Encoder Model D9040

User and Service Manual

Software Version 1.0

Notices

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AVC/MPEG-4/H.264 Products

With respect to each AVC/MPEG-4/H.264 product, Cisco is obligated to provide the following notice:

Please Read This Entire Guide

Veuillez lire entièrement ce guide

Bitte das gesamte Handbuch durchlesen

Sírvase leer completamente la presente guía

Si prega di leggere completamente questa guida

Important:

Please read this entire guide before you install or operate this product. Give particular attention to all safety statements.

Important:

Veuillez lire entièrement ce guide avant d'installer ou d'utiliser ce produit. Prêtez une attention particulière à toutes les règles de sécurité.

Zu beachten:

Bitte lesen Sie vor Aufstellen oder Inbetriebnahme des Gerätes dieses Handbuch in seiner Gesamtheit durch. Achten Sie dabei besonders auf die Sicherheitshinweise.

Importante:

Sírvase leer la presente guía antes de instalar o emplear este producto. Preste especial atención a todos los avisos de seguridad.

Importante:

Prima di installare o usare questo prodotto si prega di leggere completamente questa guida, facendo particolare attenzione a tutte le dichiarazioni di sicurezza.

Safety Precautions

Protect yourself from electric shock and your system from damage!

- This product complies with international safety and design standards. Observe all safety procedures that appear throughout this guide, and the safety symbols that are affixed to this product.
- If circumstances impair the safe operation of this product, stop operation and secure this product against further operation.

Avoid personal injury and product damage! Do not proceed beyond any symbol until you fully understand the indicated conditions!

	You may find this symbol on the product and/or in the literature that accompanies this product. It indicates important operating or maintenance instructions.
	You may find this symbol on the product and/or in the literature that accompanies this product. It indicates a live terminal; the symbol pointing to the terminal device.
	You may find this symbol on the product and/or in the literature that accompanies this product. It indicates a protective earth terminal.
	You may find this symbol on the product and/or in the literature that accompanies this product. It indicates excessive or dangerous heat.

Power

- **Important!** This is a Class I product. You must earth this product.
  This product plugs into a socket-outlet. The socket-outlet must be near this product, and must be easily accessible.
- Connect this product only to the power source that is indicated on the back panel of this product.
- If this product does not have a mains power switch, the power cord serves this purpose.

Enclosure

- Do not allow moisture to enter this product.
- Do not open the enclosure of this product unless otherwise specified.
- Do not push objects through openings in the enclosure of this product.

Cables

- Always disconnect all power cables before servicing this product.
- Always pull on the plug or the connector to disconnect a cable. Never pull on the cable itself.
- Do not walk on or place stress on cables or plugs.

Factory service

- Refer service only to service personnel who are authorized by the factory.

Règles de sécurité

Protégez-vous des risques d'électrocution et protégez votre système contre les endommagements éventuels.

- Ce produit respecte les standards internationaux de sécurité et de conception. Veuillez observer toutes les procédures de sécurité qui apparaissent dans ce guide, ainsi que les symboles de sécurité qui figurent sur le produit.
- Si, du fait des circonstances, ce produit cesse de fonctionner normalement, cessez de l'utiliser et empêchez-en l'utilisation future.

Évitez le risque de blessures et de dommages aux produits! Ne procédez à aucune tâche tant que vous n'aurez pas entièrement assimilé les conditions indiquées par un symbole!

	Ce symbole figure dans la documentation accompagnant ce produit. Il indique d'importantes instructions de fonctionnement ou d'entretien.
	Ce symbole peut être attaché à ce produit. Il indique une borne sous tension; la direction indique la borne.
	Ce symbole peut être attaché à ce produit. Il indique une borne de terre de protection.
	Ce symbole peut être attaché à ce produit. Il indique une température excessive ou dangereuse.

Alimentation

- **Important!** Ce produit fait partie de la classe I. Vous devez le mettre à la terre.
- Ce produit se branche dans une prise murale. Cette dernière doit être placée à proximité du produit et doit être facilement accessible.
- Ne branchez ce produit qu'à la source d'alimentation indiquée sur son panneau arrière.
- Si ce produit n'a pas d'interrupteur d'alimentation générale, le cordon d'alimentation remplit ce rôle.

Enceinte

- Ne laissez pas l'humidité pénétrer dans ce produit.
- N'ouvrez pas l'enceinte de ce produit, sauf instructions contraires.
- Ne forcez pas d'objets dans les ouvertures du boîtier.

Câbles

- Débranchez toujours tous les cordons d'alimentation avant de réparer ce produit.
- Tirez toujours sur la prise ou le connecteur pour débrancher un câble. Ne tirez jamais directement sur le câble.
- Ne marchez pas sur les câbles ou les prises et n'y exercez aucune pression.

Réparations effectuées à l'usine

- Ne confiez les travaux de réparations qu'au personnel autorisé par l'usine.

Sicherheitsvorkehrungen

Schützen Sie sich gegen elektrischen Schlag, und Ihr Gerät gegen Beschädigung!

- Dieses Gerät entspricht internationalen Sicherheits-und Ausführungsnormen. Beachten Sie alle in diesem Handbuch enthaltenen Sicherheitshinweise sowie die am Gerät angebrachten Warnzeichen.
- Sollten örtliche Umstände den sicheren Betrieb dieses Gerätes beeinträchtigen, schalten Sie es ab und sichern es gegen weitere Benutzung.

Vermeiden Sie Verletzungen sowie Beschädigung des Gerätes! Wenn Sie zu einem der folgenden Warnzeichen gelangen, nicht weiterarbeiten, bis Sie seine Bedeutung voll verstanden haben!

	Dieses Symbol erscheint auf dem Gerät und/oder in der ihm beiliegenden Literatur. Es bedeutet wichtige, zu beachtende Betriebs-oder Wartungsanweisungen.
	Wenn dieses Zeichen am Gerät angebracht ist, warnt es vor einer spannungsführenden Stelle.
	Dieses Symbol kennzeichnet auf dem Gerät die Anschlußstelle der Sicherheitserde.
	Wenn dieses Zeichen am Gerät angebracht ist, warnt es vor heißen Stellen, die zu Verbrennungen führen können.

Netzspannung

- **Wichtig!** Dieses Gerät ist ein Produkt der Schutzklasse I. Es muß geerdet werden.
- Das Gerät ist an einer Steckdose anzuschließen. Diese muß sich leicht zugänglich in unmittelbarer Nähe des Gerätes befinden.
- Die Netzversorgung muß den auf der Rückwand des Gerätes angegebenen Werten entsprechen.
- Falls sich kein Hauptschalter am Gerät befindet, dient das Netzkabel diesem Zweck.

Gehäuse

- Das Innere des Gerätes ist vor Feuchtigkeit zu schützen.
- Das Gehäuse ist nicht zu öffnen.
- Niemals einen Gegenstand durch die Gehäuseöffnungen einführen!

Kabel

- Vor jeglicher Wartung des Gerätes sind alle Kabel zu entfernen.
- Hierzu grundsätzlich am Stecker oder Verbindungsstück und niemals am Kabel selber ziehen.
- Nicht auf die Kabel oder Stecker treten oder diese einer Zugbelastung aussetzen.

Hersteller-Wartung

Wartungsarbeiten sind nur durch vom Hersteller autorisierte Techniker vorzunehmen.

Precauciones de seguridad

¡Protéjase contra la electrocución y proteja su sistema contra los daños!

- Este producto cumple con los criterios internacionales de seguridad y diseño. Observe todas los procedimientos de seguridad que aparecen en esta guía, y los símbolos de seguridad adheridos a este producto.
- Si las circunstancias impiden la operación segura de este producto, suspenda la operación y asegure este producto para que no siga funcionando.

¡Evite lastimarse y evite dañar el producto! No avance más allá de cualquier símbolo hasta comprender completamente las condiciones indicadas!

	Encontrará este símbolo en el impreso que acompaña a este producto. Este símbolo indica instrucciones importantes de funcionamiento o mantenimiento.
	Es posible que este símbolo esté pegado al producto. Este símbolo indica un terminal vivo, la flecha apunta hacia el aparato terminal
	Podría encontrar este símbolo pegado al producto. Este símbolo indica un terminal de protección de tierra.
	Podría encontrar este símbolo pegado al producto. Este símbolo indica calor excesivo o peligroso.

Power

- **Importante!** Este es un producto de Clase I. Tiene que estar conectado a tierra.
- Este producto se conecta a un enchufe. El enchufe necesita estar cerca del producto y ser fácilmente accesible.
- Conecte este producto únicamente a la fuente de suministro eléctrico indicada en el panel posterior del producto.
- Si el producto no tiene interruptor para la linea principal, utilice el cordón toma de corriente para este propósito.

Cubierta

- No permita que la humedad penetre en este producto.
- No abra la cubierta del producto a menos que se indique lo contrario.
- No introduzca objetos a través de las aberturas de la cubierta del producto.

Cables

- Siempre desconectar todos los cables eléctricos antes de revisar o reparar el producto.
- Tire siempre del enchufe o del conector para desconectar un cable. Nunca tire del cable mismo.
- No camine ni aplique presión sobre los cables o enchufes.

Revisión y reparación de fábrica

Solo personal aprobado por la fábrica puede darle servicio al producto.

Precauzioni di sicurezza

Proteggetevi da scosse elettriche e proteggete il vostro sistema da possibili danni!

- Questo prodotto soddisfa le norme internazionali per la sicurezza ed il design. Seguite tutte le procedure di sicurezza contenute in questa guida e i simboli di sicurezza applicati al prodotto.
- Se circostanze avverse compromettono la sicurezza d'uso di questo prodotto, interrompetene l'uso e assicuratevi che il prodotto non venga più utilizzato.

Evitare infortuni alla persona e danni al prodotto! Non procedere oltre a qualunque simbolo fino a quando non si siano comprese pienamente le condizioni indicate!

	Questo simbolo, che appare nella letteratura di accompagnamento del prodotto, indica importanti istruzioni d'uso e di manutenzione.
	Sul prodotto potete vedere questo simbolo che indica un dispositivo terminale sotto tensione; la freccia punta verso il dispositivo.
	Potrete trovare il presente simbolo applicato a questo prodotto. Questo simbolo indica un terminale protettivo di messa a terra.
	Potrete trovare il presente simbolo attaccato a questo prodotto. Questo simbolo indica un calore eccessivo o pericoloso.

Alimentazione

- **Importante!** Questo prodotto è di Classe I. Va messo a terra.
- Questo prodotto si inserisce in una presa di corrente. La presa di corrente deve essere in prossimità del prodotto, e deve essere facilmente accessibile.
- Collegare questo prodotto solamente alla fonte di alimentazione indicata sul pannello posteriore di questo prodotto.
- Se questo prodotto non è dotato di un interruttore principale, il cavo di alimentazione funge a questo scopo.

Chiusura

- Proteggete da umidità questo prodotto.
- Non aprire la chiusura di questo prodotto a meno che non sia specificato diversamente. Non inserire oggetti attraverso le fessure della chiusura.

Cavi

- Staccare sempre tutti i cavi di alimentazione prima di svolgere l'assistenza tecnica al prodotto.
- Per scollegare un cavo tirate la spina o il connettore, non tirare mai il cavo stesso.
- Non calpestare o sottoporre a sollecitazioni i cavi o le prese.

Riparazionoi di fabbrica

- Per le riparazioni contattate solamente personale tecnico autoizzato dalla fabbrica.

Important Safety Instructions

Read and Retain Instructions

Carefully read all safety and operating instructions before operating this equipment, and retain them for future reference.

Follow Instructions and Heed Warnings

Follow all operating and use instructions. Pay attention to all warnings and cautions in the operating instructions, as well as those that are affixed to this equipment.

Terminology

The terms defined below are used in this document. The definitions given are based on those found in safety standards.

Service Personnel - The term *service personnel* applies to trained and qualified individuals who are allowed to install, replace, or service electrical equipment. The service personnel are expected to use their experience and technical skills to avoid possible injury to themselves and others due to hazards that exist in service and restricted access areas.

User and Operator - The terms *user* and *operator* apply to persons other than service personnel, who operate this equipment..

Ground(ing) and Earth(ing) - The terms *ground(ing)* and *earth(ing)* are synonymous. This document uses ground(ing) for clarity, but it can be interpreted as having the same meaning as earth(ing).

Electric Shock Hazard

This equipment meets applicable safety standards.

> ⚠ **WARNING:**
>
> **To reduce risk of electric shock, perform only the instructions that are included in the operating instructions. Refer all servicing to qualified service personnel only.**

Electric shock can cause personal injury or even death. Avoid direct contact with dangerous voltages at all times. The protective ground connection is essential to safe operation and must be verified before connecting the power supply.

Know the following safety warnings and guidelines:

- **Dangerous Voltages**
  - Only qualified service personnel are allowed to perform equipment installation or replacement.
  - Only qualified service personnel are allowed to remove chassis covers and access any of the components inside the chassis.
- **Grounding**
  - Do not violate the protective grounding by using an extension cable, power cable, or autotransformer without a protective ground conductor.
  - Take care to maintain the protective grounding of this equipment during service or repair and to re-establish the protective grounding before putting this equipment back into operation.

Installation Site

When selecting the installation site, comply with the following:

- **Protective Ground** - The protective ground lead of the building's electrical installation should comply with national and local requirements.
- **Environmental Condition** - The installation site should be dry, clean, and ventilated. Do not use this equipment where it could be at risk of contact with water. Ensure that this equipment is operated in an environment that meets the requirements as stated in this equipment's technical specifications, which may be found on this equipment's data sheet.

Installation Requirements

> ⚠ **WARNING:**
>
> **Allow only qualified service personnel to install this equipment.**
> **The installation must conform to all local codes and regulations.**

Equipment Placement

> ⚠ **WARNING:**
>
> **Avoid personal injury and damage to this equipment. An unstable mounting surface may cause this equipment to fall.**

To protect against equipment damage or injury to personnel, comply with the following:

- Install this equipment in a restricted access location.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other equipment (including amplifiers) that produce heat.
- Place this equipment close enough to a mains AC outlet to accommodate the length of this equipment's power cord.
- Route all power cords so that people cannot walk on, place objects on, or lean objects against them. This may pinch or damage the power cords. Pay particular attention to power cords at plugs, outlets, and the points where the power cords exit this equipment.
- Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with this equipment.
- Make sure the mounting surface or rack is stable and can support the size and weight of this equipment.
- The mounting surface or rack should be appropriately anchored according to manufacturer's specifications. Ensure this equipment is securely fastened to the mounting surface or rack where necessary to protect against damage due to any disturbance and subsequent fall.

Ventilation

This equipment has openings for ventilation to protect it from overheating. To ensure equipment reliability and safe operation, do not block or cover any of the ventilation openings. Install the equipment in accordance with the manufacturer's instructions.

Rack Mounting Safety Precautions

Mechanical Loading

Make sure that the rack is placed on a stable surface. If the rack has stabilizing devices, install these stabilizing devices before mounting any equipment in the rack.

> ⚠ **WARNING:**
>
> **Avoid personal injury and damage to this equipment. Mounting this equipment in the rack should be such that a hazardous condition is not caused due to uneven mechanical loading.**

Reduced Airflow

When mounting this equipment in the rack, do not obstruct the cooling airflow through the rack. Be sure to mount the blanking plates to cover unused rack space. Additional components such as combiners and net strips should be mounted at the back of the rack, so that the free airflow is not restricted.

> ⚠ **CAUTION:**
>
> **Installation of this equipment in a rack should be such that the amount of airflow required for safe operation of this equipment is not compromised.**

Elevated Operating Ambient Temperature

Only install this equipment in a humidity- and temperature-controlled environment that meets the requirements given in this equipment's technical specifications.

> ⚠ **CAUTION:**
>
> **If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install this equipment in an environment compatible with the manufacturer's maximum rated ambient temperature.**

Handling Precautions

When moving a cart that contains this equipment, check for any of the following possible hazards:

> ⚠ **WARNING:**
>
> 
>
> **Avoid personal injury and damage to this equipment! Move any equipment and cart combination with care. Quick stops, excessive force, and uneven surfaces may cause this equipment and cart to overturn.**

- Use caution when moving this equipment/cart combination to avoid injury from tip-over.
- If the cart does not move easily, this condition may indicate obstructions or cables that may need to be disconnected before moving this equipment to another location.
- Avoid quick stops and starts when moving the cart.
- Check for uneven floor surfaces such as cracks or cables and cords.

