



Optelecom 9000 Series Installation and Operation Manual

Model 9621AT Simplex Model 9621AR Simplex Model 9621AY Duplex

Four Channel Option Module Host
Multiplexer/Demultiplexer Card

For transmission of any combination of
four Option Modules over one optical fiber

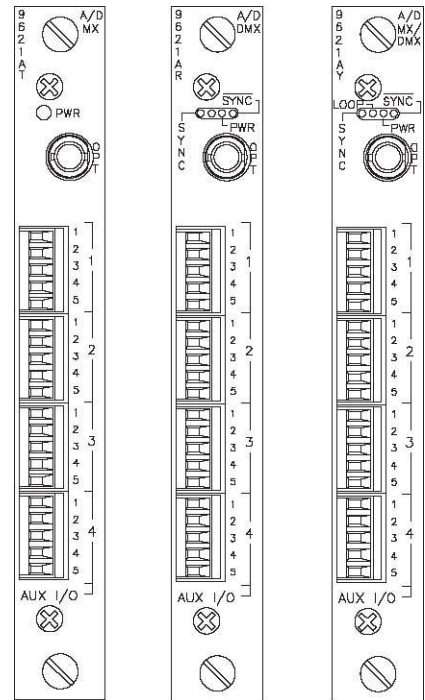


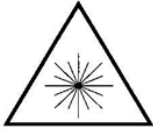
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Safety Instructions

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The safety information contained in this section, and on other pages of this manual, must be observed whenever this unit is operated, serviced, or repaired. Failure to comply with any precaution, warning, or instruction noted in the manual is in violation of the standards of design, manufacture, and intended use of the unit. TKH Security Solutions USA assumes no liability for the customer's failure to comply with any of these safety requirements.



LASER RADIATION
DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS (MAGNIFIERS)
CLASS 1M LASER PRODUCT

CAUTION:
DISCONNECTED OPTICAL CONNECTORS MAY EMIT OPTICAL ENERGY.
DO NOT VIEW BEAM WITH OPTICAL INSTRUMENTS (MAGNIFIERS)

This product contains Class 1M lasers or LEDs.

- Class 1M laser product according to IEC60825-1:1993+A1+A2
- **CAUTION: Use of controls or adjustments or procedures other than those specified herein may result in hazardous radiation exposure.**
- Precautions should be taken to prevent exposure to optical radiation when the unit is removed from its enclosure or when fiber is disconnected from the unit.
- Laser radiation may be present on a fiber connection to this unit even when the power has been removed from the unit.
- This unit is intended for installation in locations where only trained service personnel have access to the fiber connections.
- The locations of all optical connections are listed in the Connection Locations and Function section of this manual.
- Optical outputs and wavelengths are listed in the Specifications section of this manual.

The optical devices used in this equipment are Hazard Level 1M. As required by IEC60825-1, the installer is responsible for insuring that the label depicted below is present in the restricted locations where this equipment is installed.

Hazard Level 1M

The border shall be black and the background shall be yellow



This assembly contains parts sensitive to damage by electrostatic discharge (ESD). Use ESD precautionary procedures when touching, removing, or inserting parts or assemblies.

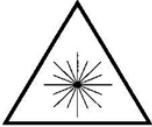


The chassis into which this unit is installed must be housed in a properly rated NEMA enclosure.



When this unit is operated in extremely elevated temperature conditions, it is possible for internal and external metal surfaces to become extremely hot. Care should be taken to insure this unit is installed in a restricted area where only properly trained service personnel have access to the unit.

Debe observarse la información de seguridad contenida en esta sección, y en otras páginas de este manual siempre que se opere, dé servicio o repare esta unidad. Si no se cumple con alguna precaución, advertencia o instrucción indicada en este manual se infringen los estándares de diseño, fabricación y el uso destinado a la unidad. TKH Security Solutions USA no asume ninguna responsabilidad si el cliente no cumple con alguno de estos requisitos de seguridad.



RADIACIÓN LÁSER
NO VER DIRECTAMENTE CON INSTRUMENTOS ÓPTICOS (DE AUMENTO)
PRODUCTO LÁSER CLASE 1M

PRECAUCIÓN:
LOS CONECTORES ÓPTICOS DESCONECTADOS PUEDEN AMITIR ENERGÍA ÓPTICA
NO VER EL HAZ CON INSTRUMENTOS ÓPTICOS (DE AUMENTO)

Este producto contiene rayos láser o diodos emisores de luz Clase 1M.

