



Cisco Series DCM D9900 Digital Content Manager System Guide

For Your Safety

Explanation of Warning and Caution Icons

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

The following warning and caution icons alert you to important information about the safe operation of this product:



You may find this symbol in the document that accompanies this product. This symbol indicates important operating or maintenance instructions.



You may find this symbol affixed to the product. This symbol indicates a live terminal where a dangerous voltage may be present; the tip of the flash points to the terminal device.



You may find this symbol affixed to the product. This symbol indicates a protective ground terminal.



You may find this symbol affixed to the product. This symbol indicates a chassis terminal (normally used for equipotential bonding).



You may find this symbol affixed to the product. This symbol warns of a potentially hot surface.



You may find this symbol affixed to the product and in this document. This symbol indicates an infrared laser that transmits intensity-modulated light and emits invisible laser radiation or an LED that transmits intensity-modulated light.

Important

Please read this entire guide. If this guide provides installation or operation instructions, give particular attention to all safety statements included in this guide.

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Important Safety Instructions (English)

 This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

Note: Save these instructions.

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.
- **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. Refer to this equipment's Identification label or contact factory for details about regulatory compliance approvals.



WARNING:

To reduce risk of electric shock, perform only the instructions that are included in the operating instructions. Refer all servicing and installation 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, where provided, is essential to safe operation and must be verified before connecting the power supply.

Know the following safety warnings and guidelines:

- **Dangerous Voltages**
 - Only trained and qualified personnel should be allowed to install, replace, or

Important Safety Instructions (English)

service this equipment.

- Only qualified service personnel are allowed to remove chassis covers and access any of the components inside the chassis.
- No user-serviceable parts inside. Do not open.

Important Safety Instructions

- 1 Read these instructions.
- 2 Keep these instructions.
- 3 Heed all warnings.
- 4 Follow all instructions.
- 5 Do not use this apparatus near water.
- 6 Clean only with dry cloth.
- 7 Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- 8 Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 9 Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- 10 Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- 11 Only use attachments/accessories specified by the manufacturer.
- 12 Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.



- 13 Unplug this apparatus during lightning storms or when unused for long periods of time.
- 14 Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.



WARNING:

To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

The apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.

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



CAUTION:

THIS INSTALLATION SHOULD BE MADE BY A QUALIFIED SERVICE PERSON AND SHOULD CONFORM TO ALL LOCAL CODES.

Installation of the equipment must comply with local and national electrical codes.

Equipment Placement



CAUTION:

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:

- This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.
- Place this equipment close enough to a mains AC outlet to accommodate the length of this equipment's power cord.
- 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

Important Safety Instructions (English)

mounting surface or rack where necessary to protect against damage due to any disturbance and subsequent fall.

- Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they prevent electromagnetic interference (EMI) that might disturb radio communications or disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.
- To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit.

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 should be mounted at the back of the rack, so that the free airflow is not restricted.



WARNING:

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.



WARNING:

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, consideration should be given to installing this equipment in an environment compatible with the manufacturer's maximum rated ambient temperature.

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.
- This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.
- For receiver products, do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, as they may cause serious injury or death. For proper installation and grounding of the antenna, please refer to national and local codes (for example, U.S.:NFPA 70, National Electrical Code, Article 810, Canada: Canadian Electrical Code, Section 54).
- Besides the safety ground connection, provided by the mains cord's "third" terminal, this equipment is provided with an additional grounding terminal located at the rear panel. This terminal is intended for bonding of the product to a low impedance earth system. The terminal is not to be considered as a safety ground, but is helpful for lightning protection and for meeting the EMC requirements at a system or installation level.

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.

AC Power

- This product requires short-circuit (overcurrent) protection to be provided as part of the building installation. Install only in accordance with national and local wiring regulations. 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).
- This unit might have more than one power supply connection. All connections

Important Safety Instructions (English)

must be removed to de-energize the unit.

- The plug-socket combination must be accessible at all times, because it serves as the main disconnecting 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.

Connection to -48 V DC / -60 V DC Power Sources

If this equipment is DC powered, refer to this equipment's specific installation instructions in this manual or in companion manuals in this series for connection to nominal -48 V DC / -60 V DC power sources.

Circuit Overload

Know the effects of circuit overloading before connecting this equipment to the power supply. Take care when connecting units to the supply circuit so that wiring is not overloaded.



WARNING:

Consideration should be given to the connection of this equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Appropriate consideration of information given on the equipment-rating label should be used 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:

- **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 the system or connect or disconnect cables during periods of lightning activity.
- **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. The covers are integral part of the safety design of the product. Do not operate the unit without the covers installed.

- **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.

Electromagnetic Compatibility Regulatory Requirements

This equipment meets applicable electromagnetic compatibility (EMC) regulatory requirements. Refer to this equipment's data sheet for details about regulatory compliance approvals. EMC performance is dependent upon the use of correctly shielded cables of good quality for all external connections, except the power source.

- 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 or double-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 double-shielded type.
- Coaxial cables should be double-braided shielded type or better.

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

Important Safety Instructions (English)

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 Statement

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

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.

Instructions de sécurité importantes (français)

 Ce symbole d'avertissement est synonyme de danger. Vous êtes dans une situation qui pourrait être à l'origine de blessures corporelles. Avant de travailler sur un équipement, vous devez connaître les dangers liés aux circuits électriques et être familiarisé avec les pratiques standards de prévention des accidents.

Remarque: Veuillez conserver ces instructions.

Terminologie

Les termes définis ci-dessous sont utilisés dans ce document. Les définitions indiquées sont basées sur celles qui figurent dans les normes de sécurité.

Personnel de maintenance - Le terme Personnel de maintenance s'applique aux individus formés et qualifiés qui sont autorisés à installer, remplacer ou entretenir des équipements électriques. Le personnel de maintenance est censé utiliser son expérience et ses compétences techniques pour éviter les blessures éventuelles à sa personne et aux autres en raison des dangers que présentent les zones de maintenance et d'accès limité.

Utilisateur et Opérateur - Les termes Utilisateur et Opérateur s'appliquent aux personnes autres que le personnel de maintenance.

Mise à la terre et Mise à la masse - Les termes Mise à la terre et Mise à la masse sont synonymes. Ce document utilise le terme Mise à la terre pour plus de clarté, mais il peut être interprété comme ayant le même sens que Mise à la masse.

Danger de choc électrique

Cet équipement est conforme aux normes de sécurité applicables. Référez-vous à l'étiquette d'identification de cet équipement ou contactez l'usine pour obtenir de plus amples informations concernant les homologations de conformité réglementaires.



DANGER :

Pour réduire le risque de choc électrique, exécutez uniquement les instructions qui figurent dans le mode d'emploi. Confiez toutes les interventions d'entretien et d'installation à du personnel de maintenance qualifié uniquement.

Un choc électrique peut provoquer une blessure corporelle, voire même la mort. Évitez tout contact direct avec des tensions dangereuses à tout moment. Le conducteur de terre protecteur, lorsqu'il est fourni, est essentiel à la sécurité de fonctionnement et doit être vérifié avant de brancher l'alimentation.

Instructions de sécurité importantes (français)

Vous devez connaître les avertissements et instructions de sécurité suivants:

■ Tensions dangereuses

- Seul un personnel de maintenance formé et qualifié doit être autorisé à installer, remplacer ou entretenir cet équipement.
- Seul un personnel de maintenance qualifié est autorisé à retirer les couvercles du châssis et à accéder aux composants situés à l'intérieur du châssis.
- Aucune pièce pouvant être entretenue par l'utilisateur ne se trouve à l'intérieur. Ne l'ouvrez pas.

Instructions de sécurité importantes

- 1 Lisez ces instructions.
- 2 Conservez ces instructions.
- 3 Tenez compte de tous les avertissements.
- 4 Suivez toutes les instructions.
- 5 N'utilisez pas cet appareil à proximité d'eau.
- 6 Nettoyez-le uniquement avec un chiffon sec.
- 7 N'obstruez pas les ouvertures de ventilation. Installez-le conformément aux instructions du fabricant.
- 8 Ne l'installez pas à proximité de sources de chaleur tels que les radiateurs, les bouches de chaleur, les poêles ou d'autres appareils (y compris les amplificateurs) qui dégagent de la chaleur.
- 9 N'allez pas à l'encontre de la fonction de sécurité de la fiche polarisée ou de mise à la terre. Une fiche polarisée est dotée de deux lames dont l'une est plus large que l'autre. Une fiche de mise à la terre est dotée de deux lames et d'une troisième broche de mise à la terre. La large lame ou la troisième broche sont fournies pour votre sécurité. Si la fiche fournie ne rentre pas dans votre prise, consultez un électricien afin de remplacer la prise obsolète.
- 10 Protégez le cordon d'alimentation pour éviter qu'il ne soit piétiné ou pincé, notamment au niveau des fiches, des prises de courant et de l'endroit où il sort de l'appareil.
- 11 Utilisez uniquement les accessoires spécifiés par le fabricant.
- 12 Utilisez-le uniquement avec le chariot, le socle, le trépied, le support ou la table spécifié(e) par le fabricant, ou vendu(e) avec l'appareil. En cas d'utilisation d'un chariot, soyez prudent en déplaçant l'ensemble chariot/appareil afin d'éviter toute blessure due à un basculement.



- 13 Débranchez cet appareil en cas d'orage ou lorsqu'il n'est pas utilisé pendant de longues périodes.
- 14 Confiez toutes les interventions d'entretien à du personnel de maintenance qualifié. Un entretien est nécessaire lorsque l'appareil a été endommagé de quelque façon que ce soit, comme par exemple lorsque le cordon d'alimentation ou la fiche est endommagé(e), lorsqu'un liquide a été renversé ou lorsque des objets sont tombés dans l'appareil, lorsque l'appareil a été exposé à la pluie ou à l'humidité, ne fonctionne pas normalement ou a subi une chute.



DANGER :

Pour réduire le risque d'incendie ou de choc électrique, n'exposez pas cet appareil à la pluie ou à l'humidité.
L'appareil ne doit pas être exposé à des fuites ou des projections de liquide, et aucun objet rempli de liquide, comme un vase, ne doit être placé sur l'appareil.

Site d'installation

Lorsque vous sélectionnez le site d'installation, vous devez respecter les exigences suivantes :

- **Terre de protection** - Le conducteur de terre de protection de l'installation électrique du bâtiment doit être conforme aux exigences nationales et locales.
- **État environnemental** - Le site d'installation doit être sec, propre et ventilé. N'utilisez pas cet équipement là où il risquerait d'être en contact avec l'eau. Veillez à ce que cet équipement soit utilisé dans un environnement répondant aux exigences telles que mentionnées dans les spécifications techniques de cet équipement, qui se trouvent sur la fiche technique de cet équipement.

Exigences en matière d'installation



ATTENTION :

CETTE INSTALLATION DOIT ÊTRE EFFECTUÉE PAR UN AGENT DE MAINTENANCE QUALIFIÉ ET DOIT ÊTRE CONFORME À TOUS LES RÈGLEMENTS LOCAUX.

L'installation de l'équipement doit être conforme aux règlements électriques locaux et nationaux.

Placement de l'équipement



ATTENTION :

Évitez les blessures corporelles et les dommages à cet équipement. Une surface de montage instable peut provoquer la chute de cet équipement.

Pour prévenir les dommages à l'équipement et les blessures au personnel, veuillez respecter les exigences suivantes.

Instructions de sécurité importantes (français)

- Cet appareil est destiné à être installé dans des zones d'accès limité. Une zone d'accès limité n'est accessible que par l'utilisation d'un outil spécial, un cadenas et une clé, ou tout autre moyen de sécurité.
- Placez cet équipement suffisamment près d'une prise d'alimentation secteur CA en tenant compte de la longueur du cordon d'alimentation de cet équipement.
- Veillez à ce que la surface ou le socle de montage soit stable et puisse supporter la taille et le poids de cet équipement.
- La surface ou le socle de montage doit être fixé(e) de façon appropriée selon les spécifications du fabricant. Veillez à ce que cet équipement soit solidement fixé à la surface ou au socle de montage le cas échéant afin de le protéger des dommages dus à toute perturbation et chute consécutive.
- Les plaques vierges et les panneaux protecteurs remplissent trois fonctions importantes: ils préviennent toute exposition à des tensions et courants dangereux à l'intérieur du châssis ; ils préviennent les perturbations électromagnétiques (EMI) qui pourraient gêner les communications radio ou les autres équipements ; et ils dirigent le flux d'air de refroidissement à travers le châssis. Ne faites pas fonctionner le système tant que toutes les cartes, plaques, couvercles avant et couvercles arrière ne sont pas en place.
- Pour prévenir les blessures personnelles ou les dommages au châssis, n'essayez jamais de soulever ou d'incliner le châssis à l'aide des poignées sur les modules (tels que les alimentations, les ventilateurs ou les cartes) ; ces types de poignées ne sont pas destinés à supporter le poids de l'appareil.

Précautions de sécurité relatives au montage du socle

Chargement mécanique

Veillez à ce que le socle soit placé sur une surface stable. Si le socle est doté de dispositifs de stabilisation, installez-les avant de monter un équipement sur le socle.



DANGER :

Évitez les blessures corporelles et les dommages à cet équipement. Le montage de cet équipement sur le socle doit être effectué de façon à ne pas provoquer une condition dangereuse due à un chargement mécanique irrégulier.

Débit d'air réduit

Lors du montage de cet équipement sur le socle, n'obstruez pas le débit d'air de refroidissement traversant le socle. Veillez à monter les plaques vierges afin de couvrir l'espace inutilisé du socle. Des composants supplémentaires tels que des combinateurs doivent être montés à l'arrière du socle pour que le débit d'air libre ne soit pas restreint.

**DANGER :**

L'installation de cet équipement sur un socle doit être effectuée de telle façon que la quantité de débit d'air nécessaire au bon fonctionnement de cet équipement ne soit pas remise en cause.

Température ambiante pour un fonctionnement en hauteur

Installez uniquement cet équipement dans un environnement dont l'humidité et la température sont contrôlés et répondant aux exigences qui figurent dans les spécifications techniques de cet équipement.

**DANGER :**

En cas d'installation dans un ensemble de socle fermé ou à unités multiples, la température ambiante de fonctionnement de l'environnement du socle peut être supérieure à la température ambiante de la pièce. Par conséquent, il est important de veiller à installer cet équipement dans un environnement compatible avec la température ambiante maximale indiquée par le fabricant.

Mise à la terre

- Ne violez pas la mise à la terre de protection en utilisant une rallonge, un câble électrique ou un autotransformateur sans conducteur de terre protecteur.
- Veillez à maintenir la mise à la terre de protection de cet équipement lors de tout entretien ou réparation et à rétablir la mise à la terre de protection avant de remettre en marche cet équipement.
- Cet équipement doit être mis à la terre. Ne désactivez jamais le conducteur de terre et ne faites jamais fonctionner l'équipement sans avoir installé un conducteur de terre approprié. Contactez l'autorité de contrôle électrique concernée ou un électricien si vous ne savez pas si une mise à la terre appropriée est disponible.
- Pour les récepteurs, ne placez pas l'antenne à proximité de lignes électriques aériennes ou d'autres circuits d'éclairage électrique, ou à un endroit où elle peut entrer en contact avec ce genre de circuits. Lors de l'installation de l'antenne, faites très attention de ne pas entrer en contact avec ce genre de circuits, car ils sont susceptibles de causer des blessures voire la mort. Pour une installation et une mise à la terre correctes de l'antenne, référez-vous aux codes nationaux et locaux (par exemple, États-Unis : NFPA 70, National Electrical Code, Article 810, Canada : Canadian Electrical Code, Section 54).
- Outre la connexion de terre de sécurité fournie par la « troisième » borne du cordon d'alimentation, cet équipement est fourni avec une borne de mise à la terre supplémentaire située au niveau du panneau arrière. Cette borne est destinée à la liaison électrique du produit à un système de mise à la terre de faible impédance. La borne n'est pas à considérer comme une mise à la terre de sécurité, mais elle est utile pour la protection contre la foudre et pour répondre aux exigences en matière de compatibilité électromagnétique au niveau du système ou de l'installation.

Puissance CA

- Ce produit nécessite une protection contre les courts-circuits (surintensité) qui doit être fournie dans le cadre de l'installation du bâtiment. Installez-la uniquement en respectant les réglementations de câblage nationales et locales. La prise doit se situer à proximité de cet équipement et doit être facilement accessible.
- Connectez cet équipement uniquement aux sources d'alimentation qui sont identifiées sur l'étiquette signalétique de l'équipement, placée en principe à proximité du ou des connecteur(s) d'admission.
- Cet appareil peut avoir plus d'une connexion d'alimentation électrique. Toutes les connexions doivent être retirées pour mettre l'appareil hors tension.
- La combinaison fiche-prise doit être accessible à tout moment, car elle joue le rôle de principal dispositif de déconnexion.
- Tirez toujours sur la fiche ou le connecteur pour débrancher un câble. Ne tirez jamais sur le câble lui-même.
- Débranchez cet équipement lorsqu'il n'est pas utilisé pendant de longues périodes.

Branchement à des sources d'alimentation de -48 V DC / -60 V DC

Si cet équipement est alimenté par Courant Continu, référez-vous aux instructions d'installation spécifiques de cet équipement qui figurent dans ce manuel ou dans les manuels d'accompagnement de cette série pour le branchement à des sources d'alimentation nominales de -48 V DC / -60 V DC.

Surcharge de circuit

Vous devez connaître les effets d'une surcharge de circuit avant de brancher cet équipement à l'alimentation électrique. Faites attention lorsque vous branchez des appareils au circuit d'alimentation de façon à ce que le câblage ne soit pas surchargé.



DANGER :

Il est important de faire attention au branchement de cet équipement au circuit d'alimentation et à l'effet que la surcharge des circuits peut avoir sur la protection contre les surintensités et le câblage d'alimentation. Une attention particulière doit être prêtée aux informations figurant sur l'étiquette signalétique de l'équipement lorsque vous traitez ce problème.