Grounding

This section provides instructions for verifying that the equipment is properly grounded.

Safety Plugs (USA Only)

Depending on the type and application of this equipment (Safety Class I or Safety Class II), Cisco supplies a mains cord with either a 3-terminal (grounding-type) safety plug or a 2-terminal (polarized) safety plug. The wide blade or the third terminal is provided for safety. Do not defeat the safety purpose of the grounding-type or polarized safety plug.

To properly ground this equipment, follow these safety guidelines:

- **Grounding-Type Plug** - For a three-terminal plug (one terminal on this plug is a protective grounding pin), insert the plug into a grounded mains, three-terminal outlet.

  Note: This plug fits only one way. If this plug cannot be fully inserted into the outlet, contact an electrician to replace the obsolete three-terminal outlet.

- **Polarized Plug** - For a two-terminal plug (a polarized plug with one wide blade and one narrow blade), insert the plug into a polarized mains, two-terminal outlet in which one socket is wider than the other.

  Note: If this plug cannot be fully inserted into the outlet, try reversing the plug. If the plug still fails to fit, contact an electrician to replace the obsolete two-terminal outlet.

Grounding Terminal

If this equipment is equipped with an external grounding terminal, attach one end of an 18-gauge wire (or larger) to the grounding terminal; then, attach the other end of the wire to a ground, such as a grounded equipment rack.

Safety Plugs (European Union)

- **Class I Mains Powered Equipment** - Provided with a three-terminal AC inlet and requires connection to a 3-terminal mains supply outlet via a three-terminal power cord for proper connection to the protective ground.

  Note: The equipotential bonding terminal provided on some equipment is not designed to function as a protective ground connection.

- **Class II Mains Powered Equipment** - Provided with a two-terminal AC inlet that may be connected by a two-terminal power cord to the mains supply outlet. No connection to the protective ground is required as this class of equipment is provided with double or reinforced and/or supplementary insulation in addition to the basic insulation provided in Class I equipment.

  Note: Class II equipment, which is subject to EN 50083-1, is provided with a chassis mounted equipotential bonding terminal. See the section titled Equipotential Bonding for connection instructions.

Equipotential Bonding

If this equipment is equipped with an external chassis terminal marked with the IEC 60417-5020 chassis icon (), the installer should refer to CENELEC standard EN 50083-1 or IEC standard IEC 6072 for correct equipotential bonding connection instructions.

AC Power

Important: If this equipment is a Class I equipment, it must be grounded.

- If this equipment plugs into an outlet, the outlet must be near this equipment, and must be easily accessible.
- Connect this equipment only to the power sources that are identified on the equipment-rating label normally located close to the power inlet connector(s).
- If this equipment has two power sources be sure to disconnect all power sources before working on this equipment.
- If this equipment **does not** have a main power switch, the power cord connector serves as the disconnect device.
- Always pull on the plug or the connector to disconnect a cable. Never pull on the cable itself.
- Unplug this equipment when unused for long periods of time.

Circuit Overload

Know the effects of circuit overloading before connecting this equipment to the power supply.

> ⚠ **CAUTION:**
>
> **Consider the connection of this equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Refer to the information on the equipment-rating label when addressing this concern.**

General Servicing Precautions

> ⚠ **WARNING:**
>
> **Avoid electric shock! Opening or removing this equipment's cover may expose you to dangerous voltages.**

Be aware of the following general precautions and guidelines:

- **Servicing** - Refer all servicing to qualified service personnel. Servicing is required when this equipment has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into this equipment, this equipment has been exposed to rain or moisture, does not operate normally, or has been dropped.
- **Wristwatch and Jewelry** - For personal safety and to avoid damage of this equipment during service and repair, do not wear electrically conducting objects such as a wristwatch or jewelry.
- **Lightning** - Do not work on this equipment, or connect or disconnect cables, during periods of lightning.
- **Labels** - Do not remove any warning labels. Replace damaged or illegible warning labels with new ones.
- **Covers** - Do not open the cover of this equipment and attempt service unless instructed to do so in the instructions. Refer all servicing to qualified service personnel only.
- **Moisture** - Do not allow moisture to enter this equipment.
- **Cleaning** - Use a damp cloth for cleaning.

- **Safety Checks** - After service, assemble this equipment and perform safety checks to ensure it is safe to use before putting it back into operation.

Electrostatic Discharge

Electrostatic discharge (ESD) results from the static electricity buildup on the human body and other objects. This static discharge can degrade components and cause failures.

Take the following precautions against electrostatic discharge:

- Use an anti-static bench mat and a wrist strap or ankle strap designed to safely ground ESD potentials through a resistive element.
- Keep components in their anti-static packaging until installed.
- Avoid touching electronic components when installing a module.

Fuse Replacement

To replace a fuse, comply with the following:

- Disconnect the power before changing fuses.
- Identify and clear the condition that caused the original fuse failure.
- Always use a fuse of the correct type and rating. The correct type and rating are indicated on this equipment.

Lithium Battery

For equipment with a lithium battery, observe the following rules:

- Do not dispose of used batteries through the regular garbage collection system, but follow the local regulations. The batteries may contain substances that could be harmful to the environment.
- Replace batteries with the same or equivalent type recommended by Cisco.
- Insert batteries correctly. There may be a risk of explosion if the batteries are incorrectly inserted.
- When disposing of this equipment, remove the batteries and dispose of them separately in accordance with local regulations.
- Do not recharge the batteries or expose them to temperatures above 100°C (212°F).

Electromagnetic Compatibility Regulatory Requirements

This equipment meets applicable electromagnetic compatibility (EMC) regulatory requirements. EMC performance is dependent upon the use of correctly shielded cables of good quality for all external connections, except the power source, when installing this equipment.

- Ensure compliance with cable/connector specifications and associated installation instructions where given elsewhere in this manual.

Otherwise, comply with the following good practices:

- Multi-conductor cables should be of single-braided, shielded type and have conductive connector bodies and backshells with cable clamps that are conductively bonded to the backshell and capable of making 360° connection to the cable shielding. Exceptions from this general rule will be clearly stated in the connector description for the excepted connector in question.
- Ethernet cables should be of single-shielded or double-shielded type.
- Coaxial cables should be of the double-braided shielded type.

EMC

Where this equipment is subject to USA FCC and/or Industry Canada rules, the following statements apply:

FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device according to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial 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. 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.

Industry Canada - Industrie Canadienne Statement

Industry Canada ICES-003: This Class A digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Industrie Canadienne ICES-003: Cet appareil numèrique de la Class A respecte toutes les exigences du Règlement sur le matèriel brouilleur du Canada.

CENELEC/CISPR Statement with Respect to Class A Information Technology Equipment

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

Modifications

This equipment has been designed and tested to comply with applicable safety, laser safety, and EMC regulations, codes, and standards to ensure safe operation in its intended environment. Refer to this equipment's data sheet for details about regulatory compliance approvals.

Do not make modifications to this equipment. Any changes or modifications could void the user's authority to operate this equipment.

Modifications have the potential to degrade the level of protection built into this equipment, putting people and property at risk of injury or damage. Those persons making any modifications expose themselves to the penalties arising from proven non-compliance with regulatory requirements and to civil litigation for compensation in respect of consequential damages or injury.

Accessories

Use only attachments or accessories specified by the manufacturer.

Compliance

Electromagnetic Compatibility

FCC Part 15 Subpart B: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

CE marked: according to EMC directive 89/336/EEC and 93/68/EEC (European standards EN 55 022, EN 55 024, EN 61000-3-2 and EN 61000-3-3).

C-Tick marked: according to AS/NZS CISPR 22/2002.

Safety

UL listed: according to UL60950.

cUL listed: according to CSA C22.2 no. 60950.

CE marked: according to LVD directive 73/23/EEC and 93/68/EEC (European standard EN 60950).

CB certification: according to IEC 60950.

Warranty and Disclaimer

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We warrant good title to any hardware Item furnished hereunder. During the Warranty Period (as defined below) we warrant that any hardware Item manufactured by or for us will be free from material defects in workmanship and materials and under ordinary use, conform in all material respects to its published specifications current at the time the hardware Item was shipped. For a software Item licensed by us, we warrant that we have the right to grant any software Item license granted and that the software Item, as provided, shall substantially conform to its published specifications current at the time the software Item was shipped. Separately branded hardware and software Items ("Third-Party Products") are warranted solely by the applicable manufacturer or licensor as provided below. We will repair or replace, at our option, any Item (excluding Third-Party Products) returned to us by Purchaser at its expense during the Warranty Period, which fails to satisfy this Warranty, unless the failure was the result of shipping; improper installation, maintenance or use; abnormal conditions of operation; attempted modification or repair by the Purchaser; use of the Items in combination with other items; or an act of God. If we elect to replace an Item, any duties, taxes, or expenses related to the importation of the replacement Item shall be at Purchaser's expense.

The Warranty Period begins on the date the Item is originally delivered and extends for (a) twelve (12) months for a new hardware Item manufactured by or for us, (b) six (6) months for a remanufactured hardware Item that has been reworked by us and is designated by us with "RMF" in the part number, and (c) ninety (90) days for a software Item licensed by us and for parts. For Third-Party Products, we will pass through, to the extent permitted, the manufacturer's and/or licensor's warranties and Purchaser shall look solely to such manufacturer and/or licensor for warranty repair. For any hardware Item that is returned to us during the Warranty Period and which is repaired or replaced by us, the Warranty Period for such repaired or replaced hardware Item shall be the longer of (i) the remainder of the Warranty Period for the hardware Item, or (ii) ninety (90) days after repair or replacement of such hardware Item by us.

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If the Purchaser returns an Item to us that is not defective under the Warranty or for which the Warranty Period has expired, we will perform diagnostic tests on the Item and repair the Item if it is defective. In such instances, we will be entitled to charge the Purchaser reasonable charges for such diagnostic testing and/or repair work.

Contents

About This Manual

Objective

This manual describes how to install, use and maintain the Encoder Model D9040.

Note: The manual describes all available options for the D9040 Encoder. Your D9040 Encoder may only have some of the features described in this manual.

Audience

The audience of this manual includes **users (operators)** and **service personnel** who are responsible for the installation, operation and service of the D9040 Encoder. For further information about the definition of operator and service personnel, see also the section about **Service Personnel** and **Users and Operators** in **Terminology**, page viii.

Required Knowledge

To use this documentation, the user should have a basic knowledge of the technology used in relation to this product. Service personnel should have additional skills and be familiar with cabling, electronic circuitry, and wiring practices.

This manual is intended for operators who are responsible for the configuration, remote operation and maintenance of the D9040 Encoder. The operator is required to have a basic knowledge of the PowerVu Network Centre control system.

ISO 9001

Cisco products and documentation are developed and manufactured under the ISO 9001 Certified Quality Management System.

Related Documentation

Further helpful information is available in the following documents:

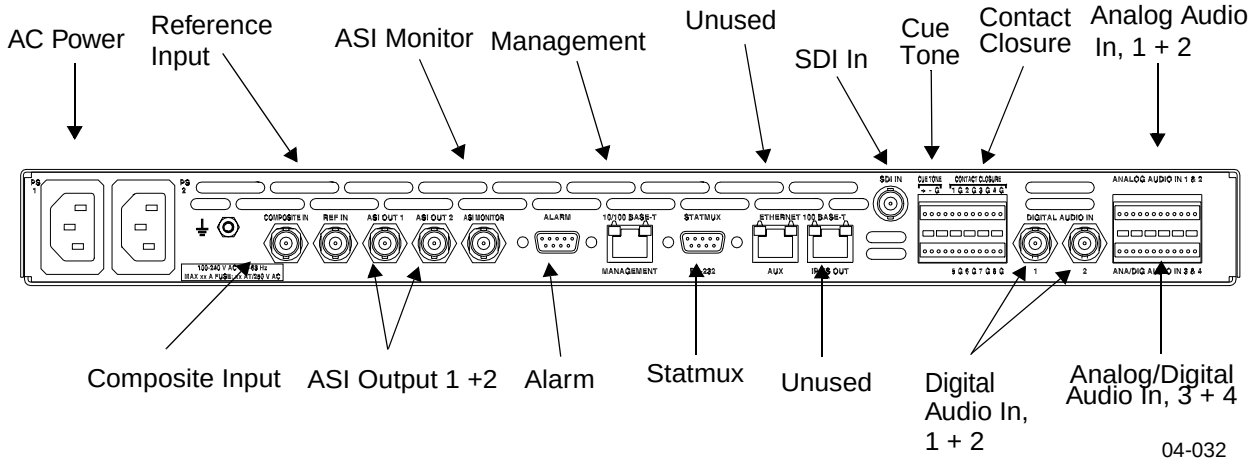
Title	Part No.
PowerVu Network Centre Control System v8.0 User's Guide	*4018881*
Regulus™, Statistical Multiplex Controller User and Service manual	***4006277***

Chapter 1
Quick Setup - Read Me First!

Connecting the Units

Electrical Connection

Proceed as follows to connect the units:



1. Connect the video input signal to the SDI IN and COMPOSITE IN connector.
   For further information, see **Connecting the Video and Reference Signal Inputs**, page 3-7.
2. If relevant, connect the reference input signal to the REF IN connector.
   For further information, see **To Connect the Reference Input**, page 3-7.
3. Connect the audio input signals for channels 1 and 2 to the DIGITAL AUDIO IN (2 BNC connectors) or ANALOG AUDIO IN 1+2.
   Use a high-quality shielded balanced audio cable for the analog inputs or a single-ended cable for the digital inputs. For further information, see **Connecting the Audio Inputs**, page 3-8.
4. Connect the statmux interface connector of each of the D9040 Encoders to one of the 16 statmux channel connectors of the Regulus Controller.
   Use a one-to-one RS-232 cable. For further information, see **Connecting the Statmux Interface**, page 3-13.
5. If relevant, connect the audio input signals for channels 3 and 4 to the terminal block connector labelled ANA/DIG AUDIO IN 3 & 4. For further information, see **Connecting the Audio Inputs**, page 3-8.
6. If relevant, connect the cable from the external alarm system to the ALARM connector.
   For further information, see **Connecting an External Alarm System**, page 3-14.

7. If relevant, connect the external contact closure equipment or cue tone equipment to the contact closure interface of the D9040 Encoder. For further information, see **Connecting to the Contact Closure or Cue Tone Interfaces**, page 3-12.
8. Connect the ETHERNET 10/100 BASE-T MANAGEMENT connector of the D9040 Encoders to the Ethernet LAN of the PNC control system.

   Use a shielded Cat. 5 (or better) ethernet cable. For further information, see **Connecting the Ethernet Management Interface**, page 3-15.
9. Connect the output signals from the D9040 Encoder connectors ASI OUT 1 and/or ASI OUT2 to the ASI input connectors of the equipment after the D9040 Encoder.

   The equipment after the D9040 Encoder will typically be a PowerVu Model D9140 Advanced Multiplexer.
10. If relevant, connect the output signals from the D9040 Encoder connectors ASI MONITOR to an ASI monitor decoder.
11. Connect the power sources of all the units.

    For further information, see the specific product manuals in question. When connecting the power source to the D9040 Encoder it takes up to 120 seconds for the unit to initialize. The front panel display shows the startup display.

Front Panel Setup

Setting Up the IP Parameters of the D9040 Encoder

Always verify that the IP parameters of the D9040 Encoder are correct before you try to control the unit for the first time from the PNC control system. Also do as follows when a D9040 Encoder is added to or reinserted in the installation.

Proceed as follows to set the IP settings of the D9040 Encoder, and if necessary change them:

1. Press the MENU key on the front panel of the D9040 Encoder.
   The MENU key toggles between the start up display and the main menu.
2. From the main menu press the SELECT key. You have now entered the System menu.
3. From the System menu, press the RIGHT arrow once and the SELECT. You have now entered the IP menu.
4. Go to the desired menu item and press the SELECT.
   You use the right and left arrow keys to navigate to the desired menu item.
5. If necessary change the value.
   Use the right arrow key to navigate to the digit to change and press one of the numeric keys to enter a value. Press the SELECT key to store the entered value(s).
6. If necessary, change the other IP parameters as described in steps 3 and 4 above.
7. Press the UP arrow to leave the IP menu.