- Producto láser Clase 1M conforme a la norma IEC60825-1: 1993+A1+A2
- **PRECAUCIÓN:** El uso de los controles, ajustes o procedimientos, aparte de los aquí especificados, pueden ocasionar exposición peligrosa a la radiación.
- Deben tomarse precauciones para evitar la exposición a la radiación óptica cuando se saque la unidad de su alojamiento, o cuando se desconecte la fibra de la unidad
- Puede haber radiación laser en una conexión de fibra a esta unidad aun cuando se haya eliminado la corriente de la unidad.
- Este equipo está destinado a instalarse en lugares donde sólo el personal de servicio debidamente entrenado tenga acceso a las conexiones de fibra.
- La ubicación de todas las conexiones ópticas se enumeran en la sección Ubicación de los conectores y funciones de este manual.
- Las salidas ópticas y longitudes de onda aparecen en la sección Especificaciones de este manual.

Los dispositivos ópticos usados en este equipo son de Nivel de Riesgo 1M. Según lo exige la norma IEC60825-1, el instalador es responsable de asegurar que la etiqueta descrita a continuación esté presente en las áreas restringidas donde se instale este equipo.



El borde debe ser negro y el fondo debe ser amarillo



Este ensamblaje contiene piezas sensibles al daño por descargas electrostáticas (ESD, por sus siglas en inglés). Use procedimientos para prevenir las descargas electrostáticas al tocar, desmontar o insertar piezas o ensamblajes.

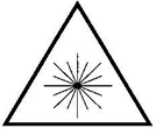


El chasis en el cual está instalada esta unidad debe estar dentro de un alojamiento debidamente calificado por NEMA.



Cuando se opera esta unidad en condiciones de temperatura sumamente elevada, es posible que las superficies internas y externas de metal se pongan extremadamente calientes. Debe tenerse cuidado para asegurar que esta unidad se instale en un área restringida donde sólo tenga acceso a la unidad el personal de servicio debidamente capacitado.

Die in diesem Abschnitt und auf anderen Seiten dieses Handbuchs enthaltenen Sicherheitsinformationen müssen befolgt werden, wenn diese Einheit betrieben, gewartet oder repariert wird. Falls Vorsichtsmassnahmen, Warnungen oder Anweisungen in diesem Handbuch nicht befolgt werden, verstösst dies gegen die Konstruktions, und Herstellungsstandards und erfolgt im gegensatz zum vorgesehenen Verwendungszweck dieser Einheit. TKH Security Solutions USA übernimmt keine Haftung für das Verabsäumen des Kunden, diese Sicherheitsanforderungen einzuhalten.



LASER-STRAHLUNG
NICHT DIREKT MIT OPTISCHEN INSTRUMENTEN (LUPEN) ANSEHEN
LASER-PRODUKT DER KLASSE 1M

VORSICHT:
ABGEKLEMMTE OPTISCHE STECKVERBINDER KÖNNEN OPTISCHE ENERGIE FREI SETZEN
NICHT MIT OPTISCHEN INSTRUMENTEN (LUPEN) IN DEN STRAHL BLICKEN.

Dieses Produkt enthält Laser oder LEDs der Klasse 1M.

- Laserprodukt der Klasse 1M gemäß IEC60825-1:1993+a1+A2
- **VORSICHT: Wenn die Bedienungselemente anders als hier beschrieben bzw. andere Einstellungen verwendet werden, kann es zu schädlicher Strahlenaussetzung kommen.**
- Es müssen Vorsichtsmaßnahmen getroffen werden, um Aussetzung an optischer Strahlung zu vermeiden, wenn die Einheit aus dem Gehäuse genommen oder die Faseroptik von der Einheit getrennt wird.
- In einer Faseroptik-Verbindung dieser Einheit kan auch dann Laserstrahlung vorhanden sein, wenn die Stromversorgung zur Einheit abgeschaltet wurde.
- Diese Einheit ist zum Einbau an Orten vorgesehen, an denen nur geschultes Personal Zugang zu den Faseroptik-Verbindungen hat.
- Die Lage aller optischen Verbindungen ist im Abschnitt über die Lage von Anschlüssen und Funktionsweise dieses Handbuchs zu finden.
- Optische Ausgänge und Wellenlängen sind im Abschnitt mit den technischen Daten dieses Handbuchs zu finden.

Die optischen Vorrichtungen in diesem Gerät haben Gefahrenstufe 1M. Wie vorgeschrieben durch IEC60825-1 ist der Installateur dafür verantwortlich, sicherzustellen, dass die unten abgebildeten Schilder an den Orten mit eingeschränktem Zugang, an denen dieses Gerät aufgestellt ist, vorhanden sind.