Précautions d'entretien générales



DANGER :

Évitez les chocs électriques ! L'ouverture ou le retrait du couvercle de cet équipement vous expose à des tensions dangereuses.

Vous devez connaître les précautions et directives générales suivantes :

- **Montres et bijoux** - Pour votre sécurité personnelle et pour éviter des dommages à cet équipement lors des interventions de maintenance et des réparations, ne portez pas d'objets conducteurs comme une montre ou des bijoux.
- **Foudre** - Ne travaillez pas sur le système et ne branchez ou débranchez pas des câbles pendant les périodes de foudre.
- **Étiquettes** - Ne retirez pas les étiquettes d'avertissement. Remplacez les étiquettes d'avertissement endommagées ou illisibles par de nouvelles.
- **Couvercles** - N'ouvrez pas le couvercle de cet équipement et n'essayez pas d'effectuer un entretien sauf mention contraire dans les instructions. Confiez toutes les interventions d'entretien à du personnel de maintenance qualifié uniquement. Les couvercles font partie intégrante de la conception de sécurité du produit. Ne faites pas fonctionner l'appareil sans avoir installé les couvercles.
- **Contrôles de sécurité** - Une fois l'entretien terminé, assemblez cet équipement et effectuez des contrôles de sécurité pour garantir qu'il est sûr d'utilisation avant de le remettre en fonctionnement.

Décharge électrostatique

La décharge électrostatique résulte de l'accumulation d'électricité statique sur le corps humain et d'autres objets. Cette décharge statique peut dégrader les composants et provoquer des défaillances.

Prenez les précautions suivantes contre les décharges électrostatiques :

- Utilisez un tapis d'établi antistatique et un bracelet ou une bride de cheville antistatique pour mettre à la terre les décharges électrostatiques potentielles via un élément à résistance.
- Conservez les composants dans leur emballage antistatique jusqu'à ce qu'ils soient installés.
- Évitez de toucher les composants électroniques lorsque vous installez un module.

Remplacement des fusibles

Pour remplacer un fusible, vous devez respecter les exigences suivantes :

- Mettez l'appareil hors tension avant de remplacer des fusibles.
- Identifiez et isolez la condition qui a provoqué la défaillance d'origine du fusible.
- Utilisez toujours un fusible du type et de la capacité nominale corrects. Le type et la capacité nominale corrects sont indiqués sur cet équipement.

Exigences réglementaires en matière de compatibilité électromagnétique

Cet équipement est conforme aux normes réglementaires applicables en matière de compatibilité électromagnétique (CEM). Référez-vous à la fiche technique de cet équipement pour obtenir de plus amples informations concernant les homologations de conformité réglementaires. Les performances en matière de CEM dépendent de l'utilisation de câbles correctement blindés de bonne qualité pour toutes les connexions externes, sauf la source d'alimentation.

- Veillez à assurer la conformité avec toutes les spécifications de câbles/connecteurs et les instructions d'installation associées qui sont indiquées par ailleurs dans ce manuel.

Autrement, vous devez respecter les bonnes pratiques suivantes :

- Les câbles multi-conducteurs doivent être du type blindé à une tresse ou double tresse et doivent avoir des corps de connecteurs conducteurs et des enveloppes d'isolateurs avec des colliers de câble qui sont liés de façon conductrice à l'enveloppe d'isolateur et capables d'effectuer une connexion de 360° au blindage du câble. Les exceptions à cette règle générale seront clairement indiquées dans la description du connecteur faisant l'objet de l'exception en question.
- Les câbles Ethernet doivent être de type double blindage.
- Les câbles coaxiaux doivent être de type blindage à double tresse ou mieux.

Lorsque cet équipement est soumis aux règles FCC des États-Unis et/ou aux règles de l'Industrie Canadienne, les déclarations suivantes s'appliquent :

- **Déclaration FCC**

Cet équipement a été testé et jugé conforme aux limites pour un appareil numérique de Classe A selon la Partie 15 des Règles FCC. Ces limites sont destinées à fournir une protection raisonnable contre les interférences néfastes lorsque cet équipement fonctionne dans un environnement commercial. Cet équipement génère, utilise et peut radier de l'énergie en radiofréquence et, s'il n'est pas installé et utilisé conformément au manuel d'instructions, peut provoquer des interférences néfastes aux communications radio. Le fonctionnement de cet équipement dans une zone résidentielle est susceptible de provoquer des interférences néfastes auquel cas l'utilisateur devra corriger ces interférences à ses propres frais.

- **Déclaration de l'Industrie Canadienne**

Industrie Canadienne ICES-003 : Cet appareil numérique de Classe A est conforme à toutes les exigences des réglementations canadiennes relatives aux équipements produisant des interférences.

Déclaration CENELEC/CISPR relative aux équipements des technologies de l'information de Classe A

Il s'agit d'un équipement de Classe A. Dans un environnement domestique, cet équipement peut provoquer des interférences radio auquel cas l'utilisateur peut avoir à prendre les mesures adéquates.

Modifications

Cet équipement a été conçu et testé pour respecter les réglementations, codes et normes applicables en matière de sécurité, de sécurité laser et de CEM, afin de garantir sa sécurité d'utilisation dans l'environnement auquel il est destiné. Référez-vous à la fiche technique de cet équipement pour obtenir de plus amples informations concernant les homologations de conformité réglementaires.

N'apportez aucune modification à cet équipement. Tout changement ou modification pourrait annuler l'autorité de l'utilisateur à utiliser cet équipement.

Les modifications peuvent potentiellement dégrader le niveau de protection intégré à cet équipement, ce qui pose un risque de blessure ou de dommage pour les personnes et les biens. Les personnes qui apportent des modifications s'exposent elles-mêmes aux pénalités découlant d'une non-conformité prouvée aux exigences réglementaires et à des contentieux civils pour l'indemnisation relative aux dommages ou préjudices indirects.

Wichtige Sicherheitsanweisungen (Deutsch)

 Dieses Warnsymbol weist auf eine Gefahr hin. Sie befinden sich in einer Situation, die zu Verletzungen führen könnte. Bevor Sie Arbeiten an einem Gerät durchführen, müssen Sie sich der mit elektrischen Schaltkreisen verbundenen Gefahren bewusst sein. Sie müssen über ausreichende Kenntnisse zu üblichen Vorgehensweisen, die einer Unfallverhütung dienen, verfügen.

Hinweis: Bewahren sie diese anweisungen bitte auf.

Terminologie

In diesen Unterlagen sind die nachfolgend definierten Begriffe enthalten. Entsprechende Definitionen basieren auf den für Sicherheitsnormen verwendeten Begriffserklärungen.

Kundendienstpersonal - Der Begriff Kundendienstpersonal bezieht sich auf geschulte und qualifizierte Personen, die elektrische Geräte und Anlagen installieren, austauschen und warten dürfen. Vom Kundendienstpersonal wird erwartet, dass es entsprechende Erfahrungen und technische Fähigkeiten und Kenntnisse dazu einsetzt, um mögliche eigene Verletzungen sowie die anderer aufgrund der in Wartungsbereichen und Zonen mit beschränktem Zugang herrschenden Gefahren zu vermeiden.

Benutzer und Bediener - Die Begriffe Benutzer und Bediener beziehen sich auf andere Personen als das Kundendienstpersonal.

Masse(verbindung) und Erdanschluss (Erdung) - Die Begriffe Masse(verbindung) und Erdanschluss (Erdung) sind gleichbedeutend. Der Klarheit halber wird in diesen Unterlagen der Begriff Erdanschluss (Erdung) verwendet. Dies kann jedoch mit dem Begriff Masse(verbindung) gleichgestellt werden.

Stromschlaggefahr

Dieses Gerät erfüllt relevante Sicherheitsnormen. Einzelheiten zur Erfüllung gesetzlicher Anforderungen können Sie dem Typenschild am Gerät entnehmen. Alternativ können Sie sich hierzu auch mit dem Werk in Verbindung setzen.



ACHTUNG:

Um das Risiko eines Stromschlags möglichst gering halten zu können, dürfen nur solche Arbeiten ausgeführt werden, die in der Bedienungsanleitung aufgeführt sind. Sämtliche Wartungs- und Installationsarbeiten sind von entsprechend qualifiziertem Kundendienstpersonal auszuführen.

Ein Stromschlag kann zu Verletzungen mit möglicher Todesfolge führen. Direkten Kontakt mit gefährlichen Spannungen stets vermeiden. Für einen sicheren Betrieb ist eine Schutzerdung zwingend erforderlich (sofern vorhanden). Die Funktionalität muss vor Anschluss der Stromversorgung gewährleistet sein.

Wichtige Sicherheitsanweisungen (Deutsch)

Folgende Sicherheitswarnhinweise und Richtlinien sind zu beachten:

■ Gefährliche Spannungen

- Dieses Gerät darf nur von geschultem und qualifiziertem Personal installiert, ausgetauscht oder gewartet werden.
- Das Entfernen der Gehäuseabdeckungen sowie der Zugriff auf die innerhalb des Gehäuses befindlichen Bauteile darf nur durch qualifiziertes Kundendienstpersonal erfolgen.
- Im Inneren befinden sich keine vom Benutzer wartbaren Teile. Nicht öffnen.

Wichtige Sicherheitsanweisungen

- 1 Lesen Sie diese Anweisungen aufmerksam durch.
- 2 Bewahren Sie diese Anweisungen auf.
- 3 Beachten Sie alle Warnhinweise.
- 4 Befolgen Sie alle Anweisungen.
- 5 Verwenden Sie dieses Gerät nicht in Wassernähe.
- 6 Nur mit einem trockenen Tuch reinigen.
- 7 Keine Lüftungsöffnungen verdecken. Die Installation gemäß den Anweisungen des Herstellers vornehmen.
- 8 Nicht in der Nähe von Wärmequellen wie Heizkörpern, Raumheizungen, Herden oder anderen Geräten die Wärme erzeugen (einschließlich Verstärkern) installieren.
- 9 Die Schutzfunktion des gepolten Steckers bzw. Schukosteckers nicht umgehen. Bei einem gepolten Stecker ist ein Leiter breiter als der andere. Ein Stecker mit Erdung umfasst außer den zwei Leitern noch einen dritten Schutzleiter. Bei diesen Steckerausführungen dient der breitere Leiter bzw. der Schutzleiter Ihrer Sicherheit. Wenn der mitgelieferte Stecker nicht in die Steckdose passt, muss die Steckdose durch einen Elektroinstallateur ausgetauscht werden.
- 10 Es muss verhindert werden, dass das Netzkabel gequetscht oder darauf getreten wird. Dies gilt insbesondere im Bereich der Stecker, Netzsteckdosen und an der Austrittsstelle vom Gerät.
- 11 Verwenden Sie nur vom Hersteller spezifiziertes Zubehör und entsprechende Zusatzgeräte.
- 12 Verwenden Sie nur einen vom Hersteller spezifizierten oder mit dem Gerät verkauften Transportwagen, Stand, Stativ, Träger oder Tisch. Bei Verwendung eines Transportwagens muss beim Bewegen der Transportwagen-Geräte-Einheit vorsichtig vorgegangen werden, um Verletzungen durch Umkippen zu vermeiden.



- 13 Während Gewittern oder bei längeren Stillstandszeiten den Netzstecker ziehen.
- 14 Lassen Sie alle Reparatur- und Wartungsarbeiten von qualifiziertem Kundendienstpersonal ausführen. Ein Kundendienst ist dann erforderlich, wenn das Gerät auf irgendeine Weise beschädigt wurde, wie z. B. wenn das Netzkabel oder der Netzstecker beschädigt wurde, wenn Flüssigkeit oder Fremdkörper in das Gerät gelangt sind, das Gerät Regen oder Feuchtigkeit ausgesetzt war, nicht normal funktioniert oder heruntergefallen ist.



ACHTUNG:

**Zur Reduzierung einer Brand- oder Stromschlaggefahr darf dieses Gerät nicht Regen oder Feuchtigkeit ausgesetzt werden.
Das Gerät vor Tropf- und Spritzwasser schützen. Keine mit Wasser gefüllten Gegenstände, wie beispielsweise Vasen, auf das Gerät stellen.**

Installationsort

Bei der Auswahl des Installationsorts muss Folgendes beachtet werden:

- **Schutzerdung** - Die Schutzerdung der Elektroinstallation des Gebäudes muss den jeweiligen örtlichen und nationalen Vorschriften entsprechen.
- **Umgebungsbedingungen** - Der Installationsort muss trocken und sauber sein und über ausreichende Belüftung verfügen. Dieses Gerät nicht an einem Ort verwenden, wo das Risiko besteht, dass es mit Wasser in Berührung kommen könnte. Es ist sicherzustellen, dass das Gerät in einer Umgebung verwendet wird, die den Anforderungen gemäß den technischen Daten dieses Geräts entspricht. Diese können dem Datenblatt für das Gerät entnommen werden.

Installationsanforderungen



VORSICHT:

DIESE INSTALLATION SOLLTE VON EINEM QUALIFIZIERTEN KUNDENDIENSTTECHNIKER VORGENOMMEN WERDEN UND MUSS ALLEN RELEVANTEN ÖRTLICHEN VORSCHRIFTEN ENTSPRECHEN.

Die Installation dieses Geräts muss örtlichen und nationalen für Elektroinstallationen geltenden Vorschriften entsprechen.

Geräteaufstellung



VORSICHT:

Gerätebeschädigungen und Verletzungen unbedingt vermeiden. Eine instabile Montagefläche kann dazu führen, dass das Gerät herunterfällt.

Zur Verhinderung einer Gerätebeschädigung oder Verletzung ist Folgendes zu beachten:

- Dieses Gerät ist für eine Installation in Bereichen mit beschränktem Zugang

Wichtige Sicherheitsanweisungen (Deutsch)

vorgesehen. Ein Bereich mit beschränktem Zugang lässt sich nur durch Verwendung eines Spezialwerkzeugs, eines Schlüssels oder über andere Sicherheitsmaßnahmen erreichen.

- Positionieren Sie das Gerät nahe genug an einer Wechselstromsteckdose, damit die Länge des Gerätenetzkabels ausreicht.
- Die Montagefläche oder der Schaltschrank müssen stabil sein und sich für Größe und Gewicht des Geräts eignen.
- Die Montagefläche bzw. das Schaltschrank müssen gemäß den Spezifikationen des Herstellers angemessen verankert sein. Vergewissern Sie sich, dass das Gerät (wo erforderlich) sicher an der Montagefläche oder dem Schaltschrank befestigt ist, um ein Herabfallen bei Erschütterung zu vermeiden.
- Blenden und Abdeckplatten dienen drei wichtigen Funktionen: Abschottung gegenüber innerhalb des Gehäuses vorhandenen gefährlichen Spannungen und Strömen sowie eine elektromagnetischer Interferenz (EMI), die sich störend auf den Funkverkehr oder andere Geräte auswirken kann. Und sie sorgen für angemessene Belüftung innerhalb des Gehäuses. Verwenden Sie das System nur, wenn alle Platinen, Blenden, vordere und hintere Abdeckungen angebracht sind.
- Zur Verhinderung von Verletzungen oder Gehäusebeschädigungen heben oder kippen Sie das Gerät niemals an Griffen von Bauteilen (z.B. Netzteile, Lüfter oder Platinen). Diese Griffen sind nicht dazu vorgesehen, dem Gewicht des Geräts standzuhalten.

Bei der Schaltschrankmontage zu beachtende Sicherheitsmaßnahmen

Mechanische Belastung

Stellen Sie sicher, dass sich das Schaltschrank auf einer stabilen Fläche befindet. Wenn das Schaltschrank Stabilisierungsvorrichtungen umfasst, müssen diese angebracht werden, bevor das Gerät im Schaltschrank installiert wird.



ACHTUNG:

Gerätebeschädigungen und Verletzungen unbedingt vermeiden. Bei der Geräteinstallation im Schaltschrank muss darauf geachtet werden, dass aufgrund einer ungleichmäßigen mechanischen Belastung keine Gefahr entsteht.

Reduzierter Luftstrom

Bei der Geräteinstallation ist darauf zu achten, dass der durch den Schaltschrank geleitete Luftstrom zur Kühlung nicht behindert wird. Nicht verwendeter Montageplatz muss mit Blindplatten abgedeckt werden. Zusätzliche Komponenten, wie beispielsweise Combiner, sollten auf der Rückseite des Schaltschranks angebracht werden, um einen ungehinderten Luftstrom sicherzustellen.



ACHTUNG:

Die Geräteinstallation im Schaltschrank muss so erfolgen, dass stets ein für den sicheren Betrieb dieses Geräts erforderlicher Luftstrom vorhanden ist.

Erhöhte Umgebungstemperatur

Das Gerät muss in einer feuchte- und temperaturgeregelten Umgebung installiert werden, die den Anforderungen gemäß den technischen Daten dieses Geräts entspricht.



ACHTUNG:

Bei einer Installation in einem geschlossenen Schaltschrank oder einem Schaltschrank, in dem mehrere Einheiten untergebracht werden, kann die Umgebungstemperatur der Geräte unter Umständen über der Raumtemperatur liegen. Es muss deshalb darauf geachtet werden, dass dieses Gerät in einer Umgebung installiert wird, die den Angaben des Herstellers in Bezug auf die höchstzulässige Raumtemperatur entspricht.