   Note: When you leave the IP menu by pressing the UP Arrow key the IP, Mask and Gateway parameters are validated against each other and stored. Any inconsistencies will be shown in the display.

   Important: For the changes to take effect you must reset the D9040 Encoder after you have finished setting or changing the IP address, subnet mask and default gateway. Proceed as follows to reset the D9040 Encoder.
8. From the main menu, press the SELECT key to naviage to the System menu. You have now entered the System menu.
9. Press the RIGHT arrow key eight times to reach the Reset menu. Press SELECT and SELECT once more to confirm the reset.

   Note: The reset make take up to 120 seconds.

Chapter 2
Introduction

Overview

Introduction

This chapter is a general introduction to the Encoder Model D9040. It describes the most common applications and interfaces of the D9040 Encoder.

In This Chapter

This chapter contains the following topics.

Encoder Model D9040

General Description

The design of the Encoder Model D9040 is compact. The D9040 Encoder is a 1U encoder that fits into a 19-inch rack. It features single-channel High-Definition high-quality SDI and/or composite video processing. It is targeted at uplink distribution and contribution applications and supports MPEG-1 Layer II audio encoding, Dolby® Digital (AC-3) audio, passthrough of Dolby Digital audio,AAC audio and passthrough of AAC audio.

The D9040 Encoder features advanced pre-processing for optimum performance at low bit rates.

PreSight*Plus*™ combined with the Regulus™ Statistical Multiplex Controller is one of the industry's leading solutions for bandwidth saving encoding.

The D9040 Encoder offers built-in support for SCTE35 digital program insertion (DPI), which will be used for ad-insertion applications in the digital domain.

Transport output is provided via ASI outputs.

The D9040 Encoder has redundant power supplies which helps ensure uninterrupted operation if one power supply should fail.

Software Update

All software in the D9040 Encoder is stored in non-volatile memory that can be electrically programmed. New software releases for the D9040 Encoder can be downloaded via the Ethernet 10/100 Base-T Management interface.

Software Options

The table lists the various software options which can be installed by the use of a license key. As can be seen from the list, some of the options are pre-installed.

Description
PNC Management[1)]
Pre-analysis[1)]
VBI[1)]
4:2:2[1)]
DPI signalling[1)]
Statistical Multiplexing[1)]
Closed Caption[1)]
Noise Reduction[1)]
Dolby® Digital Channel 1
Dolby Digital Channel 2
Dolby Digital Channel 3[2)]
Dolby Digital Channel 4[2)]
Advanced Audio Coding Channel 1
Advanced Audio Coding Channel
Advanced Audio Coding Channel 3 [2)]
Advanced Audio Coding Channel 4[2)]
Auto-concatenation[1)]

1. Pre-installed in all versions of the product
2. Available when ordered with 4 stereo pairs of audio (Dolby Digital or AAC respectively)

Note: All purchased options are installed and enabled at the factory.

Audio Channels

The D9040 Encoder is equipped with an SDI input and two composite inputs.

You may order the D9040 Encoder with either two or four stereo audio channels. The audio channels may be part of the video service.

Encoding Bit Rates

Video and audio data can be encoded at the following bit rates and coding standards:

Input signal	Bit rate	Coding standard
Video signal	0.5 to 15 Mbit/s	MPEG-2 Main Profile at Main Level (MP@ML)
Audio signal	32 to 384 kbit/s	MPEG-1 Layer II
	56 to 640 kbit/s	Dolby Digital[1)]
		Dolby Digital passthrough
		AAC[1)]
		AAC passthrough

1. Requires a liccnse.

VBI Signals

The following line standards are supported in three different VBI modes:

PowerVu Mode		DVB-VBI Mode		DVB-WST Mode	
525 Lines	625 Lines	525 Lines	625 Lines	525 Lines	625 Lines
VITC	VITC	VITC	VITC		VITC
NABTS	WST		WST		
Neilsen/ AMOL			VPS		
Gemstar			WSS		
			Transparent		

Reference Input

The D9040 Encoder provides a reference input for internal frame synchronization of the video input to an external studio reference.

Pre-Processing

The pre-processing includes:

- PreSight*Plus* pre-analysis with look-ahead for improved statistical multiplexing and normal fixed rate encoding. The PreSight*Plus* pre-analysis option includes adaptive quantization m atrices which have a positive impact on both PQR values and the subjective visual impression. The pre-analysis includes a feature to dynamically change MPEG-2 quantization matrices and the possibility to enable 3:2 pulldown inversion for 525 lines material.
- PreSight noise reduction (low-pass spatial filter.)

The PreSight video noise reduction removes noise and details that stress the encoder at low bit rates. It is possible to adjust the filter manually during operation without service interruption.

The PreSight*Plus* video noise reduction and pre-analysis features are options that may be ordered with the D9040 Encoder or added later.

Sub-sampling

The D9040 Encoder supports subsambling. Sub-sampling decreases the resolution of the source material in order to lower the amount of data to be encoded.

Transport Stream

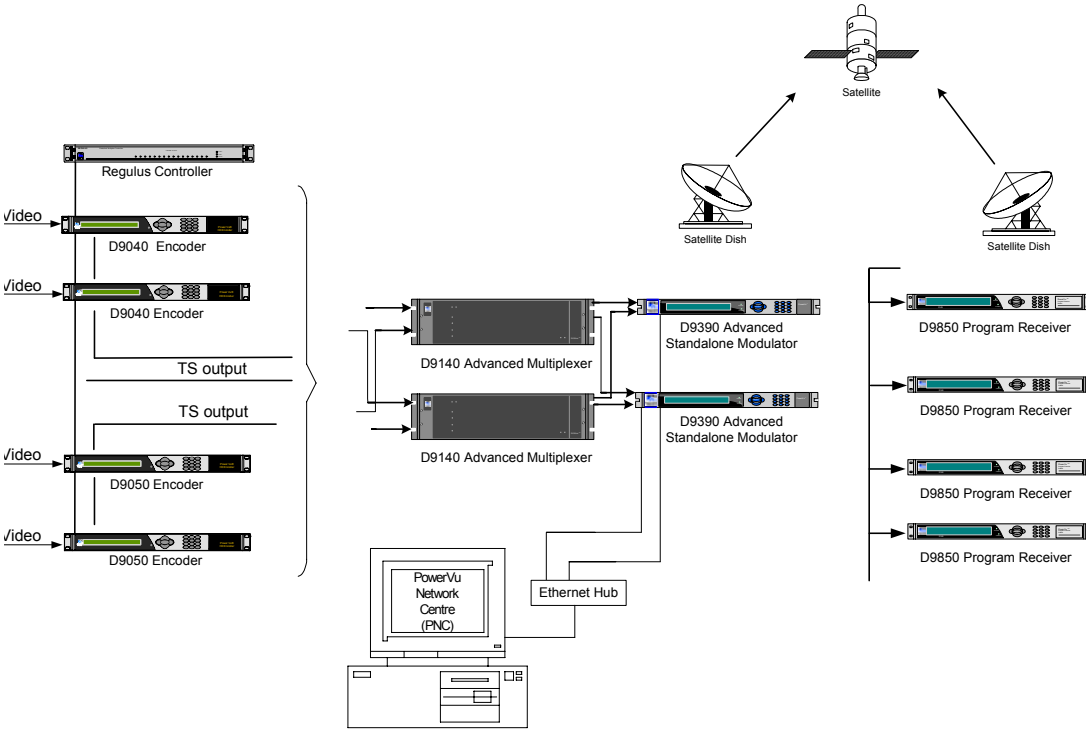
The encoded data, carrying the video and audio signals, is internally multiplexed into the MPEG-2 and DVB compliant transport stream by the D9140 Advanced Multiplexer. The three ASI outputs always carry the transport stream (TS).

Application Example

Content Distribution

The DVB-S compliant PowerVu system is designed for content distribution of high quality services, including video, audio, data and ancillary services, over satellite. PowerVu system users typically need to control multiple encoders in an automatically redundant system to securely transmit services to a large receiver population. PowerVu solutions are targeted at programmers, broadcasters, service providers and private networks who have a particular interest in comprehensive solutions with a focus on security. PowerVu commercial Conditional Access is an integral part of the PowerVu offering and is controlled through the all-in-one PowerVu Network Centre (PNC). The highly reliable PNC is a sophisticated, yet easy-to-use system that can provide network management, security, decoder management, and advanced revenue protection. In addition to the PNC, a PowerVu system can also support a number of IRDs to meet specific customer needs.

The Regulus™ Statistical Multiplex Controller is an add-on unit for the D9040 Encoder. You may connect the Regulus Controller to a number of encoders so that they together may participate in statistical multiplexing.



Video Interfaces

Composite Video Input

The composite video input interface accepts a 625-line PAL (B, D, G, H, I, K, M and N) or 525-line NTSC (M)or J-NTSC (for Japan) formatted input signal.

SDI Video Input

The SDI input interface accepts a 270 Mbit/s SDI formatted video input (D-1). The SDI module extracts embedded audio for further processing by an audio encoder module.

VBI and Related Signals

The D9040 Encoder supports teletext B, DVB-VBI Teletext, Transparent Lines, VPS, WSS, VII and Closed Captioning.

Encoding

The video encoding includes:

- Multiple resolutions
- High quality also at very low bit rates

The AFD feature requires that you have installed the VBI option.

Auto-concatenation

The D9040 Encoder optionally supports auto-concatenation of previously encoded picture material. Auto-concatenation makes it possible to align I-frames of encoded pictures with I-frames of previously encoded input material. By detecting the position of I-frames in the incoming video and making proper adjustments to the GOP, the I-frames of the encoded material can be aligned to the input. The GOP adjustments are performed seamlessly.

This feature decreases the degradation of video quality usually seen when two or more encoders are cascaded (concatenated).

Audio and Data Interfaces

Audio Input

Four audio stereo channels can be input at the D9040 Encoder. Each of the audio channels can be sourced from analog, digital AES-3id or embedded SDI audio sources. You can assign the encoded audio channels to the video program or to independent audio only programs.

Digital Audio Interface

The audio input interface accepts a digital input, formatted as an AES/EBU encoded signal. Left and right channel samples are extracted from the input and synchronized to the video signal.

Analog Audio Interface

The audio input interface features balanced left and right analog inputs. For each analog audio input you can set the input impedance and the clipping level.

Embedded Audio

The audio input interface can be configured to accept an input of embedded audio from the SDI video input interface.

Audio Encoding Formats

The supported audio encoding formats are MPEG-1 layer II, Dolby Digital, passthrough of Dolby Digital, andAAC.

Layer II Encoding

The audio inputs may be encoded in the following ways:

- a stereo program
- a joint stereo program
- two independent mono programs
- Dual channel

You can set the sampling frequency for the digitizing process to one of the following values:

- 32 kHz
- 44.1 kHz
- 48 kHz.

For audio attached to the video the D9040 Encoder locks the audio sampling frequency to the video. For AES/EBU digital input signals, the D9040 Encoder automatically adapts the incoming rate by using sample rate conversion.

Dolby Digital Encoding

The audio inputs may be encoded in the following ways:

- Dual Mono 1+1
- Stereo 2/0
- Mono 1/0

You can set the sampling frequency for the digitizing process to one of the following values:

- 32 kHz
- 44.1 kHz
- 48 kHz.

The D9040 Encoder locks the audio sampling frequency to the video. For AES/EBU digital input signals, the D9040 Encoder automatically adapts the incoming rate by using sample rate conversion.

Dolby Digital Passthrough

The D9040 Encoder supports passthrough of up to four pre-encoded Dolby Digital stereo channels.

AAC Encoding

The audio inputs may be encoded in the following ways:

- Dual Mono 1+1,
- Single Mono 1/0,
- Stereo 2/0,
- Joint Stereo 2/0,
- Mono 1/0 LR

You can set the sampling frequency for the digitizing process to one of the following values:

- 32 kHz
- 44.1 kHz
- 48 kHz.

The D9040 Encoder locks the audio sampling frequency to the video. For AES/EBU digital input signals, the D9040 Encoder automatically adapts the incoming rate by using sample rate conversion.

AAC Passthrough.

The D9040 Encoder supports passthrough of up to four pre-encoded AAC channels.

Audio Only

The D9040 Encoder supports up to eight mono or four stereo audio only programs. One or more audio sources can be combined to make up a program.

Transport Stream Outputs

DVB-ASI Transport Stream Output

The D9040 Encoder has three DVB-ASI outputs. These outputs can be used as an input for a satellite modem or a multiplexer. One of the outputs is an ASI monitor output for monitoring of the outgoing data stream. Unlike the two other ASI outputs the monitor output cannot be muted.

The outputs support SI generation with standard tables compliant to MPEG-2 and DVB.

Control and Management Interfaces

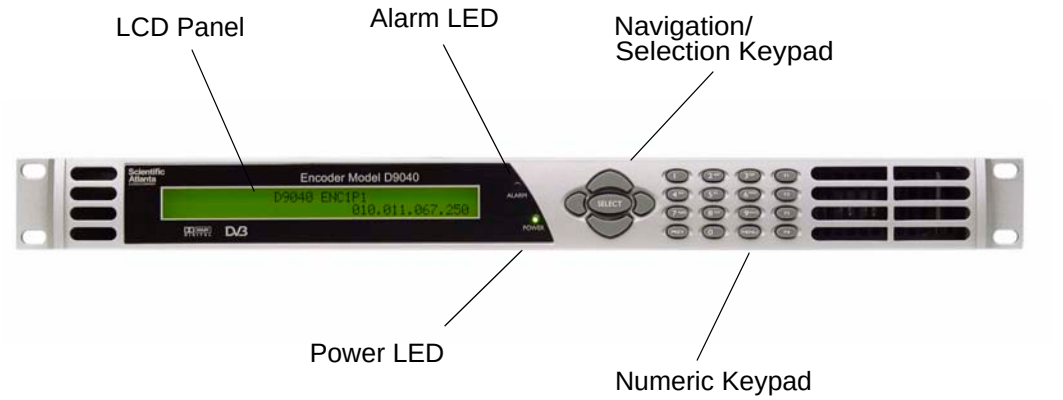
PNC Control System Management

The PNC is a single-server/multi-client based system enabling you to set up and manage a whole network of encoders. In the PNC multi-user system, the server and client are located on separate PCs. The PNC enables full control and monitoring functionality of the D9040 Encoder installations with redundancy switching, error reporting and remote control. Refer to the PowerVu Network Centre Control System v8.0 User's Guide (part number 4018881 Rev A) for more information.

Front Panel Control

There is limited control available via the front panel. You can only set or change the encoder IP address, lock or unlock the front panel, and monitor the alarm status.

The following drawing shows the front panel with its different sections.



Ethernet

The main control interface for the D9040 Encoder is the 10/100 BaseT Ethernet interface.

You can set up and control the D9040 Encoder via the Ethernet connection using SNMP and the PNC control system.

Alarm Relay Interface

During operation the condition of the D9040 Encoder can be monitored by three relay contact outputs, accessible from the Alarm connector on the rear panel of the D9040 Encoder. Furthermore, the alarm status is signalled by Alarm LEDs on the front of the D9040 Encoder and by messages sent via the PNC control system. Refer to **Connecting an External Alarm System**, page 3-14 for more information.

DPI and Cue Trigger Interfaces

The contact closure and cue trigger interfaces are used to signal cue triggers and trigger Digital Program Insertion (DPI). DPI allows for the insertion of advertisements into program content in the digital domain. The DPI messages are in accordance with the SCTE 35 specification.

Redundancy

Encoder redundancy is controlled by the PNC.

Chapter 3
Installation

Overview

Introduction

This chapter describes how to install the Encoder Model D9040. Before installing the D9040 Encoder, read all safety precautions and guidelines thoroughly.

Qualified Personnel

Only appropriately qualified and trained service personnel or operators should attempt to install, operate or maintain the D9040 Encoder.

> ⚠ **WARNING:**
>
> **Allow only qualified service personnel to install this product. Otherwise, personal injury or equipment damage may occur.**

In This Chapter

This chapter contains the following topics.

Section A - Rack Installation

General

Power Connection

As Cisco units are designed for 24-hour operation, some products do not have a power switch. In this case, the mains cord serves as the mains disconnect device.

> ⚠ **WARNING:**
>
> **Make sure that at least one end of the power cables remains easily accessible for unplugging, if you need to switch off the unit. For example: Ensure that the socket outlet is installed near the product.**

Installing the D9040 Encoder

Rack Mounted

The D9040 Encoder is a 1U unit with connector access at the rear panel. The D9040 Encoder is intended for mounting in a standard 19" rack.