Schwarzer Rand und
gelber Hintergrund



Diese Baugruppe enthält Teile, die durch elektrostatische Entladungen (ESD) beschädigt werden können. Vorsichtsmaßnahmen zum Schutz vor elektrostatischer Entladung treffen, wenn Teile oder Baugruppen berührt, ausgebaut oder eingefügt werden.



Das Gestell, in dem diese Einheit eingebaut ist, muss in einem entsprechend klassifizierten NEMA-Schutzgehäuse untergebracht sein.

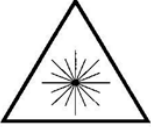


Wenn diese Einheit bei besonders hohen Temperaturen betrieben wird, können interne und externe Metallflächen extrem heiß werden. Es muss darauf geachtet werden, dass diese Einheit in einem Bereich mit eingeschränktem Zugang aufgestellt wird, damit nur geschultes Wartungspersonal Zugang zur Einheit hat.

Consignes de Sécurité

RM-1

Les consignes de sécurité contenues dans cette section et dans le reste de ce manuel doivent être respectées à chaque fois que cet appareil est utilisé ou fait l'objet d'une maintenance ou d'une réparation. Le non-respect d'une précaution, d'un avertissement ou d'une instruction figurant dans ce manuel est une violation des normes de conception, fabrication et indication d'usage de l'appareil. TKH Security Solutions USA n'est pas responsable du non-respect de ces consignes de sécurité par le client.



RAYONNEMENT LASER
NE PAS REGARDER DIRECTEMENT AVEC DES INSTRUMENTS OPTIQUES (LOUPES)
PRODUIT LASER DE CLASSE 1M

ATTENTION:
LES CONNECTEURS OPTIQUES DEBRANCHES PEUVENT EMETTRE UNE ENERGIE OPTIQUE.
NE PAS REGARDER LE FAISCEAU AVEC DES INSTRUMENTS OPTIQUES (LOUPES)

Ce produit contient des lasers ou diodes électroluminescentes de classe 1M.

- Produit laser de classe 1M conformément à IEC60825-1:1993+A1+A2
- **ATTENTION: L' utilisation de commandes ou réglages, ou de procédures différentes de celles indiquées ici risque de provoquer une exposition dangereuse au rayonnement.**
- Prendre des précautions pour empêcher une exposition au rayonnement optique lorsque l' appareil est retiré de son boîtier ou lorsque la câble optique fibre est débranché de l' appareil.
- Un rayonnement laser pourra être présent dans un câble optique branché sur cet appareil, même une fois l'alimentation coupée.
- Cet appareil est prévu pour une installation à des endroits où seul un personnel de maintenance formé accès aux câbles optiques.
- Les points de branchement de tous les câbles optiques sont indiqués à la section Points de branchement et fonction de ce manuel.
- Les sorties et longueurs d' onde optiques figurant à la section Caractéristiques techniques de ce manuel.

Les appareils optiques utilisés dans cet équipement correspondent à un niveau de danger 1M. Comme exigé par la norme IEC60825-1, il incombe à

l'installateur de s'assurer que l'étiquette ci-dessous est présente aux endroits d'accès limité où cet équipement est installé.

Niveau de danger 1M

La bordure doit être noire et le fond jaune



Cet ensemble contient des pièces sensibles aux décharges électrostatiques (ESD). Prendre les précautions relatives aux ESD avant de toucher, retirer ou insérer des pièces ou des ensembles.



Le châssis dans lequel est installé cet appareil doit être placé dans une enceinte NEMA conforme aux spécifications nominales.



Lorsque cet appareil fonctionne à une température ambiante extrêmement élevée, il est possible que les surfaces métalliques internes et externes deviennent extrêmement chaudes. S'assurer que cet appareil est installé dans une zone dont l'accès est limité à un personnel de maintenance correctement formé.

Fiber Information

This unit was manufactured with attention to fiber cleanliness by TKH Security Solutions USA. Beyond the optical safety information contained in this manual, the following guidelines should be observed when working with optical fibers.

The biggest problem is **dirt!**

It takes very little contamination to cause problems with optical fiber connections; cleanliness is extremely important to proper operation of optical equipment.