Erdung

- Die Schutzterdung nicht durch Verwendung eines Verlängerungskabels, Netzkabels oder eines Spartransformators ohne Schutzleiter aufheben.
- Achten Sie darauf, dass die Schutzterdung dieses Geräts während der Durchführung von Wartungs- oder Reparaturarbeiten beibehalten wird. Die Schutzterdung vor erneuter Inbetriebnahme des Geräts stets wieder herstellen.
- Das Gerät muss geerdet sein. Den Erdleiter niemals außer Kraft setzen oder das Gerät verwenden, ohne dass ein geeigneter Erdleiter installiert ist. Sollten Sie sich nicht sicher sein, ob eine geeignete Erdung vorliegt, setzen Sie sich bitte mit der entsprechenden Prüfstelle für elektrische Sicherheit oder mit einem Elektroinstallateur in Verbindung.
- Bei Empfangsgeräten darauf achten, dass sich die Antenne nicht in der Nähe von Überlandleitungen, Lichtschaltkreisen oder Stromkreisen befindet, bzw. an Stellen, an denen sie mit solchen in Berührung kommen kann. Stellen Sie bei der Installation der Antenne unbedingt sicher, dass Sie solche Schaltkreise nicht berühren, da dies zu ernsthaften Verletzungen mit möglicher Todesfolge führen kann. Zur korrekten Installation und Erdung der Antenne bitte entsprechende nationale und örtliche Vorschriften beachten (wie beispielsweise für die USA: NFPA 70, National Electrical Code (NEC), Abschnitt 810, und für Kanada: Canadian Electrical Code (CEC), Abschnitt 54, für Deutschland VDE 0100, VDE 0855).
- Außer der durch den „dritten“ Anschluss des Netzkabels bereitgestellten Schutzterdung ist dieses Gerät noch mit einem zusätzlichen Erdanschluss versehen, der sich an der Rückwand befindet. Dieser Anschluss ist dazu vorgesehen, das Gerät mit einem Erdungssystem mit niedriger Impedanz zu verbinden. Dieser Anschluss soll nicht als Schutzterdung betrachtet werden. Er ist jedoch für einen Blitzschutz und zur Erfüllung entsprechender EMV-

Wichtige Sicherheitsanweisungen (Deutsch)

Anforderungen auf System- oder Installationsebene dienlich.

Wechselstromversorgung

- Dieses Gerät muss als Bestandteil der Gebäudeinstallation eine Kurzschluss (Überstrom)-sicherung umfassen. Bei der Installation unbedingt relevante nationale und örtliche Anschlussvorschriften beachten. Die Steckdose muss sich in der Nähe des Geräts befinden und einfach erreichbar sein.
- Dieses Gerät nur an die auf dem Typenschild des Geräts angegebenen Stromversorgungen anschließen. Das Typenschild befindet sich gewöhnlich in der Nähe des/der Stromeingangsanschlusses/-anschlüsse.
- Dieses Gerät kann mehr als einen Stromanschluss umfassen. Zur Abschaltung des Geräts müssen alle Anschlüsse getrennt werden.
- Die Stecker-Steckdosen-Einheit muss stets erreichbar sein, da es sich hierbei um die Hauptmethode handelt, um das Gerät von der Stromversorgung zu trennen.
- Zum Abziehen des Kabels immer am Stecker oder dem Steckverbinder ziehen. Niemals am Kabel selbst ziehen.
- Stecken Sie das Gerät bei längerer Nichtverwendung aus.

Anschluss an -48 V DC / -60 V DC Stromversorgungen

Wenn dieses Gerät mit Gleichstrom versorgt wird, beziehen Sie sich hinsichtlich des Anschlusses an -48 V DC / -60 V DC bitte auf die in diesem Handbuch oder in begleitenden Handbüchern für diese Serie aufgeführten spezifischen Installationsanweisungen.

Stromkreisüberlastung

Bevor das Gerät an die Stromversorgung angeschlossen wird, muss sichergestellt werden, dass Sie über ausreichende Kenntnisse in Bezug auf die Auswirkungen einer Stromkreisüberlastung verfügen. Beim Anschluss von Geräten an den Stromkreis muss darauf geachtet werden, dass die Schaltungen nicht überlastet werden.



ACHTUNG:

Der Anschluss dieses Geräts an den Stromkreis muss wohlüberlegt erfolgen; die Auswirkungen, die eine Überlastung auf die Überstromsicherung und die Versorgungsschaltungen haben kann, sind zu berücksichtigen. Hierbei müssen die auf dem Typenschild des Geräts angegebenen Daten angemessen beachtet werden.

Allgemeine bei der Durchführung von Wartungs- und Reparaturarbeiten zu beachtende Sicherheitsmaßnahmen



ACHTUNG:

Eine Stromschlaggefahr vermeiden! Durch Öffnen oder Entfernen der Geräteabdeckung können Sie unter Umständen gefährlichen Spannungen ausgesetzt sein.

Beachten Sie folgende allgemeine Sicherheitsmaßnahmen und Richtlinien:

- **Armbanduhren und Schmuck** - Zu Ihrer persönlichen Sicherheit und Vermeidung einer Gerätebeschädigung keine elektrisch leitfähigen Gegenstände, wie beispielsweise eine Armbanduhr oder Schmuck, tragen.
- **Gewitter** - Während eines Gewitters nicht am System arbeiten oder Kabel anschließen bzw. abziehen.
- **Label** - Keine Warnschilder/-aufkleber entfernen. Beschädigte oder unleserliche Warnlabel ersetzen.
- **Abdeckungen** - Die Geräteabdeckung nicht abnehmen um, Wartungs- oder Reparaturarbeiten auszuführen, außer wenn entsprechende Anweisungen hierzu im Handbuch stehen. Alle Reparatur- und Wartungsarbeiten sind ausschließlich von qualifiziertem Kundendienstpersonal auszuführen. Die Abdeckungen sind Bestandteil des Sicherheitsdesigns dieses Geräts. Nehmen Sie die Einheit nicht ohne angebrachte Abdeckungen in Betrieb.
- **Sicherheitsprüfungen** - Setzen Sie das Gerät nach Ausführung von Wartungs- und Reparaturarbeiten wieder zusammen. Vor erneuter Inbetriebnahme führen Sie entsprechende Sicherheitsprüfungen durch, um den sicheren Betrieb des Geräts zu gewährleisten.

Elektrostatische Entladung

Ursache für eine elektrostatische Entladung (ESD) ist die statische Aufladung des menschlichen Körpers und von Gegenständen. Eine elektrostatische Entladung kann Komponenten beschädigen und zu Störungen bzw. Ausfällen führen.

Zur Vermeidung einer elektrostatischen Entladung sind folgende Maßnahmen zu beachten:

- Eine antistatische Werkbankmatte und ein Arm- oder Fußband verwenden, um sich so über ein Widerstandselement ausreichend vor einer möglichen elektrostatischen Entladung zu schützen.
- Komponenten bis zur Installation in ihrer antistatischen Verpackung lassen.
- Bei der Installation eines Moduls die Berührung elektronischer Komponenten vermeiden.

Sicherungsaustausch

Beim Austauschen einer Sicherung ist Folgendes zu beachten:

- Trennen Sie die Stromversorgung vor dem Sicherungsaustausch.
- Suchen Sie die Ursache für das Versagen der ursprünglichen Sicherung und beheben diese.
- Verwenden Sie stets die korrekte Sicherungsart mit einem angemessenen Sicherungswert verwenden. Die richtige Sicherungsart und der korrekte Sicherungswert werden am Gerät angegeben.

Regelwerksbestimmungen in Bezug auf elektromagnetische Verträglichkeit

Dieses Gerät erfüllt die relevanten Regelwerksbestimmungen in Bezug auf elektromagnetische Verträglichkeit (EMV). Einzelheiten zur Vorschriftenerfüllung sind dem Datenblatt für das Gerät zu entnehmen. Für eine angemessene EMV-Leistung müssen für alle externen Anschlüsse, außer der Stromquelle, korrekt abgeschirmte Kabel guter Qualität verwendet werden.

- Stellen Sie sicher, dass Kabel-/Anschlussspezifikationen und zugehörige Installationsanweisungen, in diesem Handbuch aufgeführt, eingehalten werden.

Desweiteren sollten folgende Empfehlungen eingehalten werden:

- Bei Mehrleiterkabeln muss es sich um abgeschirmte Kabel mit einfacher bzw. doppelter Geflechtabschirmung handeln. Sie müssen leitfähige Steckverbinderkörper und Zugentlastungen mit Kabelklemmen umfassen, die leitfähig mit der Zugentlastung verbunden sind und einen 360°-Anschluss an die Kabelabschirmung ermöglichen. Ausnahmen von dieser allgemeinen Regel werden in der Anschlussbeschreibung für den betreffenden Anschluss klar angegeben.
- Ethernet-Kabel müssen doppelt abgeschirmt sein.
- Koaxialkabel müssen mindestens eine doppelte Geflechtabschirmung aufweisen.

Sollte dieses Gerät Vorschriften der FCC der USA und/oder Industry Canada unterliegen, treffen die folgenden Erklärungen zu:

■ FCC-Erklärung

Dieses Gerät wurde geprüft und entspricht gemäß Abschnitt 15 der FCC-Vorschriften den Grenzwerten für ein digitales Gerät der Klasse A. Diese Grenzwerte dienen einem angemessenen Schutz vor Interferenzstörungen, wenn das Gerät in einer kommerziellen Umgebung verwendet wird. Dieses Gerät erzeugt und verwendet Hochfrequenzenergie und kann diese abstrahlen. Wenn es nicht entsprechend der Anleitung installiert und verwendet wird, kann es den Funkverkehr stören. Ein Betrieb dieses Geräts in einer Wohngegend führt wahrscheinlich zu Interferenzstörungen, die der Benutzer zu

seinen Lasten beheben muss.

■ **Industry Canada Erklärung**

Industry Canada ICES-003: Dieses digitale Gerät der Klasse A erfüllt sämtliche Anforderungen der in Kanada für Geräte, die Interferenzstörungen verursachen können, geltenden Vorschriften.

CENELEC/CISPR Erklärung in Bezug auf IT-Geräte der Klasse A

Hierbei handelt es sich um ein Gerät der Klasse A. Dieses Gerät kann in Wohngeländen Funkstörungen verursachen. In diesem Fall müssen vom Benutzer unter Umständen angemessene Maßnahmen ergriffen werden.

Modifikationen

Dieses Gerät wurde entworfen und geprüft, um die relevanten Sicherheits-, Lasersicherheits- und EMV-Vorschriften, Normen und Standards zu erfüllen. Dadurch kann in der vorgesehenen Umgebung ein sicherer Betrieb gewährleistet werden. Einzelheiten zur Vorschriftenerfüllung sind dem Datenblatt für das Gerät zu entnehmen.

An diesem Gerät dürfen keine Modifizierungen ausgeführt werden. Änderungen oder Modifikationen können die Berechtigung der Benutzers zum Betrieb des Geräts ungültig machen.

Modifikationen können unter Umständen die in das Gerät eingebauten Schutzmaßnahmen beeinträchtigen und somit Menschen und Eigentum einem Verletzungs- bzw. Beschädigungsrisiko aussetzen. Personen, die an diesem Gerät irgendwelche Modifizierungen ausführen, setzen sich möglichen Strafen, die sich durch eine nachgewiesene Nichterfüllung entsprechender Regelwerksbestimmungen ergeben, sowie einem eventuellen Zivilprozess wegen Schadenersatz aufgrund von Folgeschäden bzw. -verletzungen aus.

Cautions and Regulatory Compliance Statements for NEBs

Introduction

This section contains cautions, regulatory compliance statements and requirements for the Network Equipment-Building System (NEBS) certification from the Telcordia Electromagnetic Compatibility and Electrical Safety – Generic Criteria for Network Telecommunications Equipment (A Module of LSSGR, FR-64; TSGR, FR-440; and NEBSFR, FR-2063) Telcordia Technologies Generic Requirements, GR-1089-CORE.

NEBS Compliance Statements

For NEBS certification, comply with the following:



CAUTION:

- To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, all shielded cables shall be grounded at both ends. In a NEBS installation, shielded intra-building cabling grounded at both ends is required.
- The intrabuilding ports of the equipment or subassembly is only suitable for connection to intrabuilding or unexposed wiring or cabling. The intrabuilding ports of the equipment or subassembly **MUST NOT** be metallically connected to interfaces that connect to the Outside Plant (OSP) or its wiring. These interfaces are designed for use only as intrabuilding interfaces (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4), and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.
- This product is designed for a common bonding network (CBN) installation.
- This product can be installed in a network telecommunication facility or location where the NEC applies.
- An electrical conducting path shall exist between the product chassis and the metal surface of the enclosure or rack in which it is mounted or to a grounding conductor. Electrical continuity shall be provided by using thread-forming type mounting screws that remove any paint or nonconductive coatings and establish a metal-to-metal contact. Any paint or other nonconductive coatings shall be removed on the surfaces between the mounting hardware and the enclosure or rack. The surfaces shall be cleaned and an antioxidant applied before application.
- The grounding architecture of this product is DC-insulated (DC-I).
- DC-powered products have a nominal operating DC voltage of -48 V dc. Minimal steady state DC operating voltage is -40 V dc. Reference American National Standards Institute (ANSI) T1.315, Table 1.

Cautions and Regulatory Compliance Statements for NEBs

- AC-powered products are intended for deployments where an external surge protective device (SPD) is used at the AC power service equipment as defined by the National Electrical Code (NEC).

Laser Safety

Introduction

This equipment can be provided with an infrared laser that transmits intensity-modulated light and emits invisible laser radiation.

Warning: Radiation



WARNING:

- Avoid personal injury! Use of controls, adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure.
 - Avoid personal injury! The laser light source on the equipment emits invisible laser radiation. Avoid direct exposure to the laser light source.
 - Avoid personal injury! Viewing the laser output with optical instruments (such as eye loupes, magnifiers, or microscopes) within a distance of 100 mm may pose an eye hazard.
-
- Do not apply power to the equipment if the fiber is unmated or unterminated.
 - Do not stare into an unmated fiber or at any mirror-like surface that could reflect light that is emitted from an unterminated fiber.
 - Do not view an activated fiber with optical instruments (for instance eye loupes, magnifiers, microscopes).
 - Use safety-approved optical fiber cable to maintain compliance with applicable laser safety requirements.

Warning: Fiber Optic Cables



WARNING:

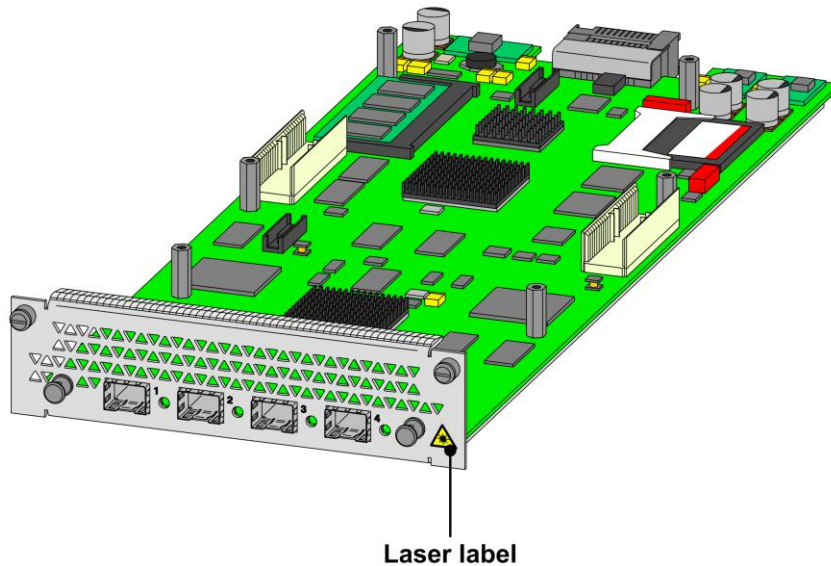
Avoid personal injury! Qualified service personnel may only perform the procedures in this document. Wear safety glasses and use extreme caution when handling fiber optic cables, particularly during splicing or terminating operations. The thin glass fiber core at the center of the cable is fragile when exposed by the removal of cladding and buffer material. It easily fragments into glass splinters. Using tweezers, place splinters immediately in a sealed waste container and dispose of them safely in accordance with local regulations.

Laser Safety

The following laser safety precautions are applicable to the equipment. According to the type of optical transmitter inside the equipment, there are different laser safety precautions. A laser label that clearly indicates the laser aperture is affixed to the equipment's rear panel.



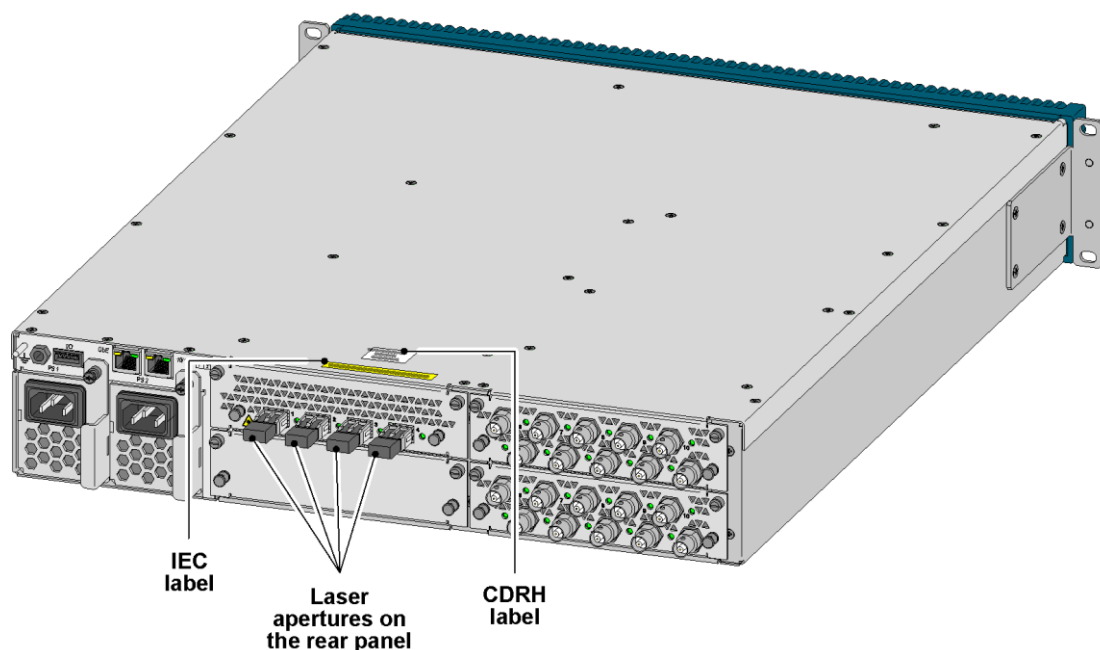
The following illustration displays the location of the laser label.