Cooling

The D9040 Encoder is cooled by the use of fans. The air intake is from the front panel and the air outlet is on the rear.

> ⚠ **CAUTION:**
> **The inlet air temperature must not exceed 50 °C/122 °F at any time.**

Grounding

You must ensure that the unit is properly connected to ground in order to meet safety and EMC requirements. Before any other connection is made, the unit must be connected to a protected ground terminal as described below:

- Via the three wire power cord of the AC power supply. This connection is mandatory.
- In addition, via the protective ground terminal on the rear panel of the unit. This connection provides additional protection of the equipment.

To Mount the D9040 Encoder

To mount the D9040 Encoder in a rack do the following:

1. Mount rails in the rack to support each D9040 Encoder to be installed.
   For further information, contact your rack supplier.
2. Place the D9040 Encoder in its position in the rack.
3. Mount the D9040 Encoder securely to the rack by securing four screws in the holes in the front panel mounting flanges.
4. Make sure that air can circulate freely from the front of D9040 Encoder.
5. Do not block the air outlet holes on the back of the D9040 Encoder.

To Connect AC Power

To connect AC power to the D9040 Encoder do the following:

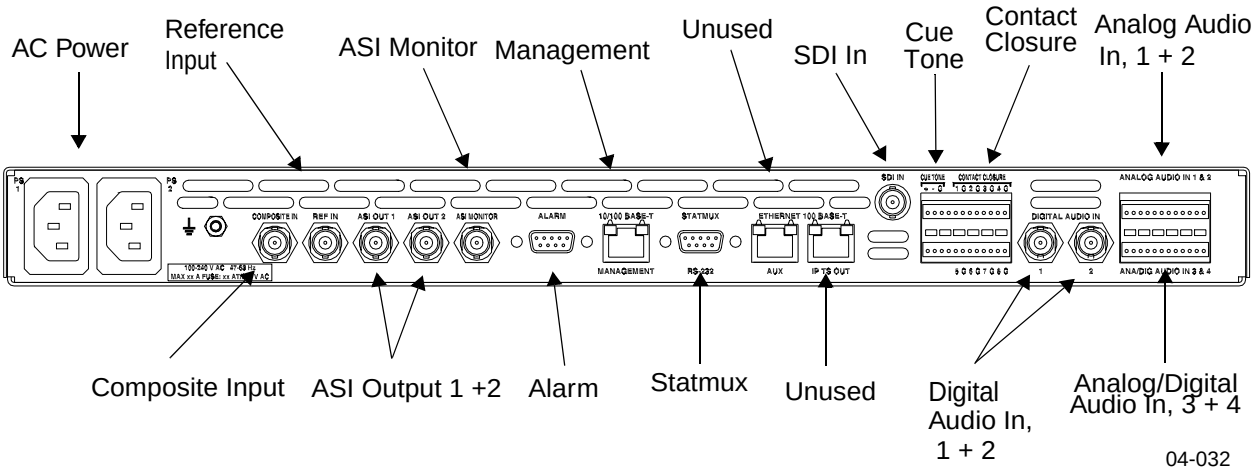
1. Connect the power cords(supplied with the D9040 Encoder) between the rear panel power receptacles and an 100 to 240 V AC power outlet.
2. Make sure that the power cables are connected to protective ground.
   See **Grounding** at the beginning of this section.

Section B - Connector Panel

Overview

D9040 Encoder Connector Panel

The following drawing shows the rear connector panel of the D9040 Encoder.



Connectors

The following table describes the function and type of the various connectors:

Connector	Function	Connector Number and Type
Power	AC power	IEC 60320 Sheet 14
COMPOSITE IN	Composite input (PAL/NTSC)	BNC
REF IN	Reference input for synchronization to an external video source.	BNC
ASI OUT 1 ASI OUT 2	ASI output. Two identical outputs. Outputs can be muted.	BNC
ASI Monitor	ASI output. This output cannot be muted.	BNC
ALARM	Alarm relays	9-pin sub-D female
10/100 BASE-T MANAGEMENT	For control and management of local and remote D9040 Encoder units.	RJ45
STATMUX	Connection to the Regulus Statistical Multiplex Controller	9-pin sub-D female
ETHERNET 100 BASE-T AUX	Transport stream encapsulated in IP packets. Used for Backup IP output or PCR synchronization	RJ45
ETHERNET 100 BASE-T IP TS OUT	Transport stream encapsulated in IP packets. Used for Main IP output	RJ45
SDI IN	SDI input	BNC
CUE TONE CONTACT CLOSURE	Cue tones for DPI triggering (not supported in this release) Contact closure for DPI triggering Audio mode changes	Terminal block
DIGITAL AUDIO IN (1 + 2)	Digital audio input for channels 1 and 2	75 ohm
ANALOG AUDIO IN 1 & 2	Analog audio input for channels 1 and 2	Terminal block
ANA/DIG AUDIO IN 3 + 4	Analog and digital audio input for channels 3 and 4	Terminal block - 75 ohm or 110 ohm

Section C - Connecting the Input/Output Signals

Connecting the Video and Reference Signal Inputs

Connectors for the Video and Reference Signal Inputs

Both the SDI, composite video input and reference input connectors are of the BNC type and are internally terminated.

The following video and reference input signals are supported:

- 270 Mbit/s digital 525 and 625 lines SDI, or
- Analog composite PAL (B, D, G, H, I , K, M, N) , NTSC system M and J-NTSC
- Composite reference input

To Connect to the Video Input

Do as follows to connect to the video input:

1. Connect the video input signal to the SDI In or Composite In connector.
   Use a 75-ohm double-braided coax cable.

To Connect the Reference Input

Do as follows to connect to the reference input:

1. Connect the reference input signal to the REF IN connector.
   Use a 75-ohm double-braided coax cable.

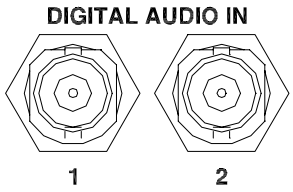
Connecting the Audio Inputs

Connectors for the Audio Input

The basic configuration of the D9040 Encoder supports two stereo channels. Optionally it supports two additional stereo channels.

Digital audio for channels 1 and 2 is input at the BNC connector called Digital Audio In.

The following drawing shows the two BNC connectors:

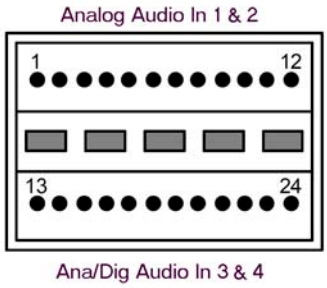


The connector label Analog Audio In 1 & 2 denotes that analog audio for channels 1 and 2 is input at the top row of pins on the terminal block connector.

The connector label Ana/Dig Audio In 3 & 4 denotes that analog or digital audio for channels 3 and 4 is input at the bottom row of pins on the terminal block connector.

On the PNC, you can set up the D9040 Encoder to use either the analog or the digital stereo channels. The D9040 Encoder also supports encoding of audio embedded in the SDI video signal.

The following drawing shows the pin positions of the terminal block connector:



The pinout for the analog part of the terminal block connector is as follows:

	Channel Numbering		Analog	
Pin Number	**Layer II**	**Dolby Digital**	**Type**	**Signal**
1	1	1	Analog In	Left +
2				Left -
3				Shield
4	2	1	Analog In	Right +
5				Right -
6				Shield
7	3	2	Analog In	Left +
8				Left -
9				Shield
10	4	2	Analog In	Right +
11				Right -
12				Shield
13	5	3	Analog In	Left +
14				Left -
15				Shield
16	6	3	Analog	Right +
17				Right -
18				Shield
19	7	4	Analog	Left +
20				Left -
21				Shield
22	8	4	Analog	Right +
23				Right -
24				Shield

The pinout for the digital part of the terminal block connector is as follows:

	Channel Numbering		AES/EBU		AES-3id	
Pin Number	**Layer II**	**Dolby Digital**	**Type**	**Signal**	**Type**	**Signal**
1 to 12			N/A		N/A	
13	5 & 6	3	Digital In	+	Digital In	Signal
14				-		Ground
15				Shield		Shield
16			Digital Out	Signal	Digital Out	Signal
17				Ground		Ground
18				Shield		Shield
19	7 & 8	4	Digital In	+	Digital In	Signal
20				-		Ground
21				Shield		Shield
22			Digital Out	Signal	Digital Out	Signal
23				Ground		Ground
24				Shield		Shield

Note: The digital audio output is always 75-ohm single-ended.

Note: The digital output on pin 16 corresponds settings-wise to the layer II channels 5&6 and the Dolby Digital channel 3. Likewise the digital output on pin 22 corresponds settings-wise to the layer II channels 7&8 and the Dolby Digital channel 4.

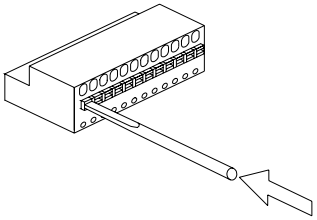
To Connect the Audio Inputs

Do as follows to connect the audio inputs:

1. For digital channels 1 and 2 connect the audio input to the Digital Audio In connector.

   Hint: For digital audio connections, use a coaxial cable designed for 75-ohm AES-3id.

2. For analog channels 1 and 2 do as follows:

Spring Cage Plug Connector	Step	Action
	1	Connect the analog audio input cable to the spring cage plug connector. Use a flat-blades screwdriver with a width of 2 mm and a maximum thickness of 0.4 mm to press in the spring representing the pin to be connected. Push the wire in the hole above the spring and release the spring.
	2	Connect the spring cage plug connector to the Analog Audio In 1 & 2 part of the terminal block connector.

3. For channels 3 and 4 connect the analog or digital audio input to the Ana/Dig Audio In 3 & 4 part of the terminal block connector. The input type of channels 3 and 4 is set up in the GUI.

   Hint: For digital audio connections, use a balanced cable designed for 110-ohm AES/EBU digital audio or a coaxial cable designed for 75-ohm AES-3id. Use a high-quality balanced audio cable for the analog inputs.

   If you have many or heavy audio cables connected to the D9040 Encoder, you may need to suspend the cables in your rack to prevent unnecessary mechanical stress on the audio connector.

4. If relevant, use the Digital Out pins of channels 3 and/or 4 to synchronize external equipment to a reference clock. The reference clock is locked to the video.

Connecting to the Contact Closure or Cue Tone Interfaces

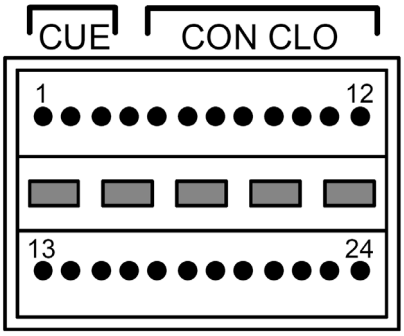
Contact Closure and Cue Tone Connector

The D9040 Encoder has a contact closure and a cue tone interface (not used), which can be used to trigger digital program insertion (DPI). The contact closure interface has 8 inputs. The cue tone interface has two inputs.

Pin Allocation

The connector labeled **CUE CON CLO** is a 24-pin terminal block connector.

The following table shows the connector and the pin allocation.

Connector Drawing	Pin Number	Description	Pin Number	Description
	1	Cue Tone In +	13	NC
	2	Cue Tone In -	14	NC
	3	Ground	15	NC
	4	NC	16	INC
	5	Contact 1	17	Contact 5
	6	Ground	18	Ground
	7	Contact 2	19	Contact 6
	8	Ground	20	Ground
	9	Contact 3	21	Contact 7
	10	Ground	22	Ground
	11	Contact 4	23	Contact 8
	12	Ground	24	Ground

Note: Contact open = not connected (internal pull-up).
Contact closed = connected to ground.

To Connect to the Contact Closure Interface

Connect the external contact closure equipment to the contact closure interface. External contact closure equipment could be a Monroe DTMF decoder.

To Connect to the Cue Tone Interface (not used)

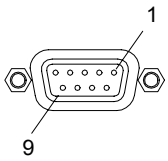
Connect the external cue tone equipment to the cue tone interface. External cue tone equipment could be a PowerVu® D9850 Program Receiver.

Connecting the Statmux Interface

Connector for the Statmux Input

The D9040 Encoder has one bidirectional RS-232 data channel for connection to the Regulus Statistical Multiplex Controller.

The following table shows the female Statmux connector and the pin allocation for the RS-232 input.

Connector	Pin number	RS-232 Connector Pin allocation	Signal
	1 2 3 4 5 6 7 8 9	Not connected RxD (output) TxD (input) DTR (input) GND DSR (output) RTS (input) CTS (output) Not connected	RS 232-E data channel, at a bit rate of 38,400 baud Connector type: 9-pin sub-D female

To Connect the Statmux Interface

Do as follows to connect to the Statmux interface:

1. Connect the one-to-one RS-232 cable to the Statmux Interface connector.

   Note: Use a shielded cable.

2. Connect the other end of the RS-232 cable to the Regulus Statistical Multiplex Controller.

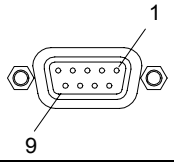
   The D9040 Encoder automatically sets up the RS-232 communication parameters when choosing statistical multiplexing.

Connecting an External Alarm System

Connector for an External Alarm System

The D9040 Encoder is equipped with a connector for alarm relay outputs for remote alarm signaling.

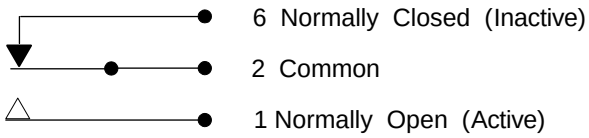
The Alarm output connector is a 9-pin Sub-D female connector. The following drawing shows the connector and the pin allocation table for the Alarm output connector.

Connector	Relay name	Function	Normally closed pin	Common pin	Normally open pin
	A	A-Alarm	6	2	1
	B	B-Alarm	7	8	3
	C	C-Alarm	4	5	9

1. Connect the cable from the external alarm system to the alarm connector.

Example, Alarm Relays

The following figure shows an example of how the alarm relays work.



02-085

For example, for an A-alarm under normal operational conditions (no alarm), pin 6 is closed, that is connected to pin 2 and pin 1 is open. However, should an alarm condition occur pin 6 is open and pin 1 is closed, that is connected to pin 2. This means that the A-alarm is active and the A-alarm LED lights on the front panel.

Note: The A-alarm relay is always activated when the power is off or the D9040 Encoder is booting, whereas the other alarm relays maintain their status.
For example, if a B-alarm relay is inactive when the power is switched off, it stays inactive. However, if it is active when the power is switched off, it stays active.

For information about the maximum relay load, see **Alarm Interface**, page A-18.

Connecting the Ethernet Management Interface

The Ethernet Interface

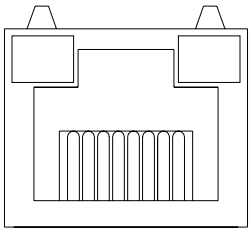
The RJ-45 interface for 10/100 BASE-T Ethernet is intended for PNC management.

Hint: If you experience problems with the 10 BASE-T Ethernet it is recommended that you change it to a 100 BASE-T connection.

Note: You must set up the IP address, the default gateway and the subnet mask to match the network connection. This is done through the front panel menu. For further information, see **Front Panel Setup**, page 1-3.

Pin Allocation, Ethernet Connector

The table shows the Ethernet connector and the pin allocation (MDI interface):

Connector	Pin	Pin allocation
 00-052	1	Tx+
	2	Tx-
	3	Rx+
	4	Not connected
	5	Not connected
	6	Rx-
	7	Not connected
	8	Not connected

Informative Notes

Proper cables are required for reliable Ethernet operation; to run over a maximum segment length of 100 m the cable has to comply with the EIA/TIA Category 5 wire specifications.

To Connect the Ethernet Interface

1. Connect a crossed RJ-45 cable between the Ethernet connector on the D9040 Encoder and the Ethernet port of your PC.

Note: You need a crossover cable if you want to connect the Ethernet interface of the D9040 Encoder directly to another Ethernet device without using a hub or switch.

