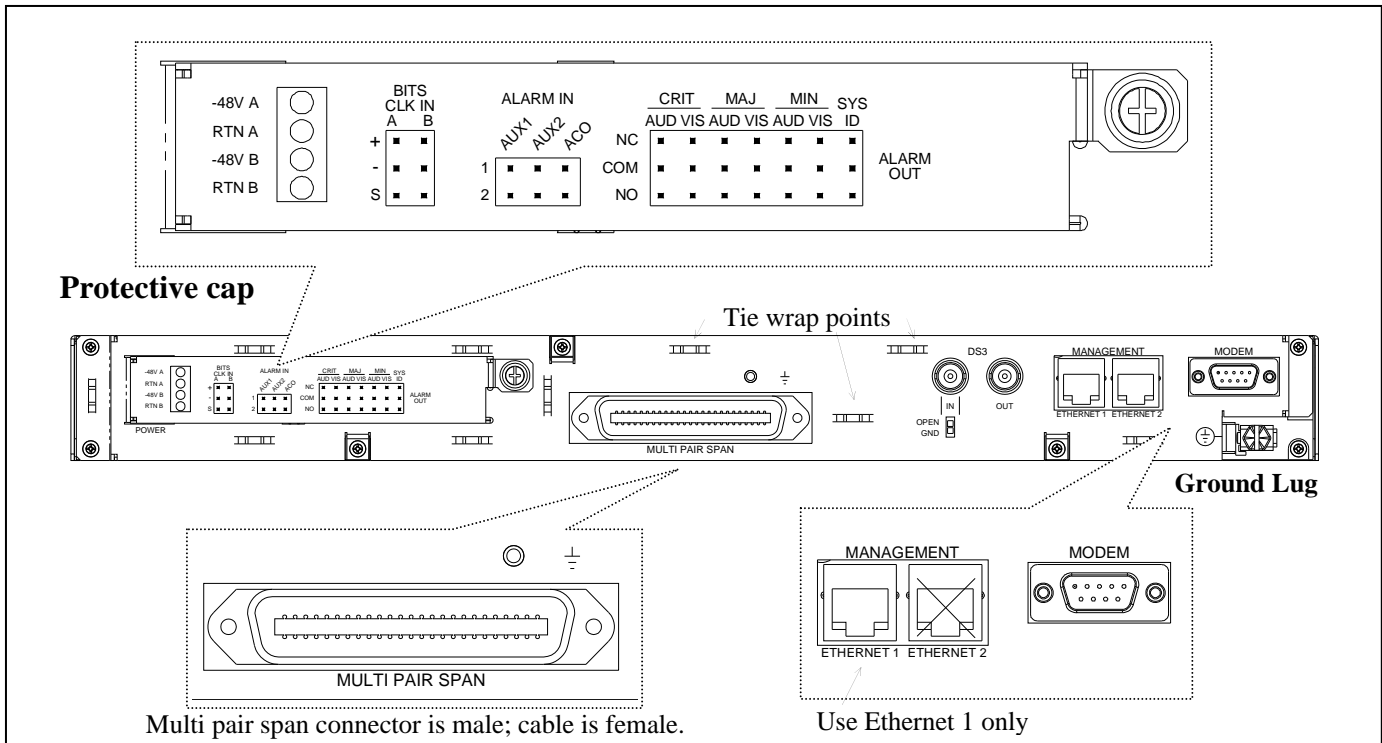


Figure 2 AK100S Back Panel

Table 1 specifies the standard 50 pin AMP connector pin assignments.

Management Connection

Ethernet 1 female RJ-45 port (located on the back panel) can be used for local or remote management access. The Ethernet port automatically is set to either 10BaseT or 100BaseT and auto-sense the polarity of TX/RX (automatic MDIX). Ethernet 2 port is not available.

Caution To order to comply with the intrabuilding lightning surge requirements, intrabuilding Ethernet management wiring must be shielded, and the shield for the wiring must be grounded at both ends.

The back panel RS232 modem port can be used for local or remote management access. The port is set for PPP communication for telnet or AktinoView GUI access.

The front panel Craft port is used for command line access using a terminal emulator program; AktinoView is not supported on the craft port except for IP initialization.

Management is generally attached at the CO end.

MSPAN Connection

The MSPAN connector is used to connect the Aktino 4000 to the outside plant pairs. The CO MSPAN cable should be shielded with a pigtail wire that attaches to the ground lug just above the MSPAN connector. The RT MSPAN cable’s shield should NOT be connected to ground (leave open). The MSPAN cable is female. Tie wrap points are available in several places on the back panel. The MSPAN cable can be routed to the left or right.

Table 1 MSPAN Connector Pin Assignments

	TIP	RING
Pair 1	26	1
Pair 2	27	2
Pair 3	28	3
Pair 4	29	4
Pair 5*	30	5
Pair 6*	31	6
Pair 7*	32	7
Pair 8*	33	8
Pair 9*	34	9
Pair 10*	35	10
Pair 11*	36	11
Pair 12*	37	12
Pair 13*	38	13
Pair 14*	39	14

* Note that only the first four pairs are active on the AK42x products and only the first eight pairs are active on the AK41x products.

#3 Provisioning (see Table 2)

AktinoView software is used to provision and monitor the system. Use AktinoView V3 to access the most up to date features available. Load AktinoView software onto the maintenance computer per the instructions on the CDRROM package.