Depending upon whether you are located in Europe (IEC-standard) or in the U.S. (CDRH-standard), there are different laser safety precautions. For more information about the equipment's laser output, refer to the equipment's data sheet.

Class 1 and Class I Labels

The following illustrations show the class 1 and class I labels attached to the housing, according to the standards.



Note: Depending on the device configuration, the Cisco Series DCM D9900 Digital Content Manager can be equipped with up to four GbE Interface Cards containing SFP cages. Each SFP cage can be populated with either an optical or electrical SFP transceiver. Information about approved SFP transceivers can be found in the data sheet of the Cisco Series DCM D9900 Digital Content Manager. This data sheet is published at the following location:

http://www.cisco.com/en/US/products/ps9230/products_data_sheets_list.html

In Accordance with the IEC Standard

The optical SFP transceivers used in the Cisco Series DCM D9900 Digital Content Manager are classified as class 1 laser products according to IEC 60825-1, 1997 amendment 2001.

An IEC laser classification label is attached to the top cover of the Cisco Series DCM D9900 Digital Content Manager.

CLASS 1 LASER PRODUCT (per IEC 60825-1 amendment 2, 2001)

In Accordance with the CDRH Standard

The optical SFP transceivers used in the Cisco Series DCM D9900 Digital Content Manager device are classified as class I laser products per CDRH, 21 CFR 1040 Laser Safety requirements.

Laser Safety

A CDRH certification label is attached to the top cover of the Cisco Series DCM D9900 Digital Content Manager.

CLASS I LASER PRODUCT
(per CDRH , 21 CFR 1040)

Preface

Introduction

This system guide provides the necessary information to install, operate, maintaining, and upgrading the Cisco Series DCM D9900 Digital Content Manager system. In this system guide the Cisco Series DCM D9900 Digital Content Manager is further indicated by DCM.

Audience

The audience of this system guide includes authorized and trained **service personnel** who are responsible for the installation, operation, and service of the DCM. For further information concerning the definition of operator and service personnel, refer to *Important Safety Instructions*, and subtopic *Terminology* earlier in this system guide.

Required Knowledge

To use this system guide, **service personnel** should have a basic knowledge about the technology used in relation to this product. Service personnel should have additional skills and be familiar with cabling, electronic circuitry, and wiring practices.

Related Publication

Refer to the following publications for more information concerning the DCM:

- *Digital Content Manager (DCM) Configuration Guide*, this guide can be accessed via the embedded Graphical User Interface of the system.
- *Cisco Series DCM D9900 Digital Content Manager Data Sheet*, this data sheet can be found at the following location:
http://www.cisco.com/en/US/products/ps9230/products_data_sheets_list.html

1

Description

Introduction

This chapter describes the Cisco Series DCM D9900 Digital Content Manager and presents a summary of the DCM equipment.

In This Chapter

■ Introducing the DCM.....	2
■ Introducing the DCM Equipment	8
■ The Embedded Graphical User Interface	23
■ Product Identification	24

Introducing the DCM

General

The Cisco Series DCM D9900 Digital Content Manager is a compact 2 RU MPEG processing platform capable of supporting high numbers of video stream processing. The DCM Series D9900 housing provides hot swappable and redundant power supplies and four I/O slots. Each I/O slot can be populated with:

- an ASI Interface Card containing 10 ASI ports
- an ASI SFN Interface Card containing eight ASI ports and two GPS reference signal inputs
- a GbE Interface Card containing two pairs Gigabit Ethernet ports
- an 8-VSB Interface Card provided with 4 or 8 8-VSB RF input ports
- a DVB-S2/CI Interface Card with 2 DVB-S2 RF ports and 2 DVB-CI slots or 4 DVB-S2 RF ports and 4 DVB-CI slots

or

- a Transcoder Card
- an MFP-S Card

The illustration below depicts a Cisco Series DCM D9900 Digital Content Manager.

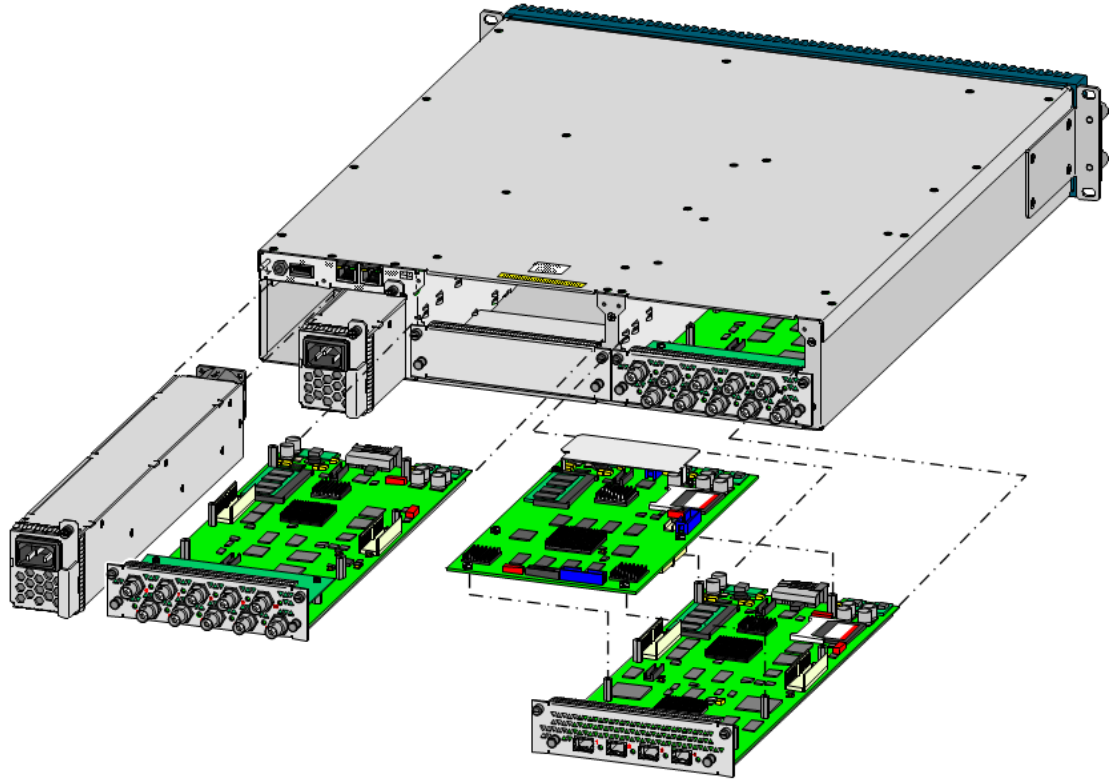


A more detailed description of the Cisco Series DCM D9900 Digital Content Manager together with technical specifications of the housing and equipment can be found on the data sheet of the device.

Modular Concept

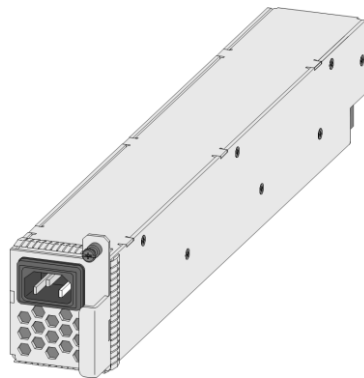
Overview

The DCM is a fully modular concept built around a 2 RU high housing. The flexible modular concept ensures easy system capacity upgrades. The following illustration represents the modular concept of the DCM.



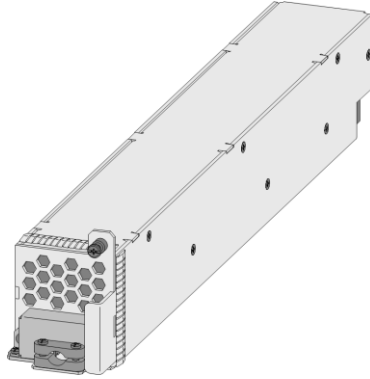
The following DCM equipment is available:

- DCM housing
- 100 - 240 V ac Power Supply Unit (PSU)

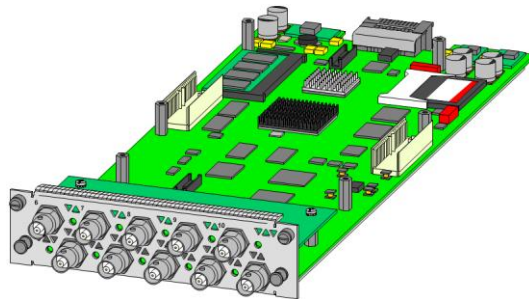


Chapter 1 Description

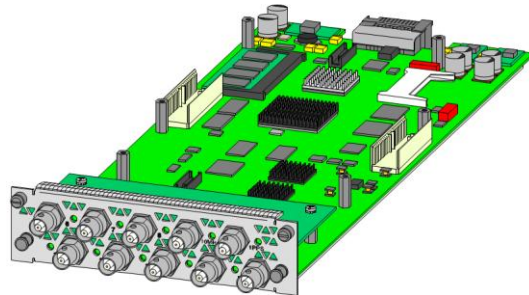
- - 48 - - 60 V dc Power Supply Unit (PSU)



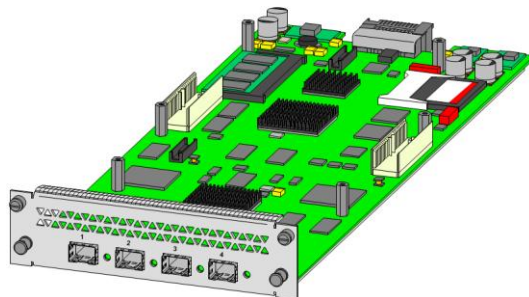
- ASI Interface Card



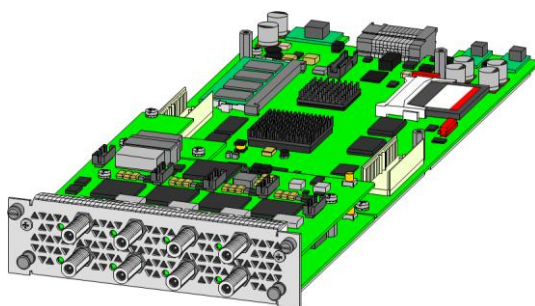
- ASI SFN Interface Card



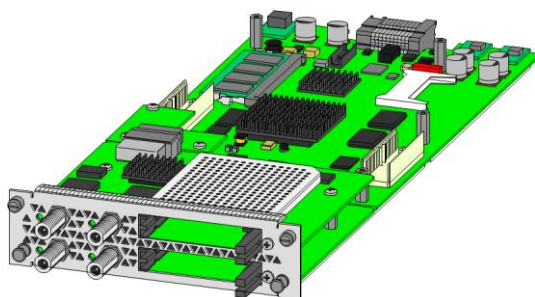
- GbE Interface Card



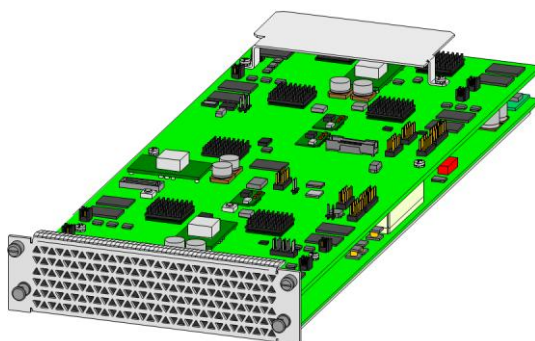
- 8-VSB Interface Card



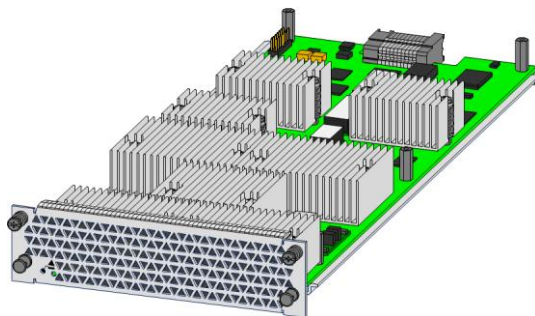
- DVB-S2/CI Interface Card



- Transcoder Card

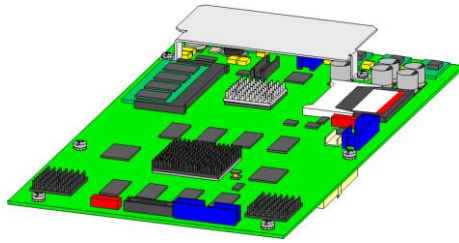


- MFP-S Card

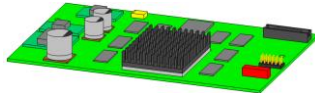


Chapter 1 Description

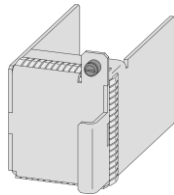
- Co-Processor Card



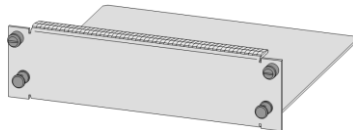
- FEC Card



- PSU slot cover plate



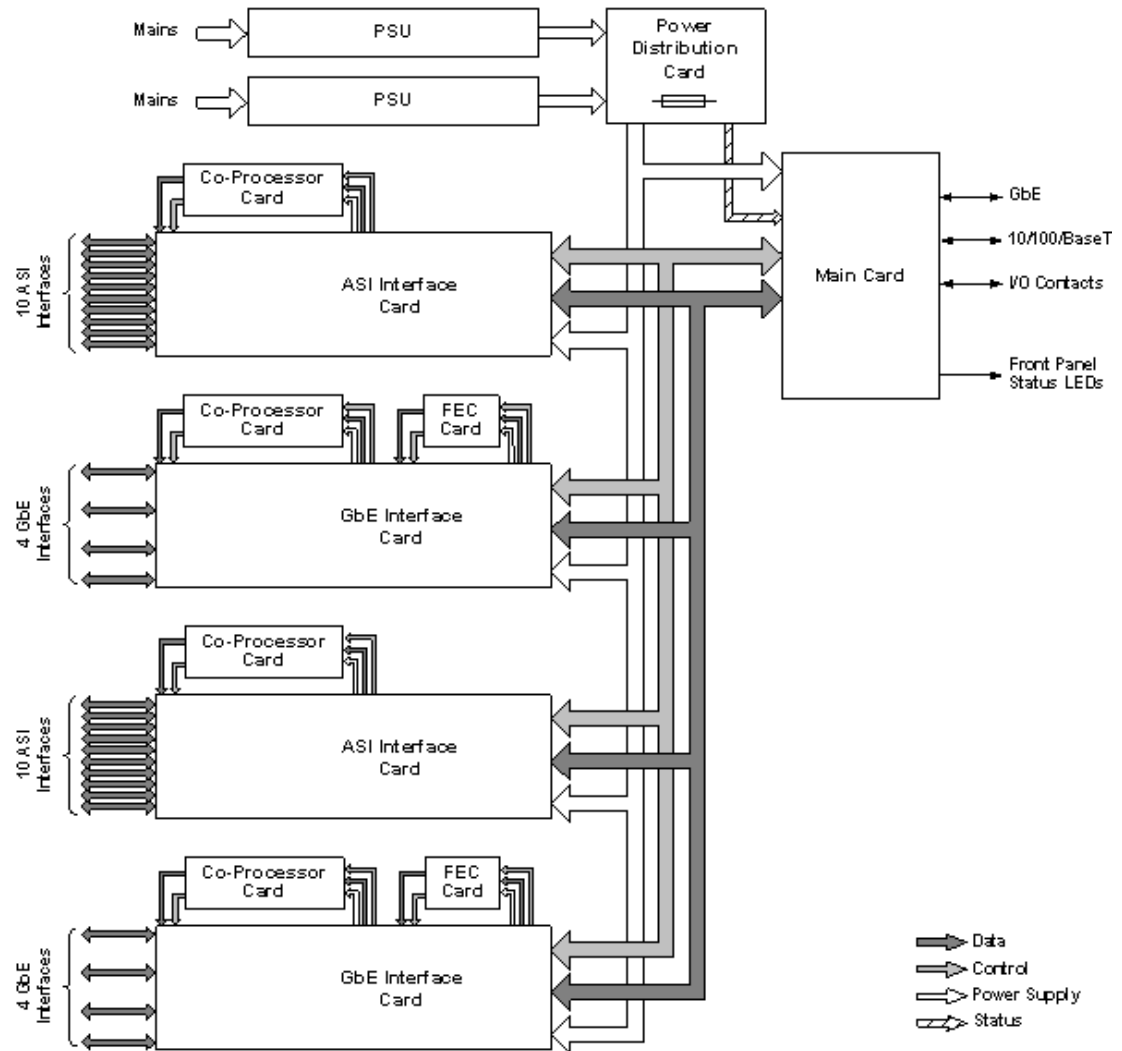
- Interface card slot cover plate



When the DCM leaves our assembly line, the device is configured as ordered. When the device is not fully populated, the device can always be upgraded at a later date by adding cards and/or PSU, see chapter *Upgrading* on page 95.

Principle

The following block diagram depicts the functional blocks of a DCM equipped with two ASI Interface Cards with Co-Processor Card and two GbE Interface Cards with Co-Processor Card and FEC Card.