You need to set up the IP address on both the D9040 Encoder (via the front panel display). For information on setting up the IP address via the front panel, see **Front Panel Setup**, page 1-3.

Connecting the ASI Outputs and the ASI Monitor Decoder

To Connect the ASI Outputs

Do as follows to connect to the ASI output:

1. Connect the output signals from the D9040 Encoder connectors ASI OUT 1 and/or ASI OUT2 to the ASI input connectors of the equipment after the D9040 Encoder.

   Use a 75-ohm double-braided cable.

   The equipment after the D9040 Encoder could be a Transport Stream Multiplexer such as the PowerVu Model D9140 Advanced Multilplexer.

   Hint: The two outputs are identical and can be used for backup purposes.

2. If you want to check the ASI output signal connect an ASI monitor to the ASI monitor connector.

   Note: The ASI monitor output cannot be muted but otherwise it works just like the two primary outputs.

Chapter 4
Front Panel Operation

Overview

Introduction

This chapter describes how to set up the D9040 Encoder using the front panel keys and display.

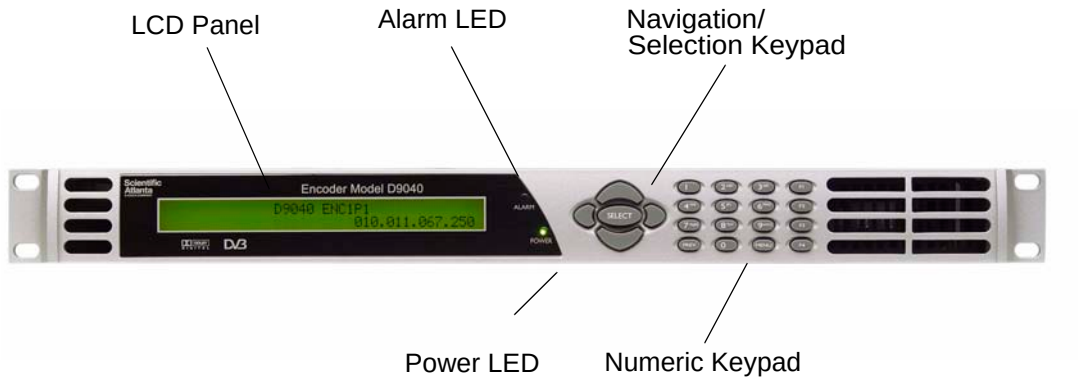
In This Chapter

This chapter contains the following topics.

About the Front Panel

Introduction

The D9040 Encoder is operated using controls and indicators on the front panel. These include the numeric keypad, the Navigation/Selection keypad, the LCD, the ALARM and POWER indicators. These are shown in the following illustration:



Keypad

The numeric keypad is used to enter alphanumeric values. The **MENU** key sets the software to the initial menu and the **PREV** key or the **UP** arrow key returns to the previous menu. The **PREV** key can also be used to cancel a numeric entry at any point during the entry sequence, and the **LEFT Arrow** key allows backspacing through the entry.

LCD

The LCD provides information on the selections available at any menu level, current settings for parameters, and certain status and alarm indications. This is a 2x40, backlit LCD panel. The top line may be status data or identifier information. It can also display optional functions available for tuning operations. The bottom line will show selections or parameter values available using the navigation/selection keypad. The items are selected by pressing the **SELECT** (center key) or **DOWN Arrow** key on the navigation/selection keypad.

Front Panel LEDs

For further information about the status signaling of the front panel LEDs, see **Front Panel LEDs**, page 5-7.

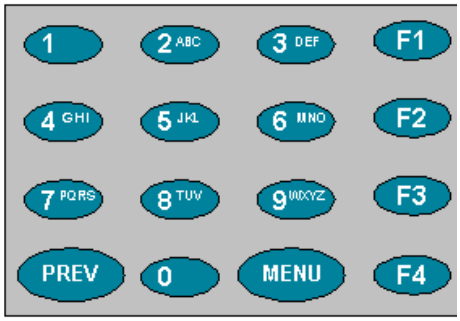
Navigation/Selection Keypad

The navigation keys (**LEFT**, **RIGHT**, **UP** and **DOWN**) and the **SELECT** key on this keypad are the primary controllers. Each navigation key performs various functions, depending on the current state of the menu system (i.e. sometimes the left navigation key backspaces over an entry and sometimes moves the cursor to a different menu item). Once the cursor is over the desired function, pressing the **SELECT** (center key) or **DOWN Arrow** key selects the current item (this may go to a different menu or change a setting). Pressing the **SELECT** key stores any entered values.

Keypad Convention

Overview

Throughout this manual, there are references to parts of a keypad on the front of the encoder. This is the Navigation/Selection keypad (see diagram at right), which changes its function, depending on the current state of the menu. For clarity, the following table shows which parts of this integral interface are being referenced by which term.

When you see this…	It means…	
LEFT Arrow key	Press the key on the left side of the Navigation/Selection Keypad.	
RIGHT Arrow key	Press the key on the right side of the Navigation/Selection Keypad.	
UP Arrow key	Press the key on the top of the Navigation/Selection Keypad.	
DOWN Arrow key	Press the key on the bottom of the Navigation/Selection Keypad.	
SELECT key	Press the key in the center of the Navigation/Selection Keypad.	
PREV key	Press the key on the lower left of the numeric keypad[1)].	
MENU key	Press the key on the lower right of the numeric keypad[a)].	
Alphanumeric Entry	Pressing the numeric keys 0-9 once will enter the respective digit into a data entry field.	

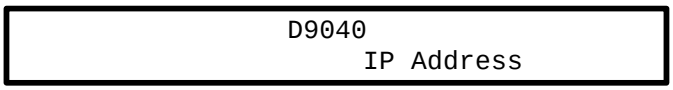
1. Numeric keypad keys are uniform. MENU and PREV have been enlarged here for effect.

Startup Screen

Structure

On power up and initialization, an identifying startup screen displays the system name and the IP address of the unit.

The startup screen contains the following parameters:



System Name

Description: The system name as set in the PNC GUI. The system name is centered on the top line of the Startup screen and is not displayed on sub-pages. It is used for uniquely identifying the D9040 Encoder.

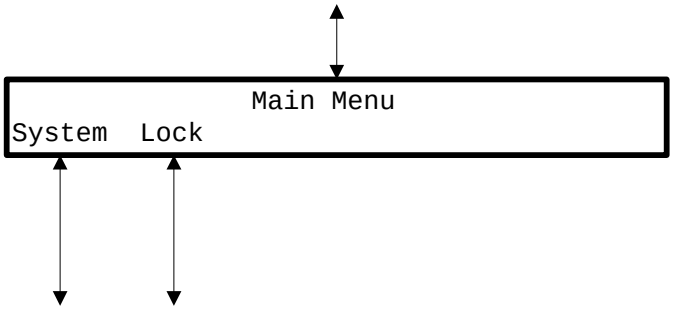
IP Addr.

Description: The IP address of the D9040 Encoder. The IP address is set up from the System menu, see **IP, Management, IP Address**, page 4-7.

Main Menu

Structure

Operation of the Encoder Model D9040 begins at the Main menu. From the startup screen press the MENU or SELECT key to view the Main menu.



Menu Selection

Select the desired function by moving the cursor left or right by pressing the LEFT or RIGHT key. Once a selection is made by pressing the SELECT or the DOWN key, the LCD presents the second menu level for the selected function. Succeeding levels for each function are described in the following pages.

System Menu

Structure

To see the System menu from the Main menu, press the SELECT key.

Each parameter is described in the following. For instructions on how to select and store settings, see **About the Front Panel**, page 4-2.

The menu has the following structure:

Status, Alarms

Parameters: N/A

Description: A list of active alarms in the system.

IP, Management, IP Address

Parameters: <0 to 255>.<0 to 255>.<0 to 255>.<0 to 255>

Description: The IP address of the management interface to the D9040 Encoder.
Contact your local network administrator to obtain an IP address.
Use the numeric keys to type the IP address.
Press the SELECT key to store the entered values.
Press the UP Arrow key to leave the menu.
When you leave the IP menu by pressing the UP Arrow once more the IP, Mask and Gateway parameters are validated against each other and stored. Any inconsistencies will be shown in the display.

Important: For the changes to take effect, you must reset the D9040 Encoder after you have finished setting or changing the IP address, subnet mask and default gateway. The D9040 Encoder will display a reminder.

Note: The reset may take up to 120 seconds.

Note: The IP Address is not affected by the Default command.

IP, Management, Mask

Parameters: <0 to 255>.<0 to 255>.<0 to 255>.<0 to 255>

Description: The subnet mask of the management interface to the D9040 Encoder. Setup similar to **IP, Management, IP Address**, page 4-7, above.
Note: The subnet mask is not affected by the Default command.

IP, Management, Gateway

Parameters: <0 to 255>.<0 to 255>.<0 to 255>.<0 to 255>

Description: The default gateway of the management interface to D9040 Encoder. The D9040 Encoder uses this gateway to route IP traffic across the network. Setup similar to **IP, Management, IP Address**, page 4-7, above.
Note: The default gateway setting is not affected by the Default command.

Hint: The default gateway 0.0.0.0 means that no gateway is used.

Software Version

Parameters: N/A

Description: The software version of the system controller.

Module Info, Main

Parameters: N/A

Description: The hardware and the software part numbers of the main board.

Module Info, H.264

Parameters: N/A

Description: The hardware and the software part numbers of the H.264 (VE6) board.

Module Info, Adv. Video Input

Parameters: N/A

Description: The hardware and the software part numbers of the Advanced Video Input module.

Module Info, Dual Audio

Parameters: N/A

Description: The hardware part number[1)] of the optional audio module. The audio module contains two stereo channels or 4 mono channels.

1)The audio module has no software part number and will show N/A in the software part number field.

Option License, PNC Management

Parameters: Enabled, Disabled

Description: The status of the license signifies the following:

Status	Explanation
Enabled	The option is present and enabled.
Disabled	The option is either disabled or uninstalled. In this case you have to enable or install the option to make it work.

Note! This option is always pre-installed and enabled at delivery.

Option License, Statmux

Parameters: Enabled, Disabled

Description: The status of the license signifies the following:

Status	Explanation
Enabled	The option is present and enabled.
Disabled	The option is either disabled or uninstalled. In this case you have to enable or install the option to make it work.

Note! This option is always pre-installed and enabled at delivery.

Option License, Closed Caption

Parameters: Enabled, Disabled

Description: The status of the license signifies the following:

Status	Explanation
Enabled	The option is present and enabled.
Disabled	The option is either disabled or uninstalled. In this case you have to enable or install the option to make it work.

Note! This option is always pre-installed and enabled at delivery.

Option License, Noise Reduction

Parameters: Enabled, Disabled

Description: The status of the license signifies the following:

Status	Explanation
Enabled	The option is present and enabled.
Disabled	The option is either disabled or uninstalled. In this case you have to enable or install the option to make it work.

Note! This option is always pre-installed and enabled at delivery.

Option License, Pre-Analysis

Parameters: Enabled, Disabled

Description: The status of the license signifies the following:

Status	Explanation
Enabled	The option is present and enabled.
Disabled	The option is either disabled or uninstalled. In this case you have to enable or install the option to make it work.

Note! This option is always pre-installed and enabled at delivery.

Option License, Dolby Digital, Channel 1, Channel 2, Channel 3 or Channel 4

Parameters: Enabled, Disabled

Description: You need an option license for each of the Dolby Digital channels. The status of the license signifies the following:

Status	Explanation
Enabled	The option is present and enabled.
Disabled	The option is either disabled or uninstalled. In this case you have to enable or install the option to make it work.

Please contact your local Cisco sales representative if you want to buy an option.

Option License, DPI

Parameters: Enabled, Disabled

Description: The status of the license signifies the following:

Status	Explanation
Enabled	The option is present and enabled.
Disabled	The option is either disabled or uninstalled. In this case you have to enable or install the option to make it work.

Please contact your local Cisco sales representative if you want to buy an option.

Option License, VBI

Parameters: Enabled, Disabled

Note: VITC data in the incoming signal will automatically be transferred to the transport stream output independently of the VBI option.

Description: The status of the license signifies the following:

Status	Explanation
Enabled	The option is present and enabled.
Disabled	The option is either disabled or uninstalled. In this case you have to enable or install the option to make it work.

Note! This option is always pre-installed and enabled at delivery.

Option License, Profile422

Parameters: Enabled, Disabled

Description: The status of the license signifies the following:

Status	Explanation
Enabled	The option is present and enabled.
Disabled	The option is either disabled or uninstalled. In this case you have to enable or install the option to make it work.

Please contact your local Cisco sales representative if you want to buy an option.

Option License, Auto Concatenation

Parameters: Enabled, Disabled

Description: The status of the license signifies the following:

Status	Explanation
Enabled	The option is present and enabled.
Disabled	The option is either disabled or uninstalled. In this case you have to enable or install the option to make it work.

Please contact your local Cisco sales representative if you want to buy an option.

Option License, AAC, Channel 1, Channel 3, Channel 5 or Channel 7

Parameters: Enabled, Disabled

Description: You need an option license for each of the AAC channels. The status of the license signifies the following:

Status	Explanation
Enabled	The option is present and enabled.
Disabled	The option is either disabled or uninstalled. In this case you have to enable or install the option to make it work.

Please contact your local Cisco sales representative if you want to buy an option.

Reset

Parameters: N/A

Description: Resets (boots) the D9040 Encoder.
The D9040 Encoder displays a message asking you to confirm the resetting of the unit. Press SELECT to reset the encoder, or press UP or PREV to leave the menu without making any changes.
Hint: You should reset the D9040 Encoder if:

- there has been a temperature alarm causing the D9040 Encoder to disable functionality.
- you have set or changed the IP address, subnet mask or gateway of one of the IP interfaces of the D9040 Encoder via the front panel display.

Note: The reset may take up to 120 seconds.

Default

Parameters: N/A

Description: The D9040 Encoder will display a message asking you to confirm setting the unit to the default values. Press SELECT to set the unit to the default values, or press UP or PREV to leave the menu without making any changes.
Use the default settings if you have set up the D9040 Encoder with illegal and incompatible settings to get the encoder back in a functional state.

Note: The default may take up to 120 seconds.

Reset Passwords

Parameters: N/A

Description: Use this feature if you want to reset the login for the telnet, FTP and web-based user interfaces. The D9040 Encoder will display a message asking you to confirm resetting the passwords to their default values.

Note: The Web GUI is used for diagnostics/troubleshooting purposes only.

Press SELECT to reset the passwords, or press UP or PREV to leave the menu without making any changes.

Lock Menu

Structure

To see the Lock menu from the Main menu press the RIGHT Arrow key five times and the SELECT key.

Each parameter is described in the following. For instructions on how to select and store settings, see **About the Front Panel**, page 4-2.

The menu has the following structure:

04-058

Lock

Parameters: Unlocked, Locked

Description: From this menu you may lock or unlock the front panel. When the front panel is locked you can only see settings but not change them from the front panel menus.

Chapter 5
Service and Maintenance

Overview

Introduction

This chapter gives information to assist you in replacing the fan and fuses. It also describes how the status of the D9040 Encoder is communicated via front panel LEDs and messages.

In This Chapter

This chapter contains the following topics.

Section A - Replacing Fans and Fuses

Introduction

General Service Information

This section gives general service guidelines. Furthermore you find some troubleshooting information.

Adjustment and Calibration

The D9040 Encoder does not require regular adjustments or calibrations, however to ensure proper cooling it is recommended that the fan be replaced every four years. In addition the fan can be replaced if the installed fan is not functioning correctly.

Replacing the Fan

General

To ensure proper cooling of the D9040 Encoder replace the fan every fourth year.