Configuring Management Ethernet Port

AktinoView uses the Ethernet port 1 for access to the Aktino unit. Generally, the CO unit is used to set up the system; the RT unit can be provisioned through the CO unit.

Use *one* of the two following procedures to configure the unit's Management Ethernet port.

Method #1: Initialization using the front panel Craft port

- 1) Connect a serial cable between the maintenance computer and the Aktino unit's front panel craft port.
- 2) Start a terminal program such as HyperTerminal on the maintenance computer. Parameters are 9600 baud, eight bits, no parity bits, 1 stop bit, and no handshake.
- 3) After the unit has finished booting, a prompt "AKxxxx>" should appear, where xxxx is the part number of the unit. At the prompt, type bolded item: AKxxxx> **enable**
- 4) At prompt login: type the login name*
- 5) At prompt Password: type the password*
- 6) You will be prompted to enter the following information:
Enter TID [CO]:
Enter IPAddress [192.168.10.1]:
Enter NetMask [255.255.255.0]:
Enter Gateway [0.0.0.0]:
Enter ProxyIP-Address[0.0.0.0]: (CO only)
Enter Date (yyyy-mm-dd)[2005-08-11]: (CO only)
Enter Time (hh-min-sec)[13-03-24]: (CO only)
- 7) Inputs can be modified with AktinoView at a later time. Hit enter to use the default value in the brackets.
- 8) Exit the terminal program.

Method #2: Initialization using the Management Ethernet port

- 1) Connect an Ethernet cable between the maintenance computer and the Aktino unit's Management Ethernet 1 port located on the back of the chassis.
- 2) The Aktino CO and RT units have a factory default IP address of 192.168.10.1 and 192.168.10.2 respectively.
- 3) Configure the maintenance computer's IP address to 192.168.10.3 and Netmask to 255.255.255.0. Note the maintenance computer's original settings.

- 4) Run AktinoView using 192.168.10.1 (CO) or 192.168.10.2 (RT) as the IP address for the Aktino unit. Enter the user name and the password*.
- 5) If desired, the Aktino units can now be provisioned with AktinoView.
- 6) If adding the Aktino unit to the local LAN, in the AktinoView GUI, under "Tools" in the top menu bar, select "Quick Provisioning".
- 7) Configure the Aktino unit's desired IP address, subnet mask, and gateway address for the local LAN.
- 8) Exit AktinoView.
- 9) Reconfigure the maintenance computer's IP address to original setting.

Provisioning with AktinoView V3

Connect the Aktino unit's Ethernet 1 port to the local LAN. Once the Management Ethernet port has been set up, AktinoView V3 should be started to provision the circuit.

See Table 2 below for common provisioning parameters under the AktinoView V3 Provisioning tab.

Table 2 Common Provisioning Selections

Parameter	Values
MSPAN Rate	Rate (Kbps)
# Pairs	1 to 4 (AK42x), 1 to 8 (AK41x), 1 to 14 (AK40x) Individual pairs can be set to UP or DOWN in the Pair menu
Line Powering	Off, -135v, -185v (-185v default) Note, line powering is not available on the AK4x1 products.
MSPAN SNR Margin (MSPAN menu)	0..18db (5db default)
Ethernet Parameters	Each port's parameter values can be provisioned in the Ethernet Menus

***NOTE: Default login name and password is superuser. For system security, the password for superuser should be changed.**

#4 System Health Verification

As soon as power is applied to the CO unit (and the RT unit if locally powered), the system automatically starts up. The front panel indicators show the status of the system (see Figure 3 and Table 4). If any of the LED's is not Normal, AktinoView can be used to determine the source of the problem.

AktinoView main status screen shows an overview of the system. Performance monitoring for Ethernet, MSPAN, and Pair is available through the tree menu. Current system alarms (see Table 3) are displayed on the main status screen. Alarm history and logs are available through the tree menu.

Table 3 Common Alarms (displayed by AktinoView)

Alarm Fault	Troubleshooting
MSPAN LOS	MultiPair Span pairs are down, check pairs
MSPAN Capacity	MultiPair Span capacity below configured rate; increase number of pairs or decrease system margin or reduce rate. Check Pairs PM to ensure proper operation.
Pair LOS	Pair is connected but not receiving signal, check Pair PM.
Pair Open Circuit	Pair is not connected

Table 4 Front Panel Indicators

LED	Condition	Function
STATUS	Off	Power off
	Green	Normal
	Red	Card malfunction
FUSE	Off	Unit fuse ok
	Red	Unit fuse has blown
ALARM	Solid green	Normal
	Solid yellow	Minor Alarm active
	Solid red	Critical or Major Alarm active
MULTIPAIR SPAN	Solid green	Normal
	Solid yellow	Minor Alarm
	Solid red	Critical or Major Alarm
PAIR STATUS	Off	Pair is disabled
	Solid green	Pair is up
	Flashing green	Pair is acquiring
	Solid red	Pair LOS/Open circuit/Short
BAT A, BAT B	Off	External DC power has not been applied
	Solid green	External DC power is present
FAN ALM	Solid green	Fan status normal
	Solid yellow	One fan has failed
	Flashing red	More than one fan has failed

Figure 3 AK4000 Front Panel (AK41x unit shown)