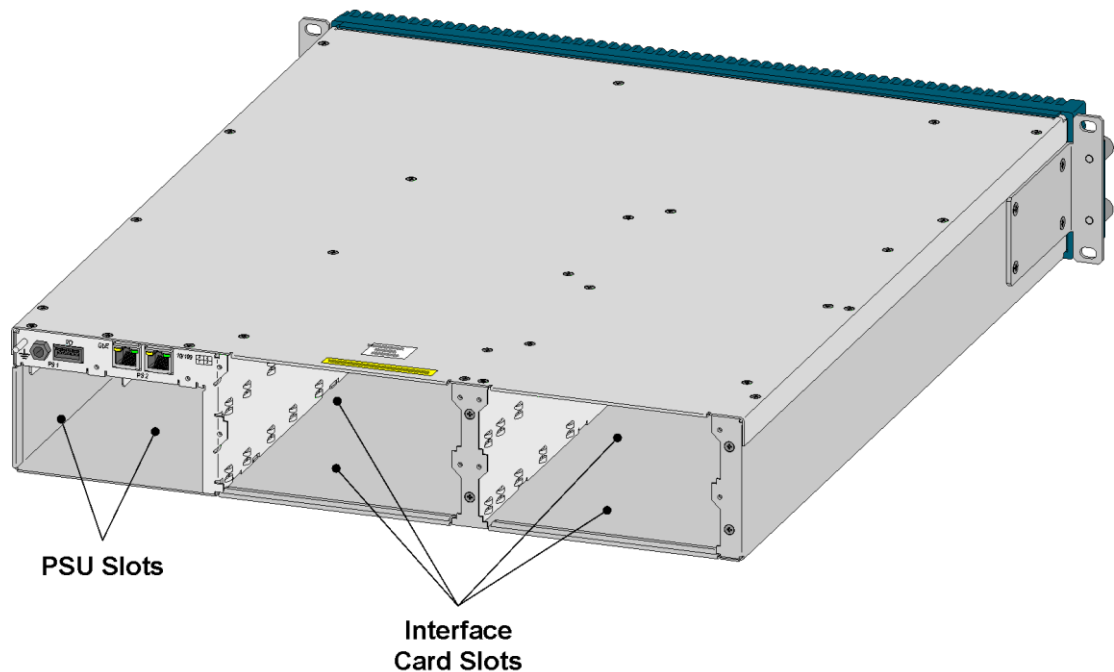


Introducing the DCM Equipment

The Housing

Introduction

The DCM housing is a compact, modular 2RU high 19-inch chassis containing four interface card slots and two PSU slots. The housing is rear loadable, meaning the interface cards as well as the PSU are loaded via the rear panel of the housing. The following illustration shows the rear panel of the housing with empty slots.

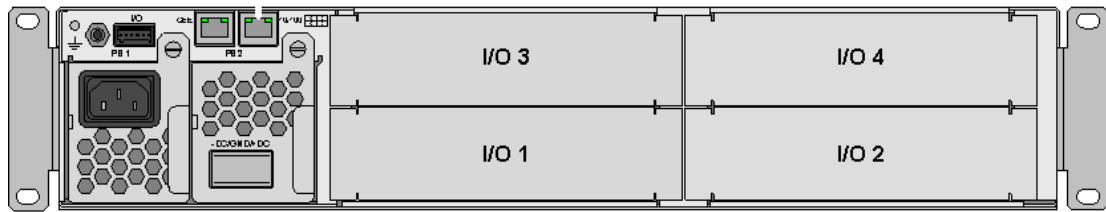


The DCM housing is provided with a 10/100Base-T and a Gigabit Ethernet (GbE) interface (further called management ports). These management ports can be used for communication with a Conditional Access (CA) system, a management system, an SI-server, or for remote control and monitoring with a network-connected PC running Microsoft Internet Explorer.

Interface Card Positions

To facilitate the identification of the interface cards during configuration, the card positions have been numbered. The default name of an interface card is *I/O* followed by its card position.

The following illustration depicts the I/O slot positions.



Cooling System

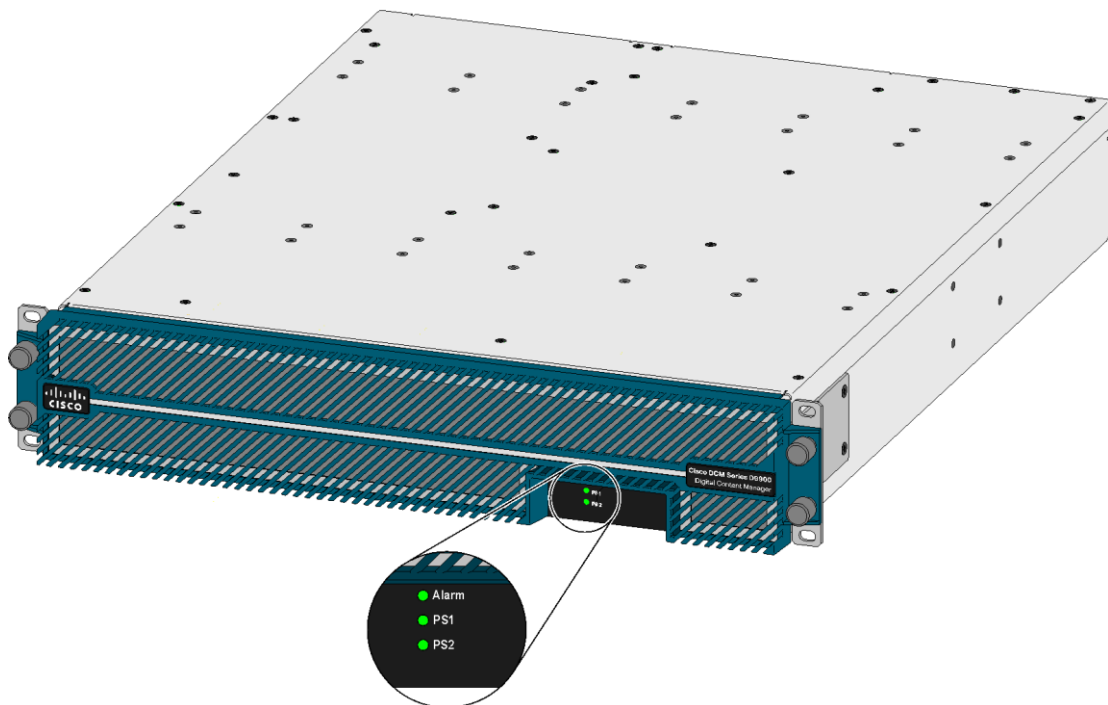
The DCM housing is provided with a number of fans. Three fans, which are mounted behind the front cover, blow the air across the interface cards and Main Card in a front-to-rear direction. Each PSU is equipped with a fan blowing the air from the front to the back of the unit.

The fans behind the front cover are continuously monitored. When one of these fans fails, the DCM generates an alarm indicating the failed fan. The procedure to replace a fan can be found in topic *Replacing a Defective Fan* on page 88.

Note: To allow proper functioning of the cooling system, it is important that the air intake and exhaust of the housing remain unobstructed during operation.

LED Indicators

At the front of the DCM housing, three LED indicators are foreseen to indicate the status of the system. The illustration below depicts these front panel LED indicators.



The following table describes the front panel LED indicators of the DCM.

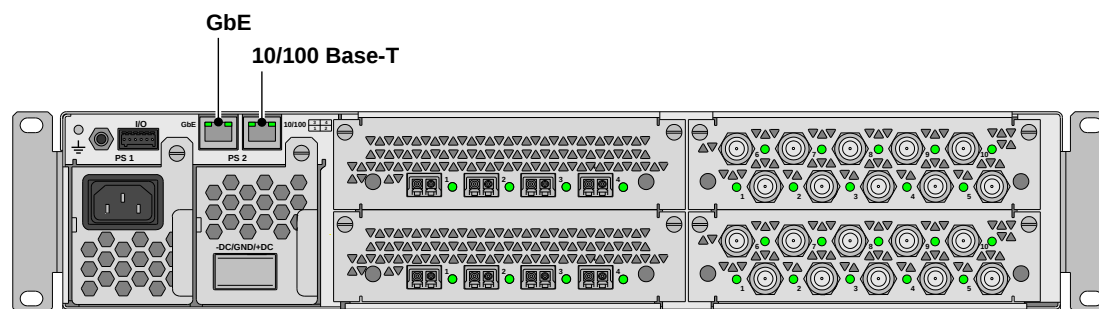
LED	LED Color/Status	Description
Alarm	Red	- One or more fans behind the front cover are failing^(*). - The ambient temperature as measured on the main board exceeds 55° C (131°F).
	Green	OK
PS 1	Red	No PSU present in PSU slot 1 or the PSU present in PSU slot 1 fails ^(**) .
	Green	A PSU is present in PS slot 1 and works fine.
PS 2	Red	No PSU present in PSU slot 2 or the PSU present in PSU slot 2 fails ^(**) .
	Green	A PSU is present in PS slot 2 and works fine.

^(*) The procedure to replace a fan can be found in topic *Replacing a Defective Fan* on page 88.

^(**) The procedure to remove and to install a PSU can be found in topic *Installing and Removing a PSU* on page 111.

The following table describes the LED indicators on the management ports.

LED	Description
orange	Communication
green	Link up

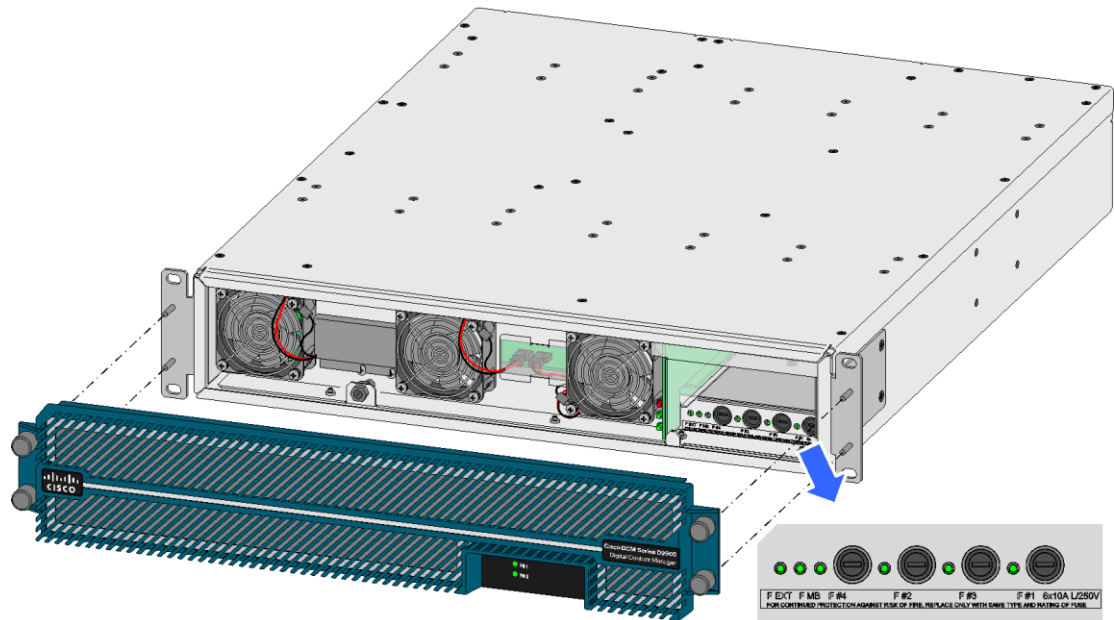


Power Distribution

The power supply coming from the PSU module(s) is distributed to the I/O slots and to the Main Board. Each power supply branch is secured by a fuse and the status of each fuse is indicated by a LED. A green illuminating LED means OK and an extinguished LED means a blown fuse. The procedure to replace a blown fuse can be found in topic *Replacing a Blown Fuse* on page 86.

Note: Only the fuses to protect the power supply for the interface cards are replaceable.

The following illustration depicts the status LEDs of the power supply branches and the fuse holders of the interface cards.



The following table lists the different power supply LED indicators.

LED	Description
F MB	Main Board
F EXT	Future use
F #1	Interface card, chassis position 1
F #2	Interface card, chassis position 2
F #3	Interface card, chassis position 3
F #4	Interface card, chassis position 4

The Power Supply Unit

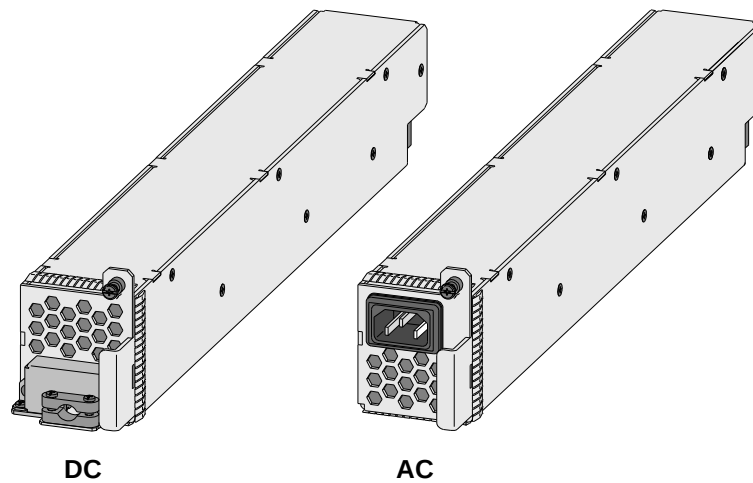
General

The DCM has a hot swappable and redundant power supply concept. This means the system tolerates the removal or failure of one of the power supplies and remains fully operational. Each power supply generates a 12 V dc supply voltage, capable of supplying a fully loaded unit.

Two PSU versions are available, a 100 - 240 V ac version (part number: 4009626) and a - 48 - - 60 V dc version (part number: 4009627).

Chapter 1 Description

The following illustration shows both an AC PSU version and a DC PSU version.



The following power supply configurations are possible: AC - AC, DC - DC, AC - DC, AC only, and DC only.

For more information concerning the DCM PSU specifications, please refer to the data sheet of the Cisco Series DCM D9900 Digital Content Manager.

Features and Benefits of the AC Version PSU

The standard features and benefits are:

- Universal AC input (100 - 240 V ac)
- Hot pluggable
- Current sharing based on droop method.
- Active Power Factor Correction. EN 61000-3-2 compliant.
- 1 fully protected 12 V dc output.

Features and Benefits of the DC Version PSU

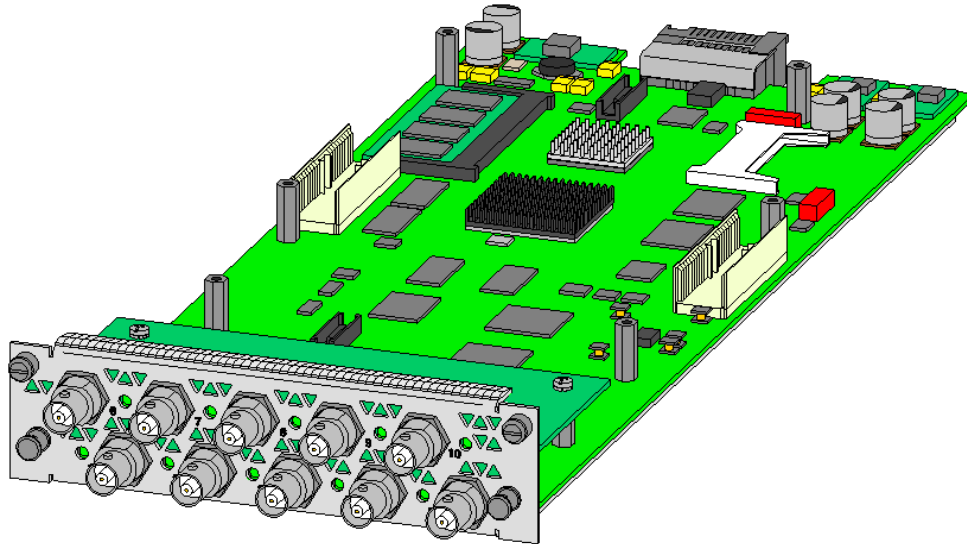
The standard features and benefits are:

- Universal DC input. (U Nominal -48 - -60 V dc)
- Hot pluggable.
- Current sharing based on droop method.
- 1 fully protected 12 V dc output.

The ASI Interface Card

General

The ASI Interface Card of the DCM is provided with 10 BNC-type ASI interface ports, which can individually be configured as either ASI input port or ASI output port using the embedded GUI of the device. All ASI interface ports support multiple program transport streams (MPTS) as well as single program transport streams (SPTS) according to ISO/IEC 13818. The following illustration shows an ASI Interface Card.



Each DCM can be equipped with maximum four ASI Interface Cards, meaning that the device can support a max of 40 ASI interfaces.

For advanced processing purposes on outgoing transport streams, a Co-Processor Card can be plugged on the ASI Interface Card. More information concerning Co-Processor Cards can be found in topic *The Co-Processor Card* on page 22.

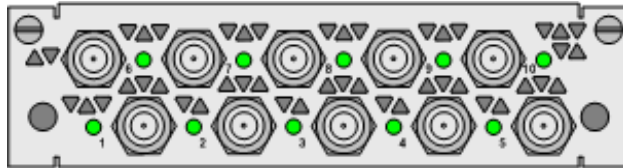
LED Indicators on the ASI Interface Card

The ASI Interface Card is provided with a number of LEDs indicating the status of the ASI interfaces. The table below describes the status of these LEDs.

LED	LED Status/Color	Description
LED 1 - 10	Green, solid	ASI interface configured as ASI input port and no valid incoming data present
	Yellow, solid	ASI interface configured as ASI output port and no outgoing data present
	Green, flashing	ASI interface configured as ASI input port and valid incoming data present
	Yellow, flashing	ASI interface configured as ASI output port and outgoing data present

LED	LED Status/Color	Description
	Extinguished	ASI Interface disabled

The illustration below reflects the rear plate of an ASI Interface Card. For port 1 up to 5 the LEDs are located at the left hand side of the port and for port 6 up to 10 at the right hand side.