1. Protect optical connectors by leaving the connector covers in place on unused fiber connections and on the fiber tips themselves.
2. Personnel who remove and replace fibers should be equipped with a fiber cleaning kit. These are inexpensive and can be obtained from any fiber equipment supply house. If you choose to, you can use propanol and lint-free tissue to clean fibers.
 - a. Do not use isopropanol alcohol (typically called rubbing alcohol) mixed with water. This can cause additional spots. (**Caution: Pure isopropanol is very flammable!**)
 - b. Use lintless tissues to clean fibers.
 - c. Clean the fiber with a folded tissue moistened with the propanol, pulling the connector tip across the tissue, then turn the connector 90 degrees and repeat in a different spot on the tissue.
 - d. Don't pull the fiber across and then push it back. This will put the dirt that was cleaned off back on again.
 - e. Repeat the process on a dry, folded tissue.
3. When removing fibers, **always** clean them when replacing them no matter how long you had them off.
4. When connecting fibers, pay attention to the bend radius of the fibers. A general rule is to have a 3-inch (8 cm) bend radius. A bend radius less than 3 inches is an attenuator and can cause optical signal loss.
5. Installers of fiber equipment should be equipped with the equipment manuals and an optical power meter to measure the optical inputs and outputs in a system. An optical power meter is an inexpensive tool that can save much time and effort in getting optical communications links up and running. Properly equipped and trained installers can quickly determine the source of any problems that occur.

External Wiring Information

Cable assemblies with lengths external to the unit not exceeding 3.05 meters, coiled or uncoiled, may be constructed of jacketed appliance wiring material suitable for the maximum voltage current and temperature, rated VW-1 or FT-1 or better. Cable assemblies with lengths external to the unit not exceeding 3.05 meters, coiled or uncoiled, and supplied by a limited power source or NEC Class 2 source of supply as defined in the National Electric Code, ANSI/NFPA 70, may be constructed of materials rated VW-1 or FT-1 or better with no additional requirements.

Functional Description

The Model 9621A Multiplexer/Demultiplexer links combine/separate the data from four Option Modules for transmission via one optical fiber. The four input channels are combined using TDM techniques into a 15 mbps data stream that is modulated onto the fiber. At the other end of the link, the 9621A separates the four channels and routes them to the four Option Modules.

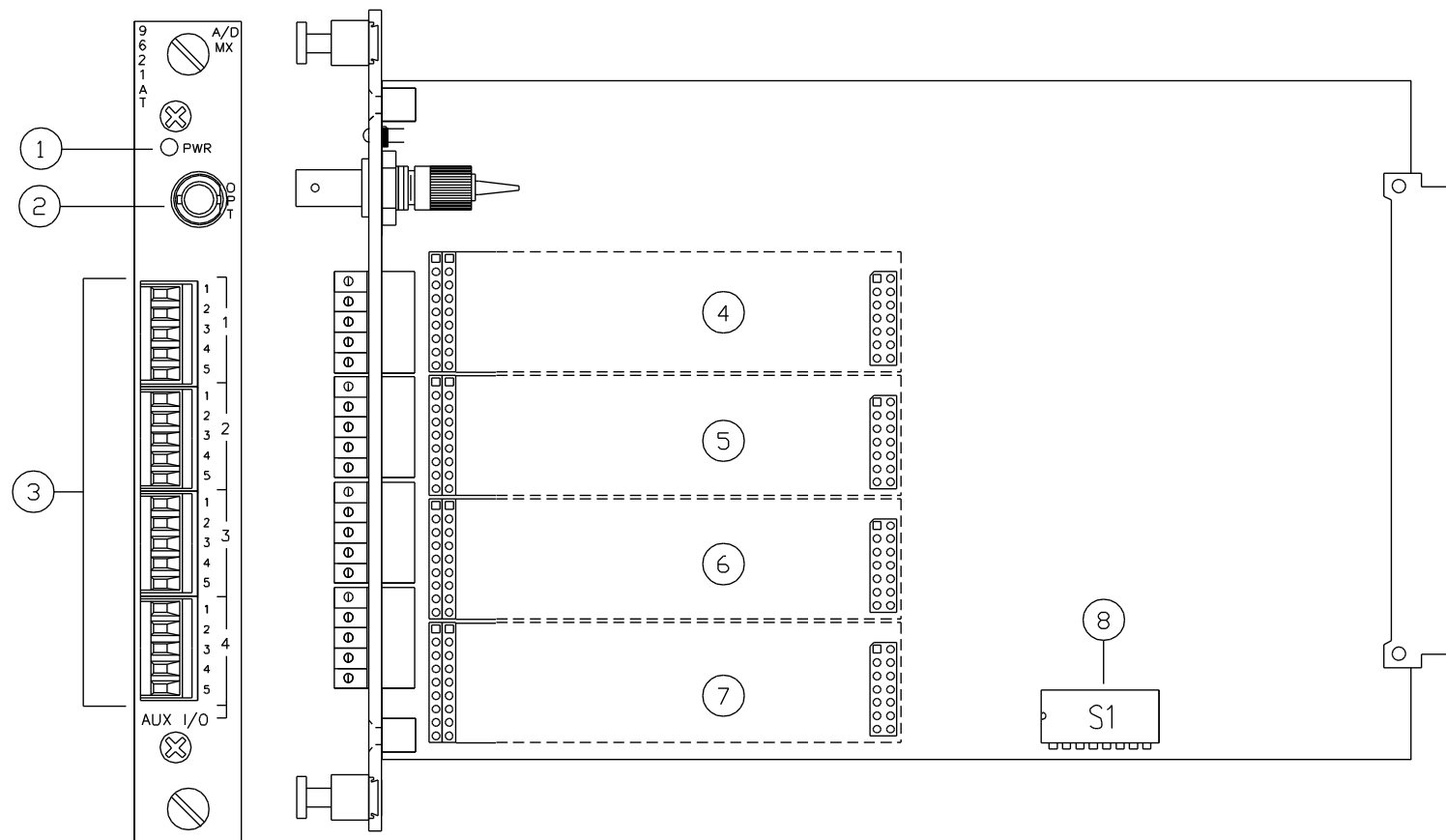
Model 9621AT/9621AR combination transmits data in one direction from the 9621ST to the 9621AR over one fiber. A pair of 9621AYs transmits data in both directions over one fiber. Refer to the separate Option Module Manual for more details on Option Module functions.