> ⚠ **WARNING:**
>
> **Allow only qualified service personnel to open the unit. Otherwise, personal injury or equipment damage may occur.**

Before You Start

You need the following tools and accessory:

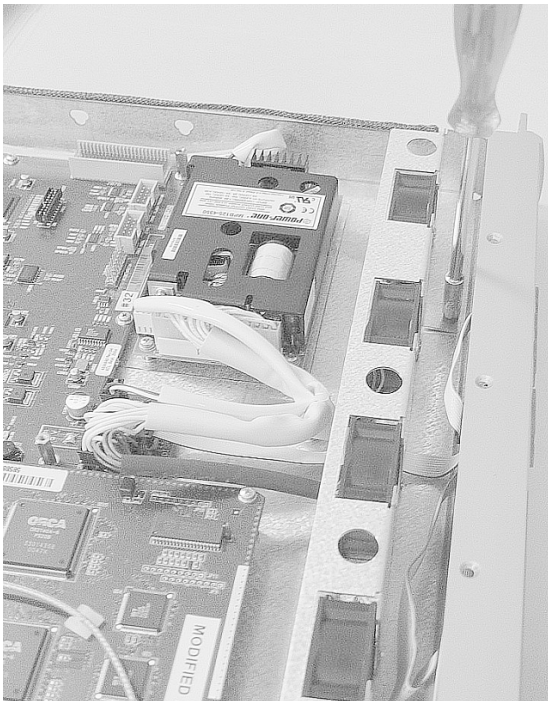
Item	Part Number
Screwdriver, PH-1	N/A
Flat-bladed screwdriver	N/A
Internal hex 5.5 mm screwdriver	N/A
Fan kit	4008940

To Replace the Fan

Do as follows to replace the fan:

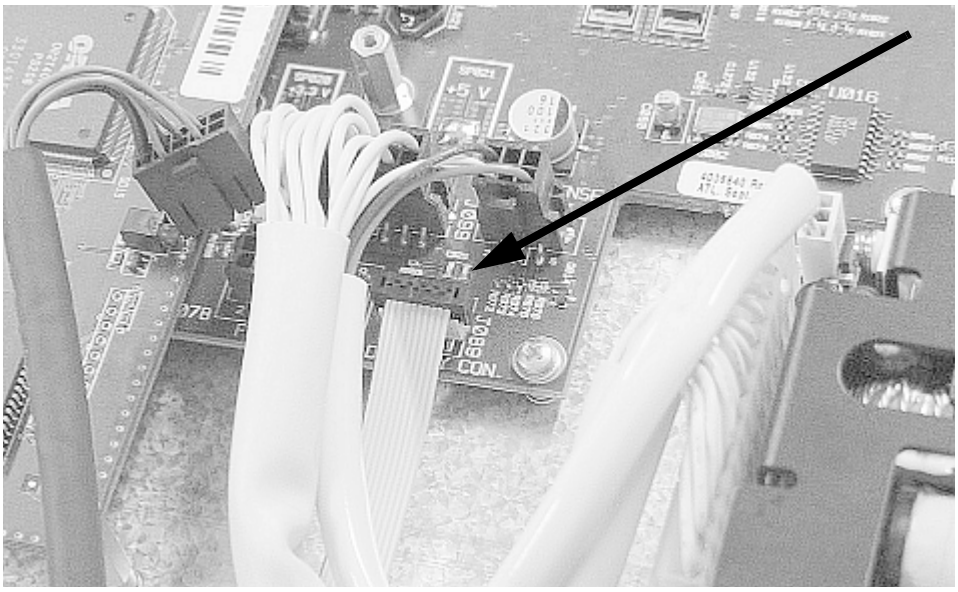
1. Switch off the power to the D9040 Encoder, remove the power cord and dismount the D9040 Encoder from the rack.
   Pull on the connector to disconnect the cable. Never pull on the cable itself.
2. Unscrew the 8 screws holding the top plate.
   Use a PH-1 screwdriver.

3. Unscrew and remove the nuts and washers. Two in front of the fan unit, and one at each side. Use an internal hex 5 mm screwdriver.

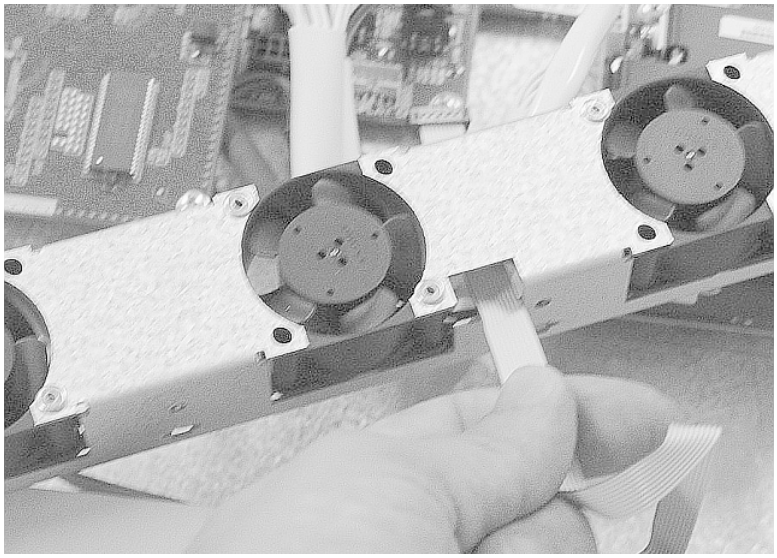


4. Unplug the fan connector at the main board.

5. Unplug the front panel connector from the main board.



6. Pull out the cable through the opening in the fan unit.



7. Replace the fan.
8. Mount in reverse order.

   Important: Make sure that the cable with the front panel connector goes through the opening in the fan unit and not below it.

9. Dispose of the old fan.
   Do not dispose of the old fan through the household garbage collection system, but follow your local regulations.

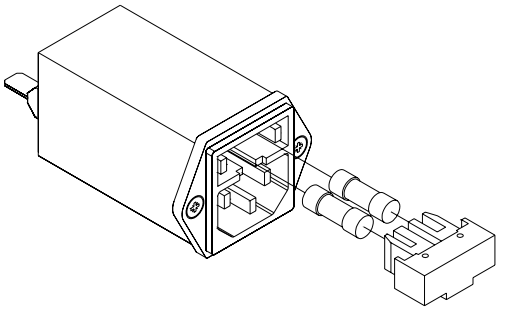
Replacing an AC Fuse in the Power Supply

To Replace an AC Fuse

To replace an AC fuse do the following:

1. Turn off the power to the D9040 Encoder.
2. Remove the power cord from the D9040 Encoder.
3. Open the lid holding the fuses.
   Use a flat bladed screwdriver.

   Note: There is a fuse in both phase conductors.
4. Pull out the lid.



98-017

5. Remove the blown fuse(s).
6. Insert a new fuse with the same rating.
   The fuse rating for the D9040 Encoder is **2 AT**.

> ⚠ **CAUTION:**
>
> **For continued protection against risk of fire replace only with same type and rating of fuse.**

7. Reinsert the lid.

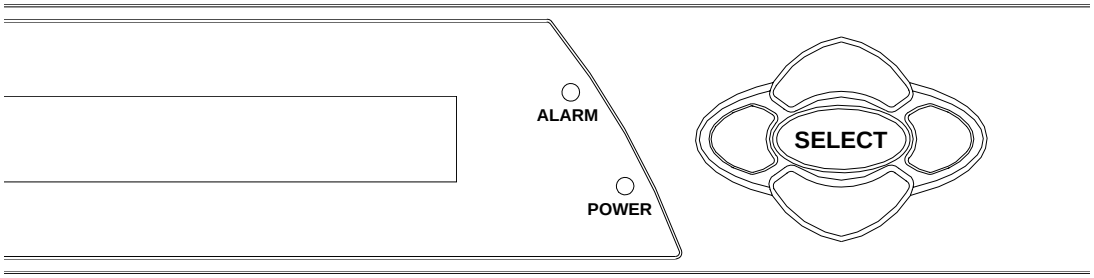
Section B - Status Signaling

Front Panel LEDs

Overview

To help signal the status of operation or the presence of an alarm the D9040 Encoder makes use of front panel LEDs.

The drawing below shows the LEDs on the front panel of the D9040 Encoder.



LED Function

The function of the LEDs is described in the table below.

LED	Signal	Explanation	Remedy
POWER	Green	The D9040 Encoder is correctly powered	N/A
	Off	There is no power present.	Check the AC line supply.
ALARM	Red	An A-alarm is active.	See the explanation/remedy in **Messages**, page 5-8.
	Off	No A-alarm is active.	N/A

Messages

General

The status of the D9040 Encoder and its immediate surroundings is reported to the PNC in the form of messages and alarms. In the PNC, you can enable or disable messages and attach an alarm category to each message.

Before You Start

Messages from the D9040 Encoder are shown in the PNC alarm log. For information on how to view the messages, see the PowerVu Network Centre 8.0 (or later) User's Guide.

D9040 Encoder Message List

The following shows an alphabetical list of examples of the the available messages, their default status and an explanation of the messages that can be displayed on the front panel LCD. For a complete of the available messages, see the PowerVu Network Centre 8.0 (or later) User's Guide. However, note that the messages may appear slightly different in the PNC alarm log compared to the D9040 Encoder front panel LCD.

Message	Description and Remedy	Severity	Default alarm category	Enable
A general hardware error has occurred.	Description: A general hardware error has occurred. Remedy: When persistent, contact your Cisco technical support center for repair.	Critical	A	On
A general software error has occurred.	Description: A general software error has occurred. Remedy: If problems are observed, reset the encoder. When persistent, contact your Cisco technical support center for further assistance.	Major	B	On
All settings were defaulted.	Description: All settings were set to default as a result of a default command. Remedy: Not applicable.	Information	None	On
An option has expired.	Description: An installed option license expired. Remedy: Order the needed license through your local Cisco technical support center.	Information	None	On

Message	Description and Remedy	Severity	Default alarm category	Enable
Application file downloaded.	Description: An application code has been downloaded to the encoder. The system will reboot. Remedy: Wait for the unit to reboot.	Information	None	On
Backup required.	Description: Backup is required. One of the events configured to trigger a backup event has occurred. Remedy: Look at the other messages to find the cause of this event.	Critical	None	On
Can't enable option as it is not installed.	Description: The installed license file doesn't contain information about the enabled license. Remedy: Order the needed license through your local Cisco technical support center.	Information	None	On
Clock synchronization failed.	Description: The device failed to fetch the clock from the time server. Remedy: Check the IP address for the clock server and the IP routing. Also check that the time server uses the RFC 867 (Day Time Protocol).	Warning	None	On
Composite input loss.	Description: There is no video source on the composite video input. Remedy: Examine the video input selection in the GUI and check the video source.	Major	A	On
Composite picture sync loss.	Description: The composite video signal does not comply with the specifications. Remedy: Check the input signal (frequency offset, jitter, etc.).	Major	B	On
Dolby Digital: AES/EBU audio input error.	Description: The encoder failed to lock to the audio frame or the audio sample frequency is out of range. Remedy: Check the cable and the incoming signal.	Major	B	On
Dolby Digital: Audio delay error.	Description: It is not possible to implement the requested audio delay. Remedy: Decrease the audio data rate or change video settings to decrease end-to-end delay. Check relative and external delay settings.	Major	B	On

Message	Description and Remedy	Severity	Default alarm category	Enable
Dolby Digital: DSP Delay high error.	Description: The audio delay setup on the Audio DSP is too high. Remedy: Decrease the audio delay.	Minor	None	On
Dolby Digital: DSP Delay low error.	Description: The audio delay setup on the Audio DSP is too low. Remedy: Increase the audio delay	Major	B	On
Dolby Digital: Embedded audio not locked.	Description: The encoder failed to lock to the embedded audio. Remedy: Check that the audio channels are embedded where required. Check the sources of the embedded audio.	Major	B	On
Dolby Digital: Overload on the audio input signal.	Description: The audio input signal is overloaded. The audio input level is too high and close to the clipping level. Remedy: Increase the clipping level or reduce the input level.	Minor	B	On
Dolby Digital: Passthrough FRMSZCOD lower and changed.	Description: The frame size code field is lower than expected and has changed. Remedy: Lower the bit rate on the Dolby Encoder.	Minor	None	On
Dolby Digital: Passthrough FRMSZCOD not valid.	Description: The frame size code field is not valid. Remedy: Use a valid bit rate on the Dolby Encoder.	Major	B	On
Dolby Digital: Passthrough FSCOD does not match.	Description: Sampling frequency code field does not match. Remedy: Set the sampling frequencies on the Dolby Encoder and the passthrough encoder to the same.	Major	B	On
Dolby Digital: Passthrough FSCOD not valid.	Description: The sampling frequency code field is not valid. Remedy: Set the sampling frequency on the Dolby Encoder to a legal value.	Major	B	On
Dolby Digital: Passthrough no sync.	Description: Passthrough input is missing. Remedy: Apply Passthrough signal.	Major	B	On

Message	Description and Remedy	Severity	Default alarm category	Enable
Dolby Digital: Passthrough rate low.	Description: The incoming bit rate on passthrough is lower than the setting. Remedy: Increase the selected bit rate.	Minor	None	On
Dolby Digital: Passthrough rate too high.	Description: The incoming bit rate on passthrough is too high. Remedy: No action needed.	Major	B	On
Dolby Digital: PCR Rate error.	Description: The requested PCR rate can non be achieved Remedy: No action possible.	Minor	None	On
Dolby Digital: TS rate/audio rate mismatch.	Description: The encoding rate is too high compared to the TS rate, or the encoding rate is too low. The encoding will restart. Remedy: Check the settings. Change the audio encoding rate or increase the TS rate. If a FIFO error occurs recurrently, contact your Cisco technical support center.	Major	B	On
DPI Cancel triggered without associated Start.	Description: An external control signal occurred out of sequence. A Start command must be triggered before it can be canceled. Remedy: Setup of automation system may need to be corrected.	Minor	None	On
DPI Message trigger ignored due to debounce delay.	Description: The general purpose input detected multiple triggers too close together in time. Remedy: Reduce the debounce delay setting, or increase the time between triggers or provide debounce protection to the general purpose input.	Minor	None	On
DPI PTS delay invalid.	Description: The relative delay setting has made the splice_time() PTS value to reference a point in time that has already occurred. Remedy: Change relative delay parameters.	Major	None	On
DPI Stop triggered without associated Start.	Description: An external control signal occurred out of sequence. A Start command must be triggered before it can be stopped. Remedy: Setup of automation system may need to be corrected.	Minor	None	On

Message	Description and Remedy	Severity	Default alarm category	Enable
DPI Transport packet overflow.	Description: Data were lost when attempting to load a DPI message to the buffer. Remedy: Increase the DPI bit rate.	Major	None	On
EDH error: EDH flag activated in encoder.	Description: The EDH (Error Detected Here) flag was activated in the encoder for one of the three groups (ANC/AP/FF). Remedy: Check your SDI source and the equipment that generates EDH.	Minor	None	Off
EDH input loss.	Description: The EDH signal has disappeared. The encoder receives no EDH data. Remedy: Check your SDI source and the equipment that generates EDH.	Major	None	Off
Encoding processing error.	Description: The internal MPEG processing of the encoder failed. The encoding will restart. Remedy: Check your settings for parameter violations. Observe the limitations in the manual. If persistent, contact your Cisco technical support center for further assistance.	Major	B	On
Fan malfunction.	Description: The system has detected a fan malfunction. Remedy: Replace the fan if it is not working correctly.	Critical	A	On
Front panel unlocked.	Description: Settings in the device can now be changed via the front panel. Remedy: Not applicable.	Warning	None	On
Invalid system type detected.	Description: The detected system type does not comply with the system type setting in the encoder. Remedy: Apply a correct system type (525 or 625 lines) or change the Video Input Type in the encoder.	Major	A	On
IP streaming buffer full.	Description: Internal buffer for IP streaming has been overwritten. TS packets have been lost and picture quality is degraded. Remedy: Lower the ASI output bit rate or check that the video IP network is not overloaded.	Major	B	On

Message	Description and Remedy	Severity	Default alarm category	Enable
Layer II: AES/ EBU audio input error.	Description: The encoder failed to lock to the audio frame or the audio sample frequency is out of range. Remedy: Check the cable and the incoming signal.	Major	B	On
Layer II: Audio delay error.	Description: It is not possible to implement the requested audio delay. Remedy: Decrease the audio data rate or change video settings to decrease end-to-end delay. Check relative and external delay settings.	Major	B	On
Layer II: DSP Delay high error	Description: The audio delay setup on the Audio DSP is too high. Remedy: Decrease the audio delay.	Minor	None	On
Layer II: DSP Delay low error.	Description: The audio delay setup on the Audio DSP is too low. Remedy: Increase the audio delay.	Major	B	On
Layer II: Embedded audio not locked.	Description: The encoder failed to lock to the embedded audio. Remedy: Check that the audio channels are embedded where required. Check the sources of the embedded audio.	Major	B	On
Layer II: Overload on the audio input signal.	Description: The audio input signal is overloaded. The audio input level has reached the clipping level. Remedy: Increase the clipping level or reduce the input level.	Minor	B	On
Layer II: PCR rate error.	Description: The requested PCR rate cannot be achieved. Remedy: No action possible.	Minor	None	On
Layer II: TS rate/ audio rate mismatch.	Description: The encoding rate is too high compared to the TS rate or the encoding rate is too low. The encoding will restart. Remedy: Check the settings. Change the audio encoding rate or increase the TS rate. If a FIFO error occurs recurrently, contact your Cisco technical support center.	Major	B	On