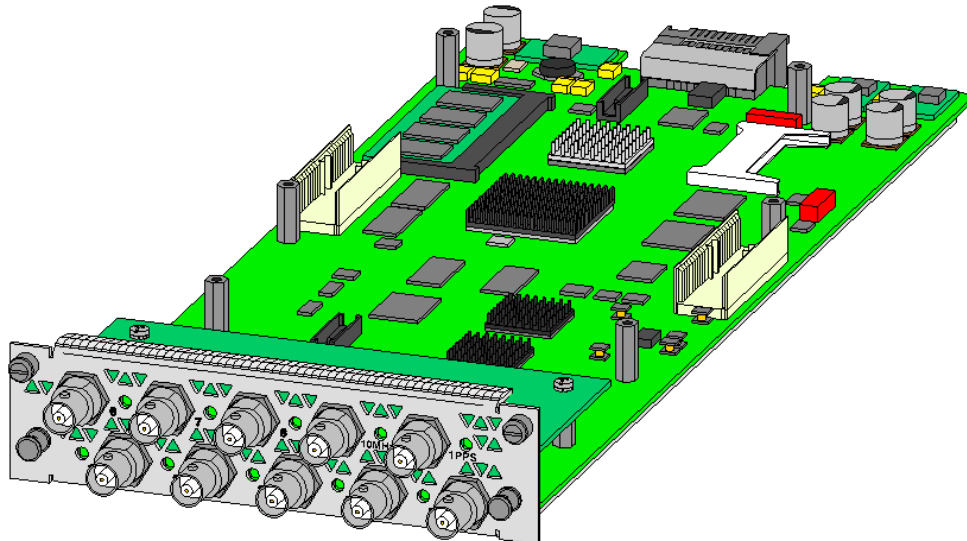


Note: In the illustration, the numbers beside the ports are the numbers of the ASI interfaces used by the embedded GUI of the device.

The ASI SFN Interface Card

General

The ASI SFN Interface Card of the DCM is provided with 8 BNC-type ASI interface ports and two GPS reference signal inputs. Similar to the ASI Interface Card, the eight ASI interface ports of the ASI SFN Interface Card can also individually be configured as either ASI input port or ASI output port using the embedded GUI of the device. All ASI interface ports also support multiple program transport streams (MPTS) as well as single program transport streams (SPTS) according to ISO/IEC 13818. The following illustration shows an ASI SFN Interface Card.



For advanced processing purposes on outgoing transport streams, a Co-Processor Card can be plugged on the ASI SFN Interface Card. More information concerning Co-Processor Cards can be found in topic *The Co-Processor Card* on page 22.

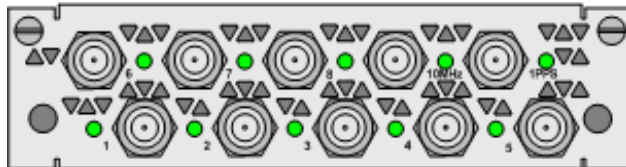
Important: With the exception of an ASI SFN Interface Card with part number 4027574C, an ASI SFN Interface Card is provided with a GPS hold-over function that becomes active if the incoming 10 MHz clock fails.

LED Indicators on the ASI SFN Interface Card

The ASI SFN Interface Card is provided with a number of LEDs indicating the status of the ASI interfaces and GPS reference signal inputs. The following table describes the status of these LEDs.

LED	LED Status/Color	Description
LED 1 - 8	Green, solid	ASI interface configured as ASI input port and no valid incoming data present
	Yellow, solid	ASI interface configured as ASI output port and no outgoing data present
	Green, flashing	ASI interface configured as ASI input port and valid incoming data present
	Yellow, flashing	ASI interface configured as ASI output port and outgoing data present
	Extinguished	ASI Interface disabled
LED 10MHz	Green, solid	Valid 10 MHz signal present
LED 1PPS	Green, solid	Valid 10 MHz and 1 PPS signal present

The illustration below reflects the rear plate of an ASI SFN Interface Card. For port 1 up to 5 the LEDs are located at the left hand side of the port and for port 6 up to 8, and the 10MHz/1PPS ports at the right hand side.



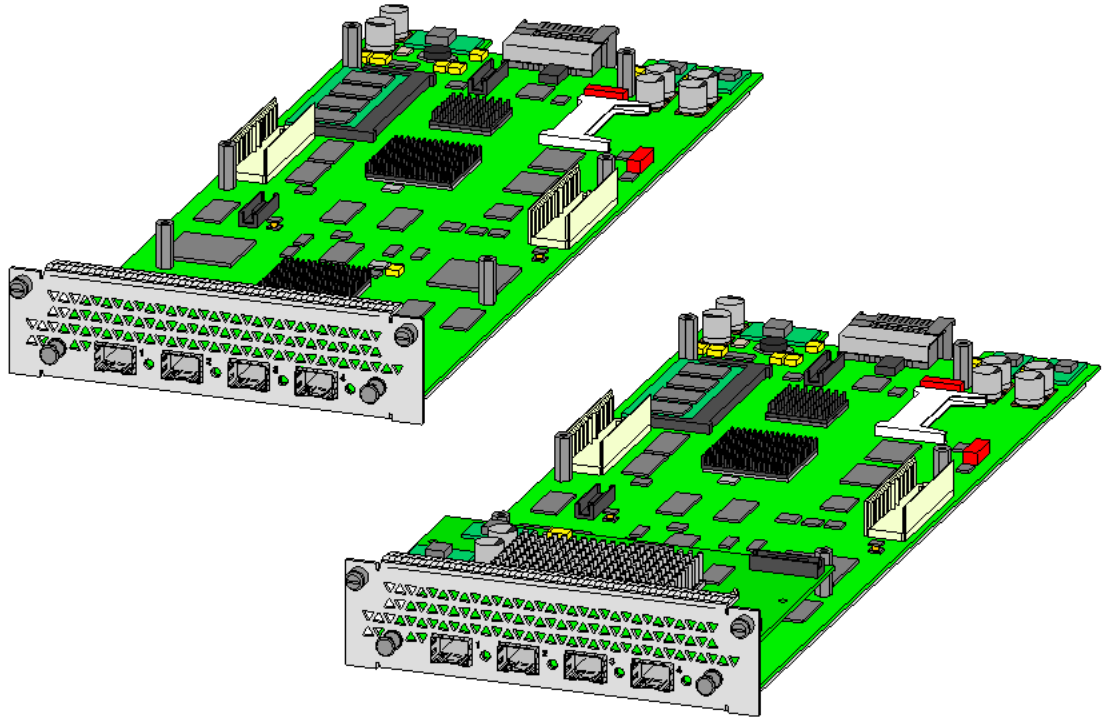
Note: In the illustration, the numbers beside the ports are the numbers of the ASI interfaces used by the embedded GUI of the device.

The GbE Interface Card

General

A GbE Interface Card of the DCM is provided with four gigabit ethernet interfaces, giving the card a total throughput of two Gbps in and two Gbps out. To protect video services transported over IP networks from impairments caused by network jitter, IP packet loss, or out-of-order IP packets, a GbE Interface Card with FEC option based on Pro-MPEG COP3 is provided.

The following illustration depicts a standard GbE Interface Card and a GbE Interface Card with FEC option.



Each GbE interface port can be equipped with either an optical SFP transceiver or an electrical SFP transceiver. The procedure to insert SFP transceivers into the SFP cages of the GbE Interface Cards can be found in topic *To install SFP transceivers into a GbE card* on page 38.

Note: When the DCM leaves our assembly line, the SFP cages of the GbE Interface Cards are not populated with SFP transceivers. Information about recommended SFP transceivers can be found in the data sheet of the DCM.

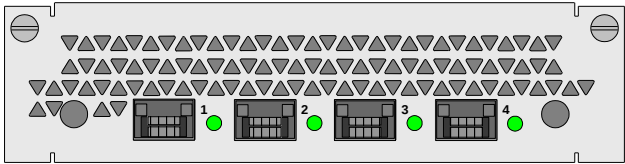
For advanced processing purposes on the outgoing transport streams, a Co-Processor can be plugged on the GbE Interface Card. More information concerning Co-Processor Cards can be found in topic *The Co-Processor Card* on page 22.

A GbE Interface Card with part number 4023050 can be upgraded with the FEC option. The procedure to install a FEC Card on such interface card can be found in topic *Installing or Removing the FEC Option* on page 109.

LED Indicators on the GbE Interface Card

The GbE Interface Card is provided with four LED indicators indicating the status of the GbE Interface ports. The illustration below depicts the rear panel of a GbE Interface Card.

The LED on the right hand side of the GbE port indicates the status of the port.



Note: In the illustration, the numbers at the right hand side of the ports are the numbers of the GbE interfaces used by the embedded GUI of the device.

The table below describes the LED indicators of the GbE Interface Card.

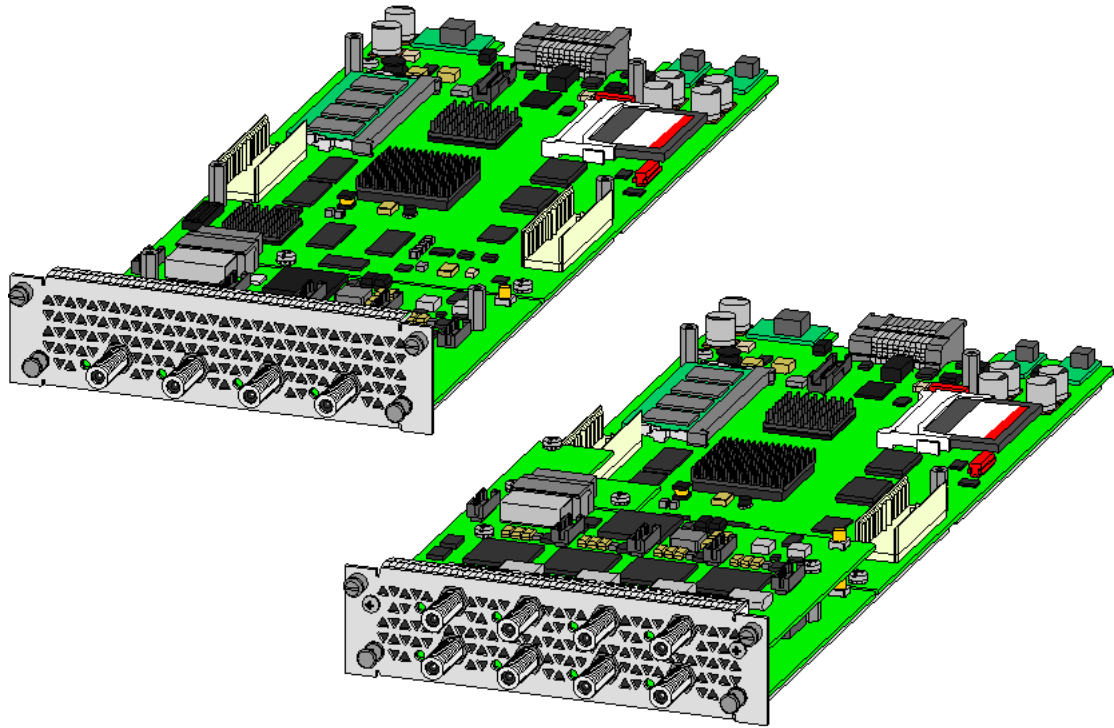
LED	LED Status/Color	Title
LED 1 - 4	Green	Link up
	Green, flashing	Link activity
	Extinguished	No link

The 8-VSB Interface Card

Introduction

The DCM 8-VSB Interface Card allows demodulating eight off-air terrestrial 8-VSB RF signals and offers these demodulated transport streams to the MUX engine of the DCM for further processing. The 8-VSB Interface Card exists in two different flavors, a 4 RF inputs and an 8 RF inputs card.

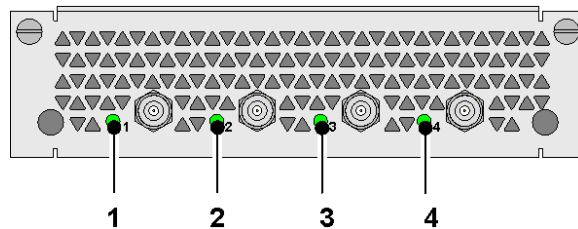
The following illustrations depict a 4 RF inputs and an 8 RF inputs 8-VSB Interface Card.



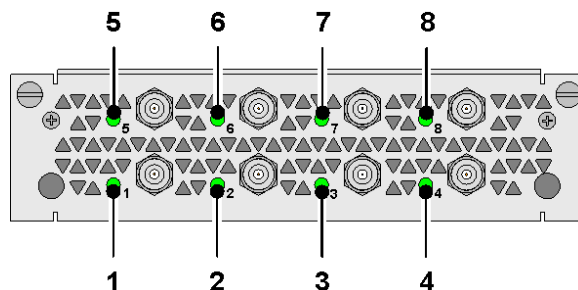
LED Indicators on the 8-VSB Interface Card

The 8-VSB Interface Card is provided with a number of LEDs indicating the status of the 8-VSB RF ports. The illustration below depicts the rear panel of an 8-VSB Interface Card with 4 RF input ports and 8 RF input ports. The LED on the left hand side of the port indicates the status of the port.

■ 8-VSB Interface Card with four 4-VSB RF ports



■ 8-VSB Interface Card with four 8-VSB RF ports



Note: In the illustration, the numbers at the left hand side of the ports are the numbers of the 8-VSB RF ports used by the embedded GUI of the device.

The table below describes the LED indicators of the 8-VSB Interface Card.

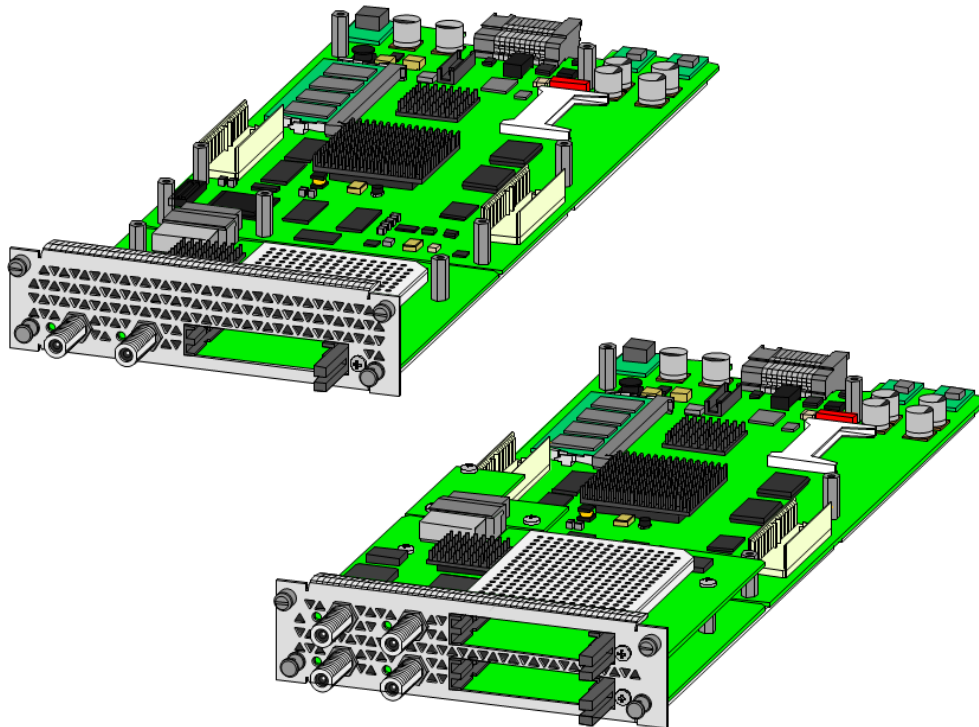
LED	LED Status/Color	Title
LED 1 - 4/8	Extinguished	8-VSB RF port is disabled.
	Green	The card is locked to the incoming signal.
	Orange	The card is not locked to the incoming signal.
	Green + orange	The card is locked to the incoming signal but uncorrectable errors are present.

DVB-S2/CI Interface Card

Introduction

The DVB-S2/CI Interface Card supports reception of DVB-S L-band signals (as defined in ETSI EN 300 421) as well as DVB-S2 L-band signals (as defined in ETSI EN 302 307) and provides a number of DVB common interface (CI) slots which can independently be used for descrambling purposes.

The DVB-S2/CI Interface Card exists in two different flavors, a version with 2 RF input ports and 2 DVB-CI slots and a version with 4 RF input ports and 4 DVB-CI slots. The following illustrations depict both versions.

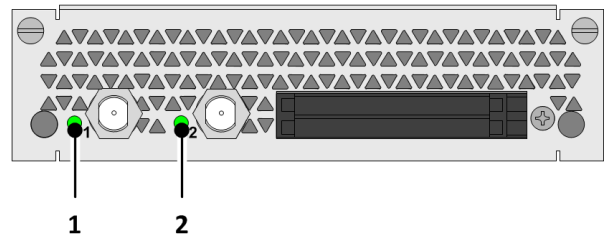


A DVB-S2/CI Interface Card with 2 RF input ports and 2 DVB-CI slots supports LNC-bias on both ports.

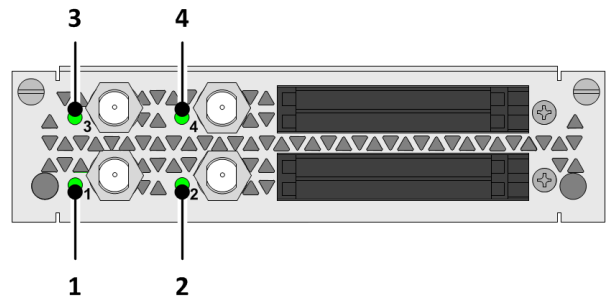
LED Indicators

The DVB-S2/CI Interface Card is provided with one LED per RF input port that indicates the status of the port. The LED on the left hand side of the port corresponds with the port.