9621AT and 9621AR cards are compatible with any Option Module except type F (FM Data Option Module). The 9621A is compatible with Option Modules GM and GR (AIPhone Intercom Series Interface Option Modules), the earlier version 9621 is not.

This model is available in selected CWDM versions for use in *SpectraStream 128* CWDM applications. Model 9621A is a rack-mount, plug-in card that occupies a single slot in a Series 9000 card chassis. It operates on 6VDC from the chassis power supply.

9621AT Indicator, Connector, and Switch Locations and Functions

FIGURE 1



1. PWR

This **green** LED illuminates when power is applied to the unit.

2. OPTICAL OUTPUT PORT

Provides the output optical connection

3. OPTION MODULE CONNECTORS

These 5-pin removable screw terminal connectors provide the I/O connections to the Option Module functions. Refer to the separate Option Module Installation and Operation Manual for details on connections.

4-7. OPTION MODULE LOCATIONS

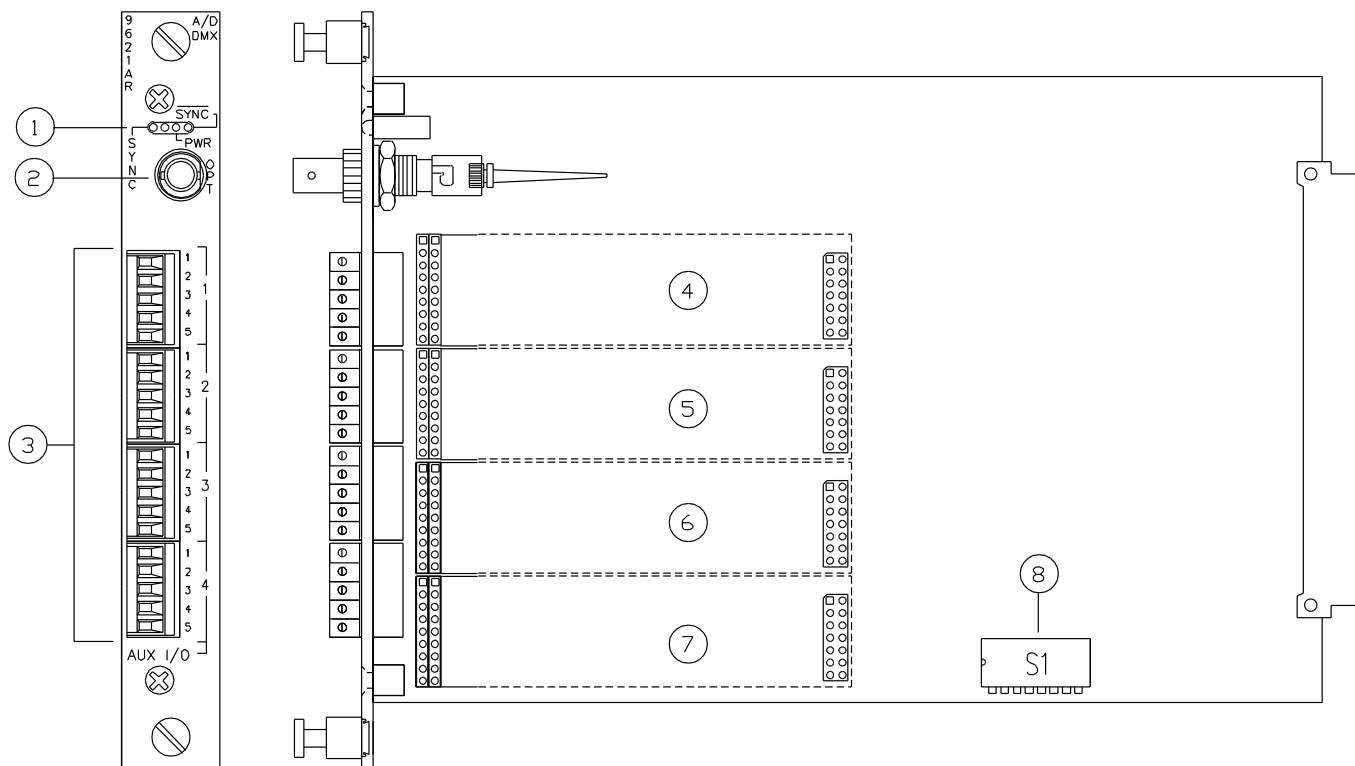
The Option Modules are installed here.