Message	Description and Remedy	Severity	Default alarm category	Enable
Power supply failure.	Description: Power supply defective or external power line broken Remedy: Check power cable. If persistent, contact your Cisco technical support center for repair.	Major	B	On
Power-up self-test failed.	Description: The internal power-up self-test failed. Remedy: When persistent, contact your Cisco technical support center for further assistance.	Critical	A	On
Regulus connection error.	Description: Error detected on the RS-232 connection to the Regulus Statistical Multiplex Controller. Remedy: Check the RS-232 connection between the Statistical Multiplex Controller and the encoder. Consult the manuals for information on how to interconnect the devices.	Major	B	On
SDI input loss.	Description: There is no video source on the SDI video input. Remedy: Examine the video input selection in the GUI and check the video source.	Major	A	On
SDI picture sync loss.	Description: SDI picture sync loss. The video signal does not comply with the specifications. Remedy: Examine the video signal. It may be off-frequency or the signal is perhaps a composite signal.	Major	B	On
Settings file is rejected.	Description: No settings changed in the device as the settings file contains conflicting settings. Remedy: Not applicable.	Information	None	On
Settings updated.	Description: The settings have changed either by a settings file import or by a change via the PNC. Remedy: Not applicable.	Information	None	On
Statmux interface RS-232 error.	Description: An error in the RS-232 statmux interface has been detected. Remedy: Check that the RS-232 cabling is OK and that the equipment connected to the RS-232 interface operates as required.	Major	B	On

Message	Description and Remedy	Severity	Default alarm category	Enable
Subcarrier unlock.	Description: The input is not able to lock to the subcarrier. Remedy: The frequency offset is likely too high. Color reproduction may suffer. Check your video source.	Major	B	On
Sync unstable.	Description: The composite video synchronization signal is unstable. Remedy: Check the video source or use a frame synchronizer.	Major	B	On
System boot completed.	Description: System boot has been completed. Remedy: Not applicable.	Information	None	On
Teletext input loss.	Description: The teletext signal has disappeared from the input. Remedy: Check your video source and the equipment that generates teletext.	Major	None	Off
Temperature approaching high limit.	Description: The temperature is approaching the upper limit for safe operation. Remedy: Check that the Fan malfunction message is enabled and not active. Apply external cooling if the ambient temperature is above 45 degrees Celsius.	Warning	B	On
Temperature approaching low limit.	Description: The temperature is approaching the lower limit for safe operation. Remedy: Raise the ambient temperature to more than 0 (zero) degrees Celsius.	Warning	B	On
Temperature outside safe limits.	Description: The temperature is outside the safe limits. The unit will be shut down. Remedy: Check that the Fan malfunction message is enabled and not active. Check that the ambient temperature is within 0 - 45 degrees Celsius.	Critical	A	On
The option import string is invalid.	Description: An option license file is invalid. Remedy: Check the Host ID and the ordered options in the option license file.	Information	None	On

Message	Description and Remedy	Severity	Default alarm category	Enable
TS rate/Video rate mismatch.	Description: The encoding rate is too high compared to the TS rate or the encoding rate is too low. The encoding will restart. Remedy: Check the settings. Change the encoding rate or increase the TS rate. In a statmux set-up, the TS rate of an encoder must have room for the maximum instantaneous encoding rate. If a FIFO error occurs recurrently, contact your Cisco technical support center.	Major	B	On
VII error.	Description: The encoder has detected an error in the VII signal. Remedy: Check your SDI source and the equipment that generates VII.	Major	None	Off
VITC input loss.	Description: The VITC signal in the video input signal has disappeared. Remedy: Check your video source and the equipment that generates VITC.	Major	None	Off
VPS input loss.	Description: The VPS signal in the video input signal has disappeared. Remedy: Check your video source and the equipment that generates VPS.	Major	None	Off
WSS input loss.	Description: The WSS signal in the video input signal has disappeared. Remedy: Check your video source and the equipment that generates WSS.	Major	None	Off

Chapter 6
Customer Information

If You Have Questions

If you have technical questions, call Cisco Services for assistance. Follow the menu options to speak with a service engineer.

Access your company's extranet site to view or order additional technical publications. For accessing instructions, contact the representative who handles your account. Check your extranet site often as the information is updated frequently

Appendix A
Technical Specifications

Overview

Introduction

This appendix contains the technical specifications for the Encoder Model D9040.

Note: The technical specifications are subject to change without prior notice.

In This Appendix

This appendix contains the following topics.

Section A - Video Input and Processing

MPEG-2 Encoder Specifications

General

Item	Specification
Number of channels	1
Encoding engine	According to MPEG-2, MP@ML
Frame types	I, P, and B frames
Encoding control	Adaptive coding parameters and GOP controlled by pre-analysis
PreSight*Plus* pre-analysis	Look-ahead for improved statistical multiplexing and normal fixed rate encoding.
PreSight*Plus* noise reduction	Advanced adaptive "Motion-compensated" temporal filter can be set to Multiframe-3D, 2-Frame, or off, and advanced adaptive spatial filter can be switched on or off.
Systems	525/29.97 Hz and 625/25 Hz
Modes	Fixed rate, statmux or capped VBR
Video data bit rate	MP@ML: 0.5 to 15 Mbit/s. The minimum bit rate depends on picture resolution and GOP (observe the recommendations for minimum rate).
Video resolution	8 bits per sample
Chroma format	4:2:0, 4:2:2
Aspect Ratio	4:3, 16:9 for MPEG-2 or auto-detect on VII/ WSS
Line start, 625 lines encoding	23
Line start, 525 lines encoding	22[1)]
H Resolutions	352, 480, 528, 544, 640, 704 and 720
V Resolutions	576 (for 625/25) and 480 (for 525/29.97)

1. If possible, set the decoder to the corresponding line start.

Composite Video Input

Video Formats

Item	Specification
Composite video	PAL systems B, D, G, H, I, K, M, N and NTSC system M, and J-NTSC acc. to BT 470-6

Input Characteristics

Item	Specification
Number of inputs	1
Type of connector	BNC female
Nominal internal termination, impedance	75 ohm
Return loss, internal or external termination, with or without power	> 35 dB, 10 Hz to 5.5 MHz.
Nominal input level	0 dBV
Maximum non-useful DC-component	±4 V

Video Synchronization and Clamp, Onboard Composite Module

Item	Specification
Non-math video sources	No disturbances in picture with a maximum subcarrier deviation of 1 Hz
Line frequency tolerance	±30 ppm of nominal line frequency, correct sync and clamp.
Maximum input line time jitter	300 ns_{pp}

Item	Specification
Clamp low frequency suppression	> 20 dB at 50 Hz > 34 db at 5 Hz
Input level range	-6 dBV to +3 dBV
Noise immunity	S/N > 20 dB, unweighted
Maximum input line time jitter	±100 ns_{pp}

Frame Synchronizer

Item	Specification
Frame locking	To an internal nominal 27 MHz reference or an external reference via the analog REF IN connector
Tolerance of the internal reference	10 ppm
Audio wandering upon frame skip/ repeat (when frame synchronizer is enabled)	± 1 frame
VBI behavior upon frame skip/ repeat	Drop VBI data upon frame skip and don't insert VBI in repeated frame upon frame repeat

Ref In

Item	Specification
Number of reference inputs	One 75 ohm, internally terminated
Type of reference	PAL/NTSC composite signal
Type of connector	BNC
Return loss	> 30 dB, 10 Hz to 5.5 MHz, with or without power
Nominal input level	0 dBV

Composite Video Input, Continued

Composite Video Performance

Item	Specification, Advanced Video Input Module	Specification, Onboard Composite module
Gain		
Insertion gain	± 0.2 dB	
Level stability	± 0.10 dB / 1 hour ± 0.15 dB/ 24 hour	
Noise		
Quantization Noise, unified weighted acc. to 567	≤ -55 dB RMS weighted relative to 0.7 V	≤ -55 dB RMS weighted relative to 0.7 V
Non-linear distortion		
Differential Gain (encoder only)	≤1% peak to peak	≤4% peak to peak
Differential Phase (encoder only)	≤1° peak to peak	≤4° peak to peak
Luminance Non Linearity	≤2% peak to peak	≤6 % peak to peak
Chrominance - luminance intermodulation	≤ 1%	≤ 2 %
Linear distortion		
Short-time waveform distortion	$K_{(p/b)} \leq 0.5\%$	≤ 2%
Line-time waveform distortion	≤± 0.5%	≤± 1%
Field-time waveform distortion	≤ ± 1%	≤ ± 3% in NTSC ≤ ± 2% in PAL
Chrominance luminance inequality		
Gain inequality	≤±2%	≤±4%
Delay inequality	±10 ns	± 26 ns
Steady state characteristics		
Gain/Frequency characteristics (codec)	≤± 0.2 db; 10 Hz to 5.00 MHz ≥ -3 dB, 6 MHz ≤ -24 dB, 6.75 MHz ≤ -40 dB, 8 to 27 MHz	≤ ± 0.65 db; 0.5 to 5.0 MHz
Group delay response (reference at 500 kHz)	≤± 20 ns, 10 Hz to 5.5 MHz	
Chrominance AM/PM Noise	< -50 dB	< -50 dB

VBI Specifications in Composite Video

VBI Processing

Item	Specification
Teletext B	
General	Teletext B acc. to ITU-R BT.653-3
Lines in 625 lines systems	7 to 22, 320 to 335, maximum 16 lines per field for DVB
Inverted Teletext	Applicable for EBU and DVB teletext
Output formats	According to EN 301 775 V1.1.1 (DVB-VBI Teletext) and/or according to EN 300472 V1.2.2, 1996. (EBU teletext)
Nominal input data amplitude 0 1	 Black level (± 15 mV) 462 mV (± 40 mV)
Input data amplitude variation:	+3 dB / -6 dB
Clock run-in	10 to 16 bits
Closed Captioning with V-chip support	
General	According to EIA-608
Lines in 525 lines systems	21 field 1 and 2 (284)
Output formats	MPEG-2: EIA 608, SA Type 4, DVS 157 H.264, PIP/H.264: EIA 608 ATSC, EIA 608 SA Proprietary
VPS	
General	VPS acc. to IRT Richtlinie 8 R 6
Lines in 625 lines systems	16
Output format	According to EN 301 775 V1.1.1
WSS	
Type of signal	According to ETS 300 294 (ETSI) or Vistek Data Sheet 1649 (AFD)
Lines in 625 lines systems	First half of line 23
Output format	According to EN 301 775 V1.1.1
VITC	
General	According to ISO13818-2
Lines in 625 lines systems	6 to 22 and 319 to 335
Lines in 525 lines systems	10 to 20 and 273 to 282

DVB Compliant Transparent VBI

Item	Specification
Lines in 625/50	7 to 23, 319 to 335
Lines in 525/60	10 to 22 field 1 and 10 to 22 field 2 (273 to 284)
Number of lines	≤2 VBI lines per field are transferred transparently if no other DVB VBI is present. ≤1 VBI line per field is transferred transparently if any other DVB VBI is present.
Signal type	Sampled signal, 13.5 MHz Synchronization pulse and burst are regenerated in the output.
Transferred samples	All luminance samples. Chrominance samples are not transferred.
Quality	The transparent lines must have a signal quality identical to ordinary video
Dynamic range	-50 to 750 mV relative to clamp
Output format	According to EN 301 775 V1.1.1.

SDI Input

System

Item	Specification
Video Formats	
Signal form	Y, CR, CB
Sampling structure	4:2:2
Line numbers/field rates	525/29.97 Hz, 625/25 Hz
Bit rate	270 Mbit/s ± 10 ppm
Video data word size	8 bit and 10 bit

Input Characteristics

Item	Specification
Number of inputs	1
Connector	BNC connector
Nominal input level	800 mV_{pp} nominal
Bandwidth	10 Hz to 5.75 MHz ±0.2 dB (625/25)
Impedance	75 ohm unbalanced
Return loss	≥ 15 dB in the range 5 to 270 MHz
Minimum jitter acceptance	25% of clock period, as determined over a period of one line
Interference rejection	No bit errors in presence of superimposed interfering signal
DC	± 2.5 V_{pp}
< 1 kHz	2.5 V_{pp}
1 kHz to 5 MHz	100 mV_{pp}
> 5 MHz	40 mV_{pp}

Embedded Data in SDI

VBI Processing

Item	Specification
EDH	
General	According to SMPTE RP 165.
Alarms	Gives an error message if there is a checksum error in the EDH or no EDH on the incoming SDI signal.
Teletext B	
General	Teletext B acc. to ITU-R BT.653-3
Lines system	625 lines SDI
Lines in 625 lines systems	7 to 22, 320 to 335, maximum 16 lines per field.
Inverted Teletext	Applicable for EBU and DVB teletext
Output formats	According to EN 301 775 V1.1.1 (DVB-VBI Teletext) and/or according to EN 300472 V1.2.2, 1996. (EBU teletext)
Nominal input data amplitude 0 1	 Black level (± 15 mV) 462 mV (± 40 mV)
Input data amplitude variation:	+3 dB / -6 dB
Clock run-in	10 to 16 bits
Closed Captioning with v-chip support	
General	According to EIA-608
Lines in 525 lines systems	Line 21 field 1 and 2 (284)
Output formats	MPEG-2: EIA 608, SA Type 4, DVS 157 H.264, PIP/H.264: EIA 608 ATSC, EIA 608 SA Proprietary
VII (MPEG-2)	
General	Acc. to SMPTE RP 186-1995 Class 1.1
Lines in 625 lines systems	Lines 11 and 324.
Lines in 525 lines systems	Line 14 field 1 and 2 (277)
Output format	Aspect ratio or AFD
VPS	
General	Acc. to IRT Richtlinie 8 R 6
Output format	According to EN 301 775 V1.1.1

DVB Compliant Transparent VBI

WSS	
General	Acc. to ETS 300 294 (ETSI) or Vistek Data Sheet 1649 (AFD)
Lines in 625 lines systems	First half of line 23
Output format	According to EN 301 775 V1.1.1.
VITC	
General	According to ISO13818-2
Lines in 625 lines systems	6 to 22 and 319 to 335
Lines in 525 lines systems	10 to 20 and 273 to 282

Item	Specification
Lines in 625/50	7-23, 319-335
Lines in 525/60	10-22 field 1 and 10-22 field 2 (273 to 284)
Number of lines	≤2 VBI lines per field are transferred transparently if no other DVB VBI is present in that field. ≤1 VBI line per field is transferred transparently if any other DVB VBI is present in that field.
Transferred samples	All luminance samples. Chrominance samples are not transferred.
Output format	According to EN 301 775 V1.1.1.

Embedded Audio

Item	Specification
Location of audio	The encoder accepts audio transmitted in any ancillary data space.
Formatting	According to SMPTE 272M
Audio sampling frequency	48 kHz locked to the video. According to SMPTE 272M
Resolution	20 bits
Number of channels	For each of the stereo audio encoders you can select one of the 8 stereo channels available in an SDI signal.