■ DVB-S2/CI Interface Card with 2 RF input ports and 2 DVB-CI slots



■ DVB-S2/CI Interface Card with 4 RF input ports and 4 DVB-CI slots



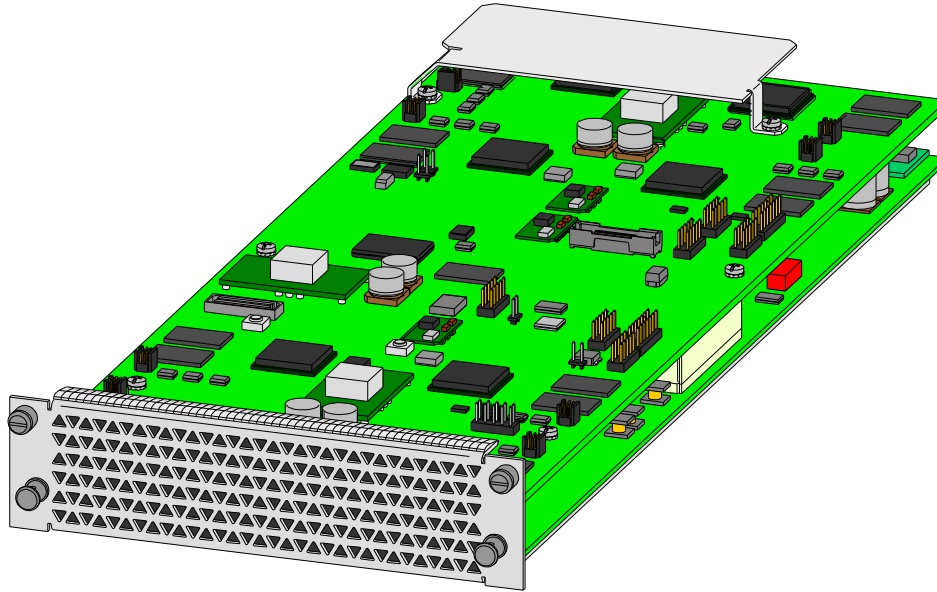
Note: In the illustration, the numbers at the left hand side of the ports are the numbers of the RF input ports used by the embedded GUI of the device.

The table below describes the LED indicators of the DVB-S2/CI Interface Card.

LED	LED Status/Color	Title
LED 1 - 4/8	Extinguished	RF port is disabled.
	Green	The card is locked to the incoming signal.
	Orange	The card is not locked to the incoming signal.
	Green + orange	The card is locked to the incoming signal but uncorrectable errors are present.

The Transcoder Card

A Transcoder Card of the DCM performs high density MPEG-2 to H.264 video conversion and is suitable to support for optional audio transcoding from AC-3 and MPEG-1 LayerII to HE-AAC, audio and metadata pass-through. It is capable of processing a high number of both SD and HD video streams, supporting 1080i and 720p formats at up to full HD resolution. The following illustration depicts a Transcoder Card.



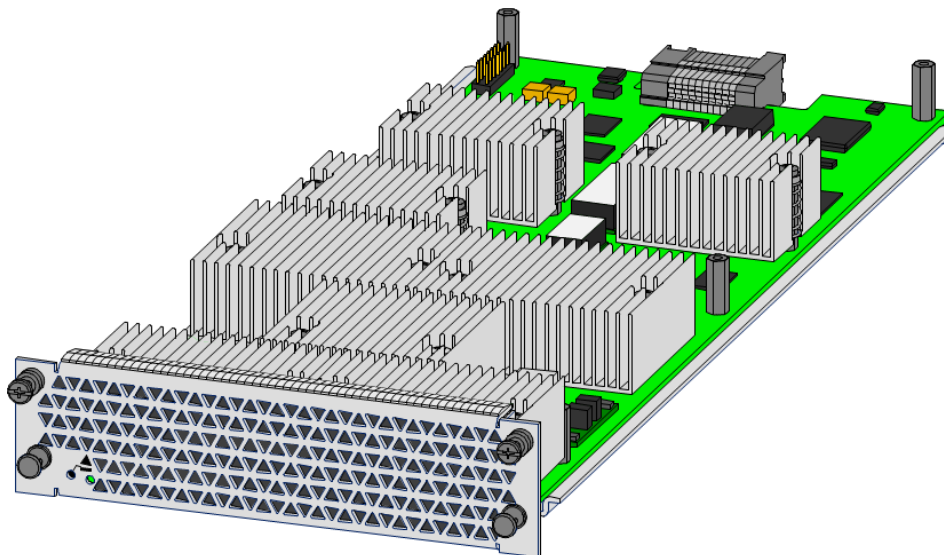
A Transcoder Card is able to transcode up to 16 SD channels or 4 HD channels.

The MFP-S Card

The Multi Format Processor Card (or for short MFP Card) provides the DCM with a high number of video/audio processing engines suitable for dense multiformat video and audio transcoding. Next to these transcoding capabilities, an MPF card features HD to SD downscaling, picture in picture, audio leveling, MPEG-2 transrating, MPEG-2 digital program insertion, video overlay...

Important: Cisco provides a DCM MFP single layer card and a DCM MFP dual layer card. Only the DCM MFP single layer card can be used in a Cisco Series DCM D9900 Digital Content Manager device.

The following picture illustrates a DCM MFP single layer card.

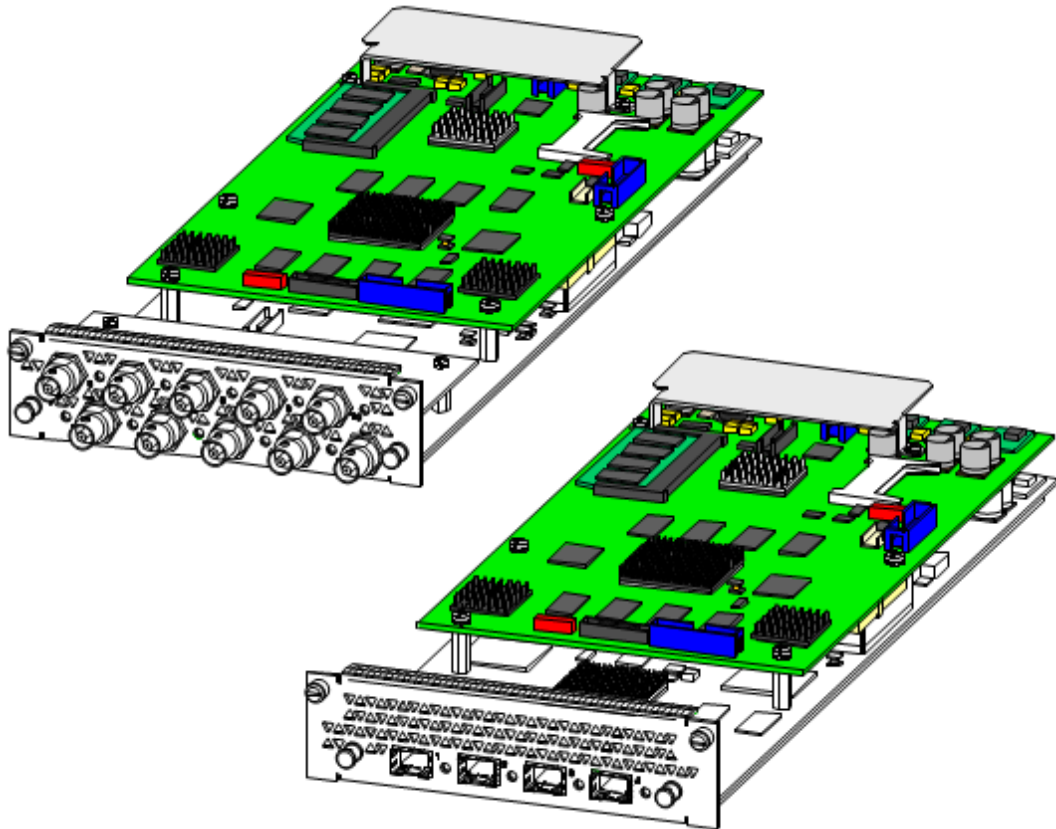


The MFP-S Card has inputs nor outputs and signals should be routed to this card via the user interface of the DCM.

The Co-Processor Card

General

The Co-Processor Card of the DCM is used for advanced processing. The Co-Processor Card is a plug-in card for the ASI, ASI SFN, or GbE Interface Card. The following illustration depicts a Co-Processor Card plugged on an ASI Interface Card and a Co-Processor Card plugged on a GbE Interface Card.



The Embedded Graphical User Interface

Introduction

The DCM can be configured and monitored via an embedded graphical user interface (GUI) that can be accessed using Microsoft Internet Explorer or Mozilla Firefox. The following shows the start page of the web browser user interface of the DCM.



The procedure to access DCM's web browser user interface can be found in chapter *Operation* on page 51.

Embedded GUI Information

For more information concerning the embedded GUI, please refer to technical publication *Digital Content Manager (DCM) Configuration Guide*. This user's guide opens in Acrobat Reader by selecting the *User Manual* link on the *Help* page of the web browser user interface of the DCM.

Product Identification

General

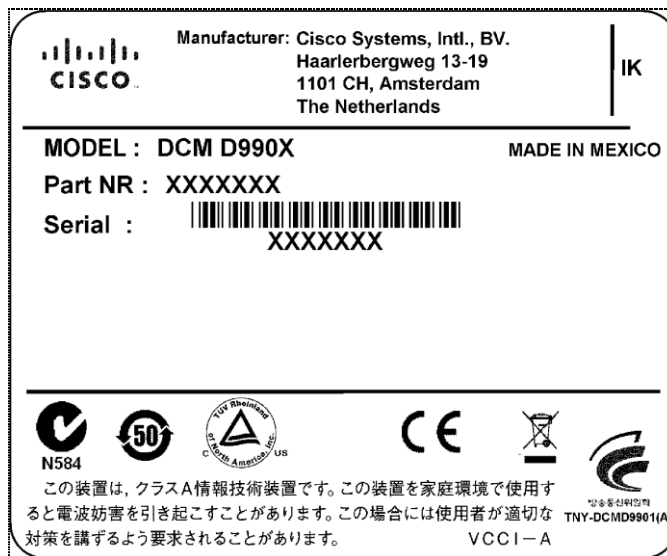
Products can be identified by means of the ID label attached to the product. The following information is available on the label(s).

- Company address
- Model number
- Serial number
- Part number

Under some circumstances you might need this information. For example when a unit is failing, the serial number is necessary for returning your unit.

Identification Label

The following illustration depicts an example of the identification label affixed to the DCM.



2

Installation

Introduction

This chapter contains the information for technicians installing the Cisco Series DCM D9900 Digital Content Manager.

Qualified Personnel

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



WARNING:

Allow only authorized and qualified service personnel to install, operate, maintain, and service this product. Otherwise, personal injury or equipment damage may occur.

Who Should Use this Guide

This guide is intended for authorized personnel who have experience working with similar equipment. The personnel should have appropriate background and knowledge to complete the procedures described in this guide.

In This Chapter

■ Preparing for Installation.....	27
■ Operating Temperature Limits	28
■ Rack Mounting.....	29
■ Earth Bonding Terminal Connection	32
■ Connection of Cisco Equipment to AC Power Sources.....	33
■ Connection of a DCM to a DC Power Source	34
■ Connecting the GbE Interfaces.....	37
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■ Connecting the ASI Interfaces.....	45
■ Connecting the GPIO Contact Closure	46
■ Inserting and Removing CI-CAMs and Smart Cards.....	48

Preparing for Installation

Before You Start

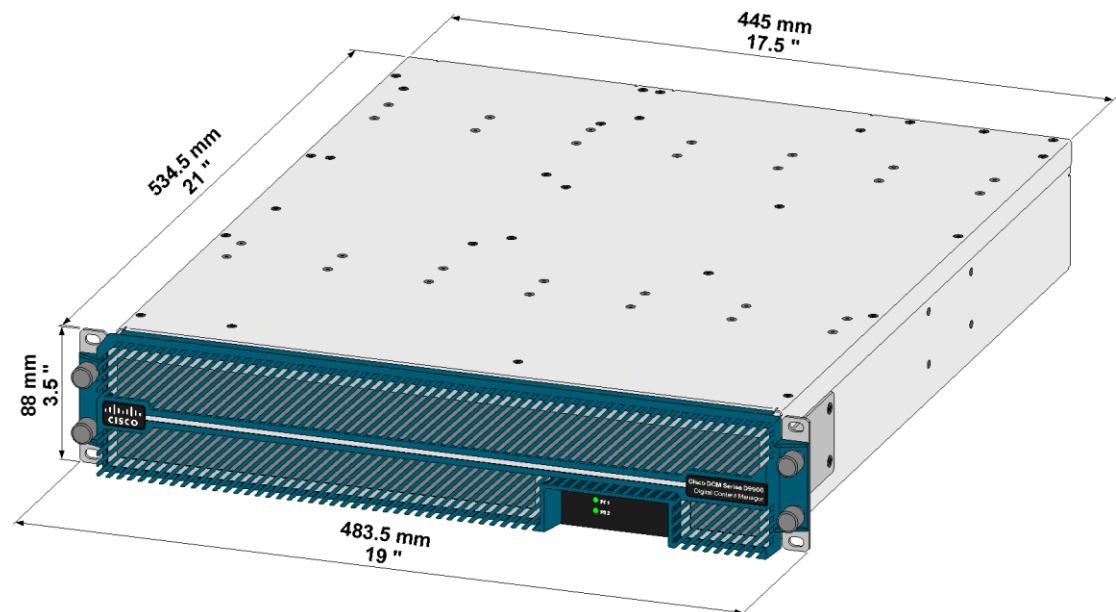
Make sure that the chassis is in good condition and that you have the tools and equipment needed.

Unpacking and Inspecting the Housing

As you unpack the housing, inspect it for shipping damage. If you find any damage, contact the customer services department. Refer to appendix *Customer Information* on page 115, for information on contacting the customer services department.

Chassis Dimensions

The following drawing shows the dimensions of the DCM chassis.



Operating Temperature Limits

Introduction

The DCM is designed to operate within a specified operating temperature range. Specifications of the DCM can be found in the data sheet of the Cisco Series DCM D9900 Digital Content Manager.



WARNING:

Avoid damage to the DCM. Your warranty is void if you operate this product above the maximum specified operating temperature.

Operating Environment

We recommend the following activities to moderate the operating temperature:

- Mount additional components, such as combiners and net strips, at the back of the 19-inch equipment rack, so that the free airflow between the sides of the unit and the rack is not restricted.
- Mount ventilation profiles at the bottom and top of the 19-inch equipment rack. This allows the fresh air to enter and the hot air to leave the rack.
- Place the 19-inch equipment rack in a conditioned room with a temperature below 25°C (77°F).

Rack Mounting

Tools and Accessories

You need the following tools and accessories for mounting the unit:

- Screwdriver.
- Support brackets and rack mounting screws.

Mounting Requirements

Follow the mounting guidelines below:

- Use 19-inch racks with the appropriate depth.
- Mount the unit adequately to secure optimal operation and reliability.
- Use rack-compatible support brackets to support the unit properly.
- Pay attention to the mechanical loading and stability to avoid hazardous situations.

To Mount the DCM

When you have read the *Rack Mounting Safety Precautions* in topic *Important Safety Instructions*, earlier in this guide, you are ready to install the housing.



CAUTION:

It is of great importance to place the DCM and its components in a conditioned room within the ambient temperature specifications. For more information, please refer to the data sheet of the Cisco Series DCM D9900 Digital Content Manager.

Perform the following procedure to install the DCM.

- 1 Unpack the device.
When unpacking the device, examine it, the accessories, and the packing material for obvious signs of damage. Check the unit against the delivery/packing note. Retain the packing material, as it is required for warranty shipments and for later inspection by the carrier. Should any item be damaged, notify the carrier and our customer services department.
- 2 Select a 2 RU high location in the rack.
- 3 If the rack holes are not threaded, install a cage nut in the top and bottom holes of the selected 2 RU space.
- 4 Mount a left and right support bracket in the 19-inch rack.

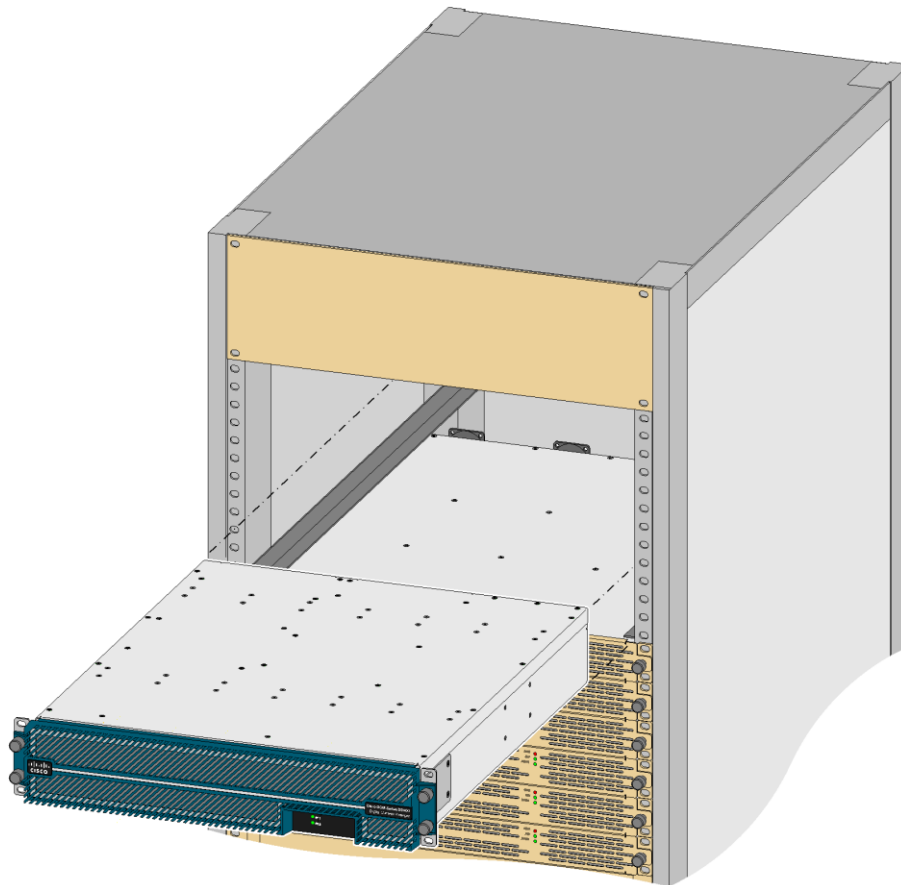


CAUTION:

Installing the DCM without support brackets may result in damage to the device.