8. DIPSWITCH S1

This dipswitch sets operation of the board as a transmitter, receiver, or transceiver. It has been preset at the factory for proper operation. The settings on this switch should not be changed. Refer to the Configuration and Connection section for details on how the switch should be set.

9621AR Indicator, Connector, and Switch Locations and Functions

FIGURE 2



1. LED INDICATORS

- SYNC:** This **green** LED illuminates when the receiver has acquired the optical signal from the transmitter and is synchronized to the incoming signal.
- PWR:** This **green** LED illuminates when power is applied to the card.
- NOT SYNC:** This **red** LED illuminates when the incoming optical signal is insufficient or when the receiver cannot synchronize to the incoming signal.

2. OPTICAL INPUT PORT

Provides the input optical connection.

- OPTION MODULE CONNECTORS** These 5-pin removable screw terminal connectors provide the I/O connections to the Option Module functions. Refer to the separate Option Module Installation and Operation Manual for details on connections.

4-7. OPTION MODULE LOCATIONS

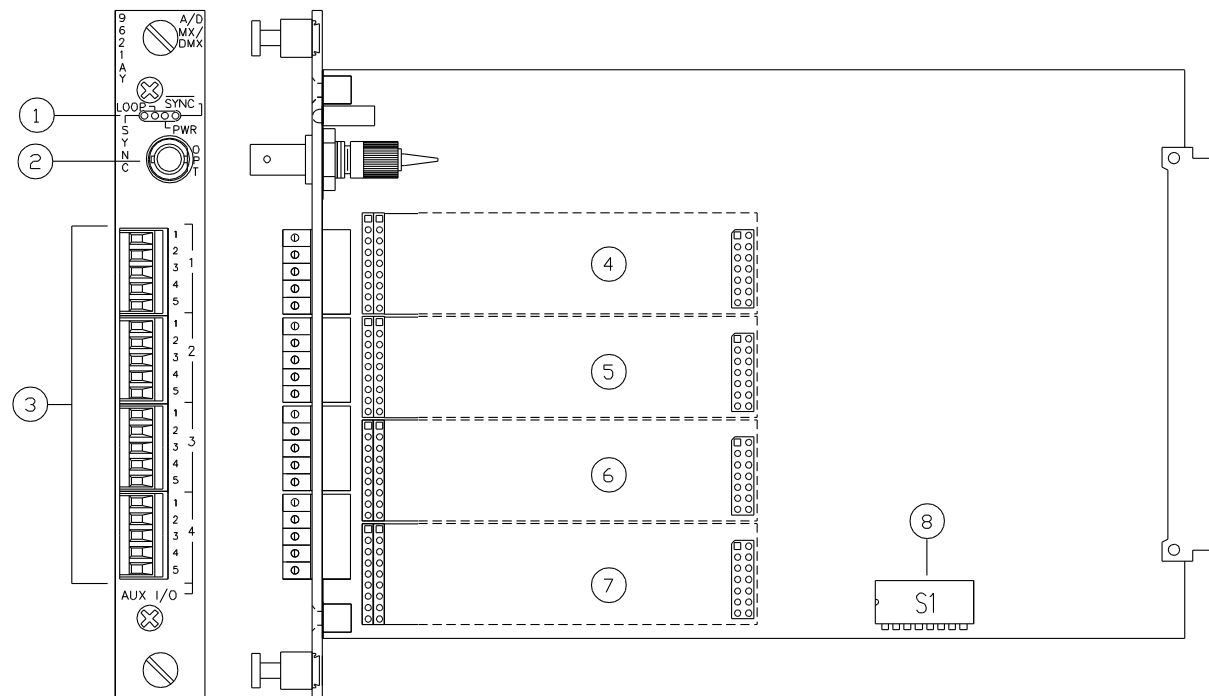
The Option Modules are installed here.