Section B - Audio Input and Processing

Audio Input

General

Item	Specification
Inputs	Analog, Digital AES/EBU or AES-3id and embedded. AES/EBU is not supported for channels 1 and 2.
Connectors Digital Audio In, Ch. 1 + 2 Analog Audio In, Ch. 1 + 2 Ana/Dig Audio In, Ch. 3 + 4 (option)	 2 BNC connectors Top row of terminal block connector Bottom row of terminal block connector
Basic audio channels	2 stereo (stereo channels 1 and 2) or 4 mono
Optional audio channels	2 stereo (stereo channels 3 and 4) or 4 mono

Analog Audio Input Channels 1, 2, 3 and 4 (Terminal Block Connector)

Item	Specification
Input impedance	> 20 kohm or 600 ohm balanced, selectable
Input clipping level	-6 to +24 dBu, selectable, 500 mdBu increments
Return loss	> 30 dB, 20 Hz to 20 kHz, 600 ohm impedance
CMRR	> 50 dB, 1 kHz

AES/EBU Digital Audio Input, Channels 3 and 4 (Bottom Row of Terminal Block Connector)

Item	Specification
Encoding	According to AES3-1992
Input impedance	110 ohm balanced
Return loss	≥ 21 dB, 0.1 to 6.0 MHz
Input level	2 to 7 Vpp nominal, min. 500 mV

AES-3id Digital Audio Input, Channels 1 and 2 in BNC and 3 and 4 in Terminal Block

Item	Specification
Encoding	According to SMPTE 276M
Input impedance	75 ohm single-ended
Return loss	≥ 15 dB, 0.1 to 6.0 MHz
Input level	0.5 to 2 Vpp nominal

AES-3id Reference Output, Channels 3 and 4 in Terminal Block Connector

Item	Specification
Output impedance	75 ohm

Audio Processing

Audio Performance

Item	Specification
Insertion gain	±0.5 dB
Pass-band frequency response	±0.25 dB, rel. 1 kHz
32 kHz sample rate	20 to 14,500 Hz
44.1 and 48 kHz sample rate	20 to 20,000 Hz
Crosstalk	< -80 dB, 20 Hz to 20 kHz
Gain difference between channels	±0.5 dB, 20 Hz to 20 kHz
Phase difference between channels	< 3°, 20 Hz to 20 kHz

Layer II Encoding

Item	Specification
Encoding	According to MPEG-1, Layer II
Program modes	Single mono, dual channel, joint stereo, stereo
Audio data bit rate	32, 48, 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320 and 384 kbit/s
Sample frequency	32, 44.1 and 48 kHz

Layer II Audio Performance (at 384 kbit/s)

Item	Specification
SINAD at 1,020 Hz	> 80 dB
Idle channel noise	< -86 dBq0ps, A-weighted

Dolby Digital Encoding

Item	Specification
Encoding	According to ATSC Standard: Digital Audio Compression (AC-3) Rev. A, August 2001.
Audio Coding Modes	Dual Mono 1+1, Mono 1/0, Stereo 2/0
Audio data rate	56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, 576 and 640 kbit/s
Sample frequency	32, 44.1 and 48 kHz

Dolby Digital Audio Performance (at 640 kbit/s)

Item	Specification
SINAD at 1,020 Hz	> 80 dB
Idle channel noise	< -86 dB A-weighted

AAC Encoding

Item	Specification
Encoding	According to ISO/IEC 13818-7 "Advanced Audio Coding".
Audio Coding Modes	Dual Mono 1+1, Single Mono 1/0, Stereo 2/0, Joint Stereo 2/0, Mono 1/0 LR
Audio data rate	14 to 320 kbit/s
Sample frequency	32, 44.1 and 48 kHz

AAC Audio Performance (at 640 kbit/s)

Item	Specification
SINAD at 1,020 Hz	> 80 dB, 3 dB below clipping level
Idle channel noise	< -86 dB, A-weighted

Section C - Data Interfaces

Statmux Interface

Item	Specification
Number of inputs	1
Type of connector	9-pin sub-D female (DCE)
Type of input	Bi-directional, asynchronous RS-232-E
Baud rates as data interface	38400
Data format	8N1, no parity

Section D - Transport Stream Output

ASI Output

Item	Specification
Number of outputs	3, one is designated ASI Monitor
Type of connector	75 ohm BNC
Output impedance	75 ohm according to EN 50083-9
Data amplitude	800 mV peak-peak ± 10% according to EN 50083-9
Return loss	>15 dB, 27 to 270 MHz
Transport stream bit rate	1 to 64 Mbit/s ± 100 ppm
Transport stream formats	According to EN 50083-9. 188 bytes structure, 204 bytes without Reed Solomon, 204 bytes with Reed Solomon, Burst or packet format.
ASI bit rate	270 Mbit/s ± 100 ppm

Section E - Control and Management Interfaces

Ethernet Management Interface

Item	Specification
Number of connectors	1
Type of connector	Eight-pin RJ-45, MDI
Ethernet type	10/100 Base-T
Required setup	IP address, default gateway and subnet mask

Alarm Interface

Item	Specification
Number of outputs	3, each having one set of contacts closed and one set open during normal operation. Alarms are signalled by reversing the polarity of the two contact sets.
Type of connector	9-pin sub-D female
Max. voltage	≤ 30 V AC, ≤60 V DC
Max. current	≤1 A

Contact Closure Interface

Item	Specification
Connector type	Terminal block
Usage	DPI according to SCTE 35
8 contacts	Ground + Input/sense

Cue Trigger Interface

Item	Specification
Connector type	Terminal block (shared with contact closure inputs)
Usage	DPI according to SCTE 35
Input Impedance	> 20 kW
Nominal input level	0 dBu
Input level range	-18 dBu to +6 dBu

Front Panel Interface

Item	Specification
LCD	2 lines of 40 characters backlit LCD.
Keypad	Arrow keys, 0 to 9, Select, Menu Prevand F1 to F4 keys.
LEDs	Green LED for power on. Red LED for Alarm indication.

Section F - Power and General Specifications

Power

AC Power Connector

Item	Specification
Number of inputs	2
Type of connector	Standard 3-pin IEC with filter, no switch
Input voltage	100 - 240 V AC ± 10%
Input power consumption	≤95 W fully equipped
Input frequency	47 to 63 Hz
Fuse	2.0 AT fuse in both line and neutral conductor

Mechanics, D9040 Encoder

Item	Specification
Sub-rack	According to IEC 297-3
Height	1 U (44.5 mm) (1.75″)
Width	482 mm (19″)
Depth	560 mm (22″)
Installation depth	630 mm (24.8″)
Weight	8.7 kg (19.2 lbs)
Connector access	Rear
Grounding stud	M4 screw, non-detachable at rear panel

Environment

Item	Specification
Storage/Transportation	
General	The product is within the original packaging.
Humidity	95% Relative Humidity at +50°C/122°F according to IEC 60068-2-78. Test: Cab
Temperature	-20 to +70°C (-4 to 158°F)
Vibration, transportation	According to MIL-STD-810E, Method 514.4, Category 1, Basic transportation
Fall, transportation	According to ETS 300 019 part 1-2. Transportation class 2.3, and thus EN/IEC 60068-2-32, test: Ef. Free fall
Operation	
Humidity	95% Relative Humidity at +50°C/122°F according to IEC 60068-2-78. Test: Cab
Temperature	0 to +50°C (32 to 122°F)
Altitude	70 to 106 kPa ETS 300 019 part 1-3 stationary use, Class 3.2 and thus EN/IEC 60068-2-13, test: M
Cooling	Fan-based
Fan lifetime	> 35000 hours at 50°C ambient temperature
EMC	EN 55022 and EN 55 024, EN 61000-3-2 and EN 61000-3-3 and FCC 47 CFR part 15 subpart B class A and AS/NZS CISPR 22.
Safety	According to IEC 60950-1, EN 60950-1, UL60950-1, CSA C22.2 No. 60950-1-00.
Certifications	
CB	Yes
CE marked	Yes
UL and cUL	Yes
C-Tick marked	Yes

Data subject to change.

Appendix B
Equipment and Accessories

Overview

Introduction

This appendix contains names and part numbers of equipment and accessories for the D9040 Encoder.

In This Appendix

This appendix contains the following topics.

Accessory Kits for the D9040 Encoder

Accessory Kit, AC Version

The accessory kit for the AC version of the D9040 Encoder is included in the delivery. It has the part number 4013357 and contains the following items:

Part number	Description
4020024	Encoder Model D9040, User and Service Manual
196788	4 spring cage plugs for terminal block connectors

One of the following optional line cords can be included with the D9040 Encoder:

Part Number	PCS	Description
700788	1	Line cord, European version
3993131	1	Line cord, UK version
180178	1	Line cord, Australian version

Options and Accessories

Basic Configurations, D9040 Encoder

The following basic configurations are available:

Part number	Description
4018041.000	D9040 - PAL/NTSC/SDI, MPEG-2 SD encoder, Dual AC, 2 stereo audio Dolby Digital/AAC Passthrough and Layer II audio, Closed Captioning support, VBI, DPI[1)], ASI out, PNC Control, MPEG-2 Statmux, PreSight*Plus* adaptive and motion-compensated filter suite (noise reduction), US power cord
4018041.100	D9040 - PAL/NTSC/SDI, MPEG-2 SD enc, Dual AC, 4 stereo audio Dolby Digital/AAC Passthrough and Layer II audio, Closed Captioning support, VBI, DPI[1)], ASI out, PNC Control, MPEG-2 Statmux, PreSight*Plus* adaptive and motion-compensated filter suite (noise reduction), US power cord
4018041.200	D9040 - PAL/NTSC/SDI, MPEG-2 SD enc, Dual AC, 2 stereo audio Dolby Digital/AAC Passthrough and Layer II audio, Closed Captioning support, VBI, DPI[1)], ASI out, PNC Control, MPEG-2 Statmux, PreSight*Plus* adaptive and motion-compensated filter suite (noise reduction), AVC Ready[2)], US power cord
4018041.300	D9040 - PAL/NTSC/SDI, MPEG-2 SD enc, Dual AC, 4 stereo audio Dolby Digital/AAC Passthrough and Layer II audio, Closed Captioning support, VBI, DPI[1)], ASI out, PNC Control, MPEG-2 Statmux, PreSight*Plus* adaptive and motion-compensated filter suite (noise reduction), AVC Ready[2)], US power cord

1. DPI for the D9040 Encoder in PNC systems requires a valid PNC DPI Option license.
2. "AVC Ready" indicates that the D9040 Encoder will ship with the necessary hardware to accommodate AVC encoding. AVC encoding requires 4018041.010. It will be available in the future as a software upgrade with an additional license option at a commercially reasonable price.

Software Options, D9040 Encoder[1)]

The following software options are available:

Part number	Description
4018041.001	Dolby Digital (AC-3) 2.0 encoding. Channels 1 and 2.
4018041.004	Dolby Digital (AC-3) 2.0 encoding. Channels 3 and 4. Requires 4 audio channels.
4018041.002	AAC-LC and HE-AAC audio encoding. Channels 1 and 2.
4018041.008	AAC-LC and HE-AAC audio encoding. Channels 3 and 4.

Hardware Options, D9040 Encoder[2)]

The following hardware options are available:

Part number	Description
4013737	Audio Channels 3 and 4, uncludes MPEG-1 Layer II

1) Please contact your local Cisco sales representative if you want to buy an option.
2) Please contact your local Cisco sales representative if you want to buy an option.

Optional Accessories, D9040 Encoder

The following optional accessories are available.

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Part number	Description	To be used/Comment
4013724	Fan kit	The fan lifetime is at least 4 years at 45°C ambient temperature.
4013127	Kit, AC Power Supply Unit	Spare part.

Appendix C
References

Applicable Documents

AES3-1992	Serial transmission format for two-channel linearly represented digital audio data.
ANSI/SMPTE 12M-1995	Television, Audio and Film ---- Time and Control Code
AS/NZS, 2002	Limits and methods of measurements of radio disturbance characteristics of information technology equipment.
ATSC Standard, August 2001	Digital Audio Compression (AC-3) Rev. A
CSA C 22.2 No. 60950-1, 2003	Safety of information technology equipment.
EIA708-B, December 1999	Digital Television (DTV) Closed Captioning
EIATIA-232-E, 1991	Interface between data terminal equipment and data circuits.
EN 55022, 1998 including A1, 2000	Limits and methods of measurements of radio disturbance characteristics of information technology equipment.
EN 55024, 1998 including A1, 2001	Information technology equipment - Immunity characteristics - Limits and method of measurement.
EN 60950-1, 2003	Safety of information technology equipment.
EN 61000-3-2, 2000	Limits for harmonic current emission.
EN 61000-3-3, 1995 including A1, 2001	Limitations of voltage fluctuations and flicker.
EN 300 468 V1.4.1	"Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems".
EN 50083-9 E 1998	"Interfaces for CATV/SMATV headends and similar professional equipment"
ETR 162 E1	"Allocation of Service Information (SI) codes for DVB systems".
ETR 211 E.2 - 1997	"Digital broadcasting systems for television; guidelines on implementation and usage of service information".
ETR 290, 05 1997	Measurement guidelines for DVB systems.

ETSI EN 300 468 V1.4.1, 2000-11	Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems.
ETSI TR 102 154 v1.1.1, 2001-04	Digital Video Broadcasting (DVB); Implementation guidelines for the use of MPEG-2 Systems, Video and Audio in Contribution and Primary Distribution Applications.
ETSI TS 101 154 V1.7.1 (2005-06)	Digital Video Broadcasting (DVB); Implementation guidelines for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream.
FCC CFR 47 Part 15	Radio Frequency Devices.
IEC 60950-1, 2001	Safety of information technology equipment.
IEC 68-2-1, IEC 68-2-6	Basic Environmental Testing Procedures.
IEC 68-2-29, 1987, IEC 68-2-56	Basic Environmental Testing Procedures.
IIEEE 802.3, 1996	IEEE Standard for Local and metropolitan area networks. Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications.
ISO/IEC 11172-3 - 1993	"Information Technology - Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s - Part3: Audio."
ISO/IEC 13818-1, 1995	Generic Coding of Moving Pictures and Associated Audio: Systems - Part1:Audio."
ISO/IEC 13818-2 - 2000	"Information Technology - Generic coding of moving pictures and associated audio - Part 2: Video."
ISO/IEC 13818-3 - 1994	"Information Technology - Generic coding of moving pictures and associated audio - Part 3: Audio."
ISO/IEC 13818-7 - 2004	Information technology -- Generic coding of moving pictures and associated audio information -- Part 7: Advanced Audio Coding (AAC)
ISO/IEC 13818-7, 2006	Information technology -- Generic coding of moving pictures and associated audio information -- Part 7: "Advanced Audio Coding" (AAC Low Complexity).
ISO/IEC 14496-3, 2005-12-01)	Information technology, coding of audio visual objects, part 3: Audio (Hi Efficiency AAC).
ISO/IEC 14496-10, 2005	Coding of audio-visual objects - Part 10: Advanced Video Coding.
ITU-R BT. 470-6	"Conventional Television Systems"
ITU-T Rec. G.742, 1972	"Second order digital multiplex equipment operating at 8448 kbit/s and using positive justification"

ITU-R Rec. 647, 1986	A digital audio interface for broadcasting studios.
RFC 791, 1981	Internet protocol, protocol specification.
RFC 867, 1985	Daytime Protocol.
RFC 1904, 1996	Conformance Statements for Version 2 of the Simple Network Management Protocol (SNMPv2).
SMPTE 272M, 1994	Proposed edition, "Formatting AES/EBU Audio and Auxiliary Data into Digital Video Ancillary Data Space."
SMPTE 291M, 1998	Proposed edition, "Ancillary Data Packet and Space Formatting".
SMPTE RP 168, 2002	"Definition of vertical switching point for synchronous switching."
TR 101 154 V1.4.1	"Digital Video Broadcasting (DVB); Implementation guidelines for the use of MPEG-2 systems; Video and audio in satellite, cable and terrestrial broadcasting applications."
UL 60950-1, 2003	Safety of information technology equipment.

Glossary

List of Terms and Abbreviations

AES/EBU	Audio Engineering Society/European Broadcasting Union. AES/EBU is the name of a digital audio transfer standard. The AES and EBU developed the specifications for the standard. AES/EBU is an alternative to the AES-3id standard.
ASI	Asynchronous Serial Interface. A 270 Mbit/s data stream similar to the 270 Mbit/s SDI signal. Note that the 270 Mbit/s is only the ASI rate. You may put in any MPEG stream from about 1.5 Mbit/s to 120 Mbit/s.
DCE	Data Communication Equipment
DPI	Digital Program Insertion
DVB	Digital Video Broadcasting
EIA	Electronic Industries Association
ETS	European Telecommunications Standards
LED	Light Emitting Diode
MDI	Media Dependant Interface
SDI	Serial Digital Interface
SINAD	Signal-to-Noise Ratio and Distortion
SMPTE	Society of Motion Picture and Television Engineers
SPI	Synchronous Parallel Interface
THD	Total Harmonic Distortion
TS	Transport Stream

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