8. DIPSWITCH S1

This dipswitch sets operation of the board as a transmitter, receiver, or transceiver. It has been preset at the factory for proper operation. The settings on this switch should not be changed. Refer to the Configuration and Connection section for details on how the switch should be set.

9621AY Indicator, Connector, and Switch Locations and Functions

FIGURE 3



1. LED INDICATORS

- a. **SYNC:** This *green* LED illuminates when the receiver has acquired the optical signal from the transmitter and is synchronized to the incoming signal.
- b. **LOOP:** This *green* LED illuminates when both the local and remote ends of the link have synchronized with the optical signal.
- c. **PWR:** This *green* LED illuminates when power is applied to the card.
- d. **NOT SYNC:** This *red* LED illuminates when the incoming optical signal is insufficient or when the receiver cannot synchronize to the incoming signal.

2. OPTICAL I/O PORT

Provides the input/output optical connection.

3. OPTION MODULE CONNECTORS

These 5-pin removable screw terminal connectors provide the I/O connections to the Option Module functions. Refer to the separate Option Module Installation and Operation Manual for details on connections.

4-7. OPTION MODULE LOCATIONS

The Option Modules are installed here.

8. DIPSWITCH S1

This dipswitch sets operation of the board as a transmitter, receiver, or transceiver. It has been preset at the factory for proper operation. The settings on this switch should not be changed. Refer to the Configuration and Connection section for details on how the switch should be set.

9621A Configuration and Connection Guide

CONFIGURATION

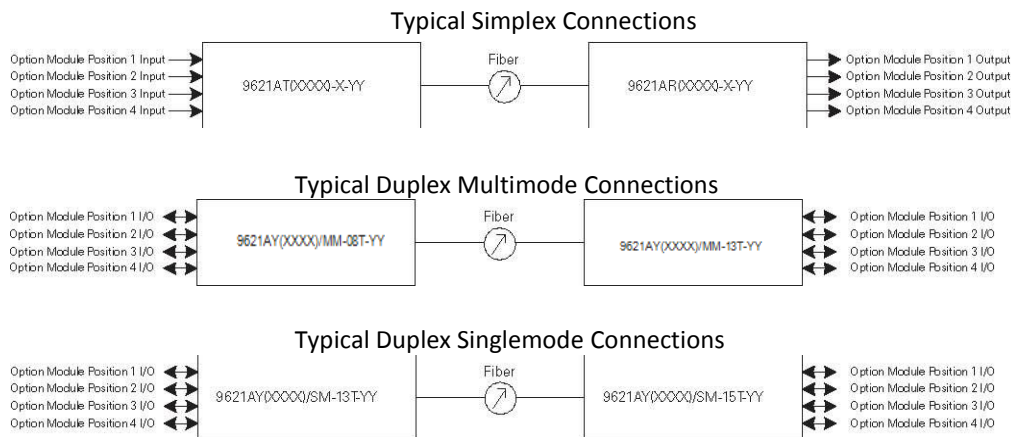
The only configuration item on the 9621AY is dipswitch S1. *This switch has been preset at the factory and should not be changed.* Refer to Table 1 for the correct settings of this switch.

Card Type	1	2	3	4	5	6	7	8
9621AT	Off (UP)	Off (UP)	Off (UP)	Off (UP)	Off (UP)	Off (UP)	On (DOWN)	Off (UP)
9621AR	Off (UP)	Off (UP)	Off (UP)	Off (UP)	Off (UP)	Off (UP)	Off (UP)	On (DOWN)
9621AY	Off (UP)	Off (UP)	Off (UP)	Off (UP)	Off (UP)	Off (UP)	Off (UP)	Off (UP)

CONNECTIONS

Make the fiber connection from the 9621AT to the 9621AR. A 9621AY link requires a mated pair. Refer to Figure 4 for fiber connection details and to the Specifications Section for a list of mating pairs.

FIGURE 4



Connect the signals to be transported via the 9621A to the Option Module connectors. Refer to the separate Option Module manual for details on these connections.

Operation of the 9621A

Operation is straightforward. There are no adjustments. Table 2 lists possible problems and troubleshooting items to check based on the indicators.

TABLE 2				
Model	PWR Indicator	Sync Indicator	Loop Indicator	Sync Indicator
9621AT	OFF — No power applied or card fault	N/A	N/A	N/A
	ON (green) — Power OK	N/A	N/A	N/A
9621AR	OFF — No power applied or card fault	OFF — Receiver not in sync with optical signal from transmitter. Check fiber, optical received power, transmitter optical output power	N/A	OFF — Receiver in sync with optical signal from transmitter
	ON (green) — Power OK	ON (green) — Receiver in sync with optical signal from transmitter	N/A	ON (red) — Receiver not in sync with optical signal from transmitter, check fiber, optical received power, transmitter optical output power
9621AY	OFF — No power applied or card fault	OFF — Local transceiver not in sync with optical signal from remote transceiver. Check fiber, optical output power, optical received power	OFF — Either local or remote transceiver not in sync. Check fiber, optical output power, optical received power at both ends	OFF — Local transceiver in sync with optical signal from remote transceiver
	ON (green) — Power OK	ON (green) — Local transceiver in sync with optical signal from remote transceiver	ON (green) — Local transceiver in sync with optical signal from remote transceiver and remote transceiver in sync with optical signal from local receiver	ON (red) — Local transceiver not in sync with optical signal from remote transceiver. Check fiber, optical output power, optical received power

Operation of the 9621A with Network Management System Software

Operation of the 9621A with the Network Management System consists of the following parameters:

1. Card Location
2. Card Size (Number of Slots)
3. Card Name (Mode Number)
4. Serial Number
5. Revision Number
6. Chronometer Value (Cumulative Hours of Operation)
7. Reset Cycles (Cumulative Number of Power Cycles)
8. Firmware Revision
9. Local Demux in Sync (9621AR and 9621AY)
10. Remote Demux in Sync (9621AY)
11. LED/Laser Drive Current (9621AT and 9621AY)
12. Received Optical Power (9621AR and 9621AY)

Specifications for the 9621AT/R/Y

OPTICAL SPECIFICATIONS

Model Numbers Complimentary T/R Pairs	Fiber Type	Transmission Direction	Wavelength (nm)	Output Power (dBm)	Receiver Sensitivity (dBm)	Link Budget (dB)	Est. Range (km) ¹
9621AT(XXXX)-S-ZZ 9621AR(XXXX)-S-ZZ	62.5/125 MM	T to R	850	-16	N/A	16	4
		N/A	850	N/A	-32		
9621AT(XXXX)-L-ST 9621AR(XXXX)-L-ST	62.5/125 MM	T to R	1310	-16	N/A	16	13
		N/A	1310	N/A	-32		
9621AY(XXXX)/MM-08T-ZZ 9621AY(XXXX)/MM-13T-ZZ	62.5/125 MM	T to R	850	-16	-31	15	4
		R to T	1310	-17	-31	14	
9621AT(XXXX)-LD-ZZ 9621AR(XXXX)-L-ZZ	SM	T to R	1310	-7	N/A	25	62
		N/A	1310	N/A	-32		
9621AT(XXXX)-LDH-ZZ 9621AR(XXXX)-L-ZZ	SM	T to R	1310	0	N/A	32	82
		N/A	1310	N/A	-32		
9621AT(XXXX)-LD3E-ZZ 9621AR(XXXX)-L-ZZ	SM CWDM	T to R	1550	0	N/A	32	82-116
		N/A	1270-1610	N/A	-32		
9621AY(XXXX)/SM-13T-ZZ 9621AY(XXXX)/SM-15T-ZZ	SM	T to R	1310	-7	-32	25	62
		R to T	1550	-7	-32	25	

¹Range based on losses of 3.0 dB/km @ 850 nm or 1.0 dB/km @ 1310 nm for 62.5/125 multimode fiber and 0.35 dB/km @ 1310 nm or 0.25 dB/km @ 1550 nm for 09/125 singlemode fiber, and includes a 3 dB safety factor.

POWER REQUIREMENTS

Current
Voltage
Source

0.4 to 0.8 Amps (varies with the type of Option Modules installed)
6VDC
Chassis backplane

DATA SUBCHANNEL SPECIFICATIONS

Composite Data Rate
Data Sampling Rate
Option Module I/O Specs

15 Mbps
1.5 mHz
Refer to the separate Option Module Installation and Operation Manual

PHYSICAL**Dimensions (in inches)**

6.2 H x 0.8 W x 8.6 D

Weight (in pounds)

0.5

ENVIRONMENTAL**Operating Temperature**

-40° C to +74° C

Storage Temperature

-55° C to +85° C

Relative Humidity

0 to 95% noncondensing

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