- 5 Slide the housing completely in the 19-inch rack with the bottom being supported by the support brackets.
- 6 Insert the front panel rack mounting screws through the washers into the threaded holes or cage nuts.
- 7 Tighten the front panel rack mounting screws.

The following illustration shows a 19-inch rack with a DCM and other equipment.



Note: The DCM can be mounted into a 23" Telco rack system. Therefore two mounting brackets (part number 4008942), shipped with the DCM housing, must be mounted, see illustration below. The device can then be installed into the Telco rack using adaptation parts that are shipped with the rack.



Earth Bonding Terminal Connection

Introduction

The DCM is equipped with an external chassis terminal for equipotential bonding. Refer to the CENELEC standard EN 50083-1 or IEC 60728-11 standard for correct equipotential bonding connection instructions.

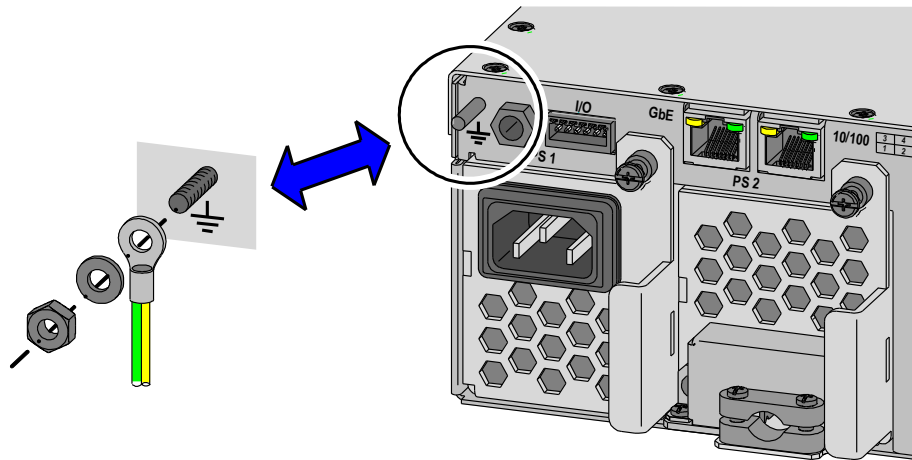
Observe the following safety warnings and guidelines:

- The conductor used to connect the earth bonding terminal must be the same size or larger than the supply conductors used to power the equipment.
- The earth bonding terminal conductor must be constructed of copper.

Connecting the Earth Bonding Cable

Perform the following steps to connect the earth bonding cable to the earth bonding terminal on the back panel of the device.

- 1 Remove the nut and shakeproof washer from the earth bonding terminal on the back panel.
- 2 Place the eye strap of the earth bonding cable over the earth bonding terminal.



- 3 Replace the shakeproof washer and nut.
- 4 Tighten the nut.

Connection of Cisco Equipment to AC Power Sources

Introduction

A DCM with AC PSU is equipped with an AC mains input connector. For the allowable nominal voltage, refer to the ratings label stuck on the power supply module.

**CAUTION:**

The DCMs are Class I Mains Powered Equipment. More information concerning Class I Mains Powered Equipment can be found in topic *Important Safety Instructions* earlier in this guide.

Connecting the AC Power

When you have read the safety instructions in *Important Safety Instructions* on page xi, you are ready to connect the DCM to the AC mains power outlet.

**WARNING:**

Check if the AC mains source voltage corresponds to the appropriate power input voltage for the device. This voltage is noted on the power supply module.

Perform the following steps to connect AC power to the DCM.

- 1 Connect the AC power cord to the back of the device.
- 2 Connect the power cord to the AC power outlet.

Notes:

- If your DCM is equipped with two AC type power supply units, it is advisable to plug each power supply unit into a separate dedicated branch circuit.
- Once the DCM is powered up, the device starts booting. Booting the DCM can take some time depending on the configuration and the features of the device.
- The DCM AC power supply has been approved for connection to an IT power distribution system with voltage limiter, neutral not distributed and 230 V ac line-to-line voltage as used in Norway.

**CAUTION:**

- Do not insert nor unplug a powered power supply from the chassis without disconnecting the power source.
- When a DCM is brought from a cold into a warm environment, the device should be acclimated to the environment temperature and humidity conditions for at least 30 minutes. Non-acclimated devices may not meet the technical specifications as described. Powering up a non-acclimated device may result in damage to the component and/or chassis.

Connection of a DCM to a DC Power Source

General

The DCM with DC Power Supply Unit is designed and rated for connection to -48 V dc - -60 V dc Nominal power supply system (Normal Service Voltage Range not exceeding -36 V dc to -72 V dc). For this category of equipment, the safety considerations for handling dangerous voltages are applicable.



WARNING:

Use the same level of safety precautions for this equipment and power source as for the AC power source.

Observe the following safety warnings and guidelines:

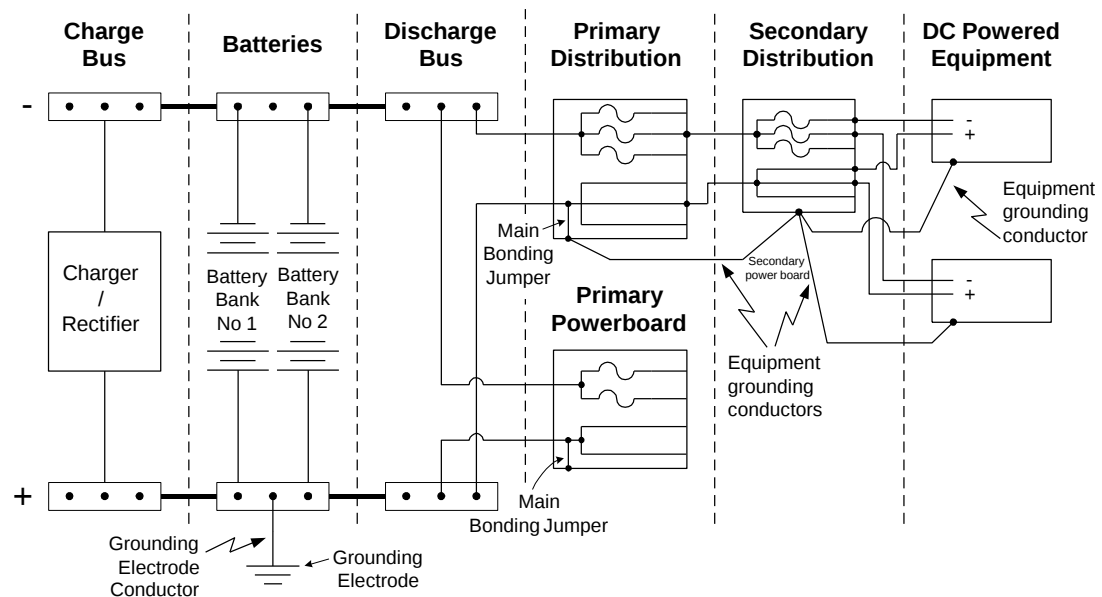
- Use a listed DC rated Branch Circuit protection in accordance with the wire size, and with a maximum of 15 A current. The circuit protection must be placed in the hot wire.
- We recommend a minimum of 1.5 mm² (or AWG16) for 15 A fusing.
- The DC power source must be electrically isolated from the Mains AC source in accordance with the standard of the country where you are installing the product.
- The wire size of the cable used to connect a product to the DC distribution module or bus bar must have the appropriate wire size to avoid overloading.
- Always wire the protective earth terminal of the DC power supply connector or cable.

Connection to Centralized DC Power Systems

A centralized DC power distribution system (typically -48 V dc) is a power system consisting of open batteries, charger/rectifier circuits, and primary, and secondary distribution equipment intended to provide power to equipment loads. Two types of systems exist:

- **Source earthed DC power systems**, in which the connection to the earthing electrode is located at the source, and separate earthed and protective earth conductors, are provided throughout the system.
- **DC power system earthed at the equipment location**, in which the connection to the earthing electrode is located in the area where the load equipment is to be installed.

A typical power distribution arrangement is shown below:



Connecting the DC Power

A DC-version of the DCM is equipped with a field wiring screw terminal block.

Use a listed jacketed cable with the following specifications:

- Outer jacket diameter: 0.28 inch $\pm$ 0.04 inch (7.1 mm $\pm$ 1 mm)
- Wire gauge: AWG 16 (1.3 - 1.5 mm²)

For use in the US, install wiring according to the NEC article 300. For other countries, install according to national requirements.



CAUTION:

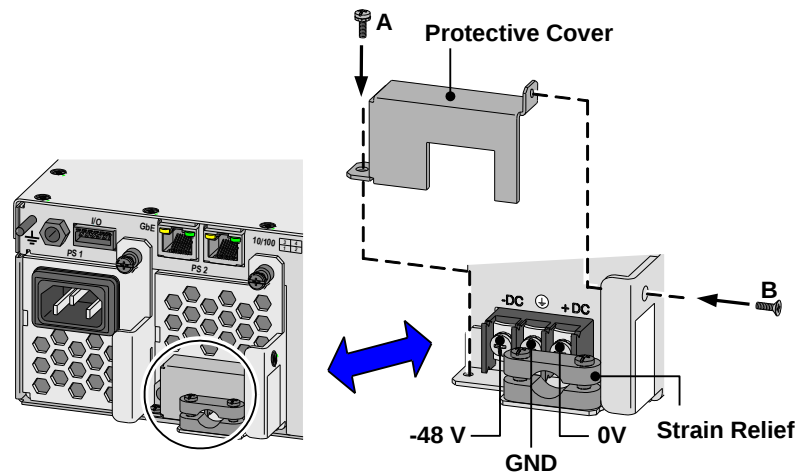
- The DCM is a Class 1 Mains Powered Equipment. More information concerning Class 1 Mains Powered Equipment can be found in topic Important Safety Instructions earlier in this guide.
- Connection to a -48/-60 V dc nominal power system requires a readily accessible disconnect branch circuit protection device. The protection device must be used as disconnection device.
- Do not attach the power supply wiring to the building surface, nor run through walls, ceilings, floors and similar openings in the building structure.
- Take measures to prevent physical damage to the power supply cord.
- The DCM is not compatible with a DC power system earthed at the equipment location without taking additional precautions (such as specific marking).

Perform the following steps to connect the DCM to a DC power source.

- 1 Verify that the DC power cable is disconnected from the DC power source.

Chapter 2 Installation

- 2 Unscrew the protective cover screws (see **A** and **B** on illustration below) to access the terminal block screws.



- 3 Remove the power cable jacket over a total length of 1.4 inch (35 mm) and make the -DC and +DC wire 0.2 inch (5 mm) shorter than the GND wire.
- 4 Strip the stranded wires for about 0.2 inch (5 mm) and insert them from the top side behind the pressure plates.
- 5 Attach the wires to the terminal block with a maximum torque of 7 lb-in (0.8 Nm).
- 6 Mount the DC power cable into the strain relief cable clamp with a maximum torque of 1.8 lb-in (0.2 Nm).
- 7 Replace the protective terminal block cover to ensure user safety.
- 8 Install the DC power supply into the DCM chassis and connect the DC power cable to the DC power source.

Note: Once the DCM is powered up, the device starts booting. Booting the DCM can take some time depending on the configuration and the features of the device.



CAUTION:

Do not insert nor unplug a powered power supply from the chassis without disconnecting the power source.

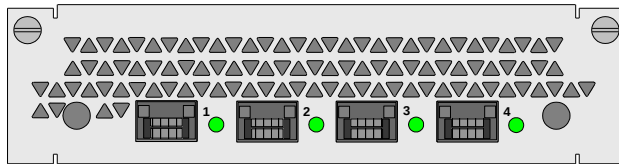
Do not try to replace the power supply fuse. Only our personnel or approved service centers are allowed to replace a blown power supply fuse. Contact customer services for more information.

When a DCM component is brought from a cold into a warm environment, the component should be acclimated to the environment temperature and humidity conditions for at least 30 minutes. Non-acclimated components may not meet the technical specifications as described. Powering up a non-acclimated component may result in damage to the component and/or chassis.

Connecting the GbE Interfaces

Introduction

Each GbE Interface Card of the DCM is provided with four GbE interfaces. The cable connections to the GbE interfaces are carried out by means of electrical or optical SFP transceivers. The following illustration depicts the back panel of a GbE Interface Card.



When the DCM leaves our assembly line, the GbE Interface Cards are not provided with SFP transceivers. Use only approved SFP transceivers. Information about SFP transceivers can be found in the data sheet of the Cisco Series DCM D9900 Digital Content Manager.

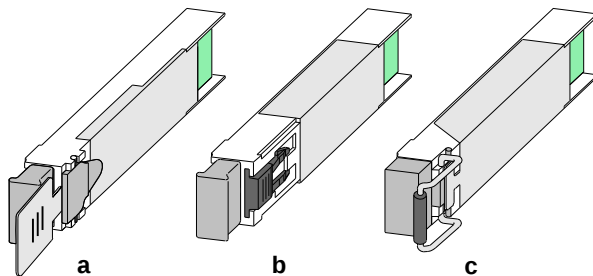
Note: The approved optical GbE SFP transceivers are Class 1 laser products according to IEC 60825-1 (1997) Amendment 2(2001).

Installing or Removing SFP Transceivers

Introduction

The SFP transceivers have three different types of latching devices used to secure and detach the SFP module from a Gigabit Ethernet port:

- The Tab SFP transceiver (detail 'a' in the illustration below)
- The Button SFP transceiver (detail 'b')
- The Cam Latch SFP transceiver (detail 'c')



WARNING:

Invisible laser radiation may be emitted from disconnected optical fibers or connectors. Do not stare into beams or view directly with optical instruments.

Notes:

- When the cables are extracted from the SFP transceiver, insert a clean rubber dust plug into the SFP transceiver to protect the transceiver.
- Clean the optic surface of the fiber cables before inserting into an optical type SFP transceiver.



WARNING:

At any case, optical SFP transceivers should be compliant to the following requirements:

- only deploy Class 1 optical output level SFPs.
- SFPs must comply with UL 60950-1 safety requirements.

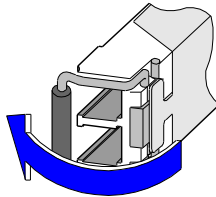
To install SFP transceivers

The following procedure explains how to install an SFP transceiver into an SFP housing.

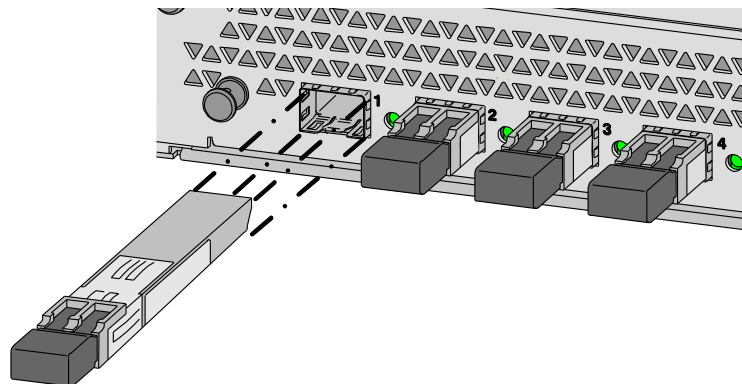
- 1 Slide the SFP transceiver into an empty SFP housing.

Notes:

- Before inserting a Cam Latch SFP transceiver, close the latch, see illustration below.



- When inserting an SFP transceiver into an SFP housing, ensure you firmly press the SFP transceiver into the SFP housing. Gently pull on the SFP transceiver to confirm whether or not the transceiver is locked into its housing.

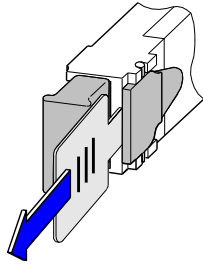


- Inserting an SFP into an IP Video Gateway Card must be done facing down.

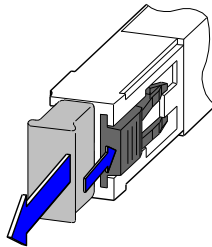
To remove SFP transceivers

The following procedure explains how to remove an SFP module from an SFP housing.

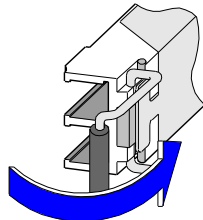
- 1 Unplug the optical fiber from the SFP transceiver.
- 2 Remove the SFP transceiver from the housing. The procedure to remove the SFP transceiver depends on the SFP transceiver type.
 - **Tab SFP transceiver:** Pull the tab of the SFP transceiver gently until the transceiver disengages from the port, and then pull the SFP transceiver out.



- **Button SFP transceiver:** Gently press the actuator/button on the front of the SFP transceiver until it clicks and the latch mechanism activates, releasing the SFP transceiver from the port.



- **Cam latch SFP transceiver:** Remove the rubber dust plug from the transceiver if present. Open the latch on the SFP transceiver and then pull the SFP transceiver out.



- 3 Protect the transceiver by inserting a clean rubber dust plug into the transceiver.

Required Cable

The following table lists the cables required to cable optical and electrical GbE SFP transceivers.

Item	Quantity
Fiber optic cable with appropriate connectors (depends on optical GbE SFP transceiver type) Distance: 500 meters up to 70 km (depends on optical GbE SFP transceiver type)	2 optic fiber cables (TX and RX) for each optical GbE SFP transceiver
Category 5 (CAT5E, minimum) STP ethernet cable Distance: 100 meters maximum	1 cable for each electrical GbE SFP transceiver

Cabling an Optical GbE SFP Transceiver

Perform the following steps to cable the TX and RX port of an optical GbE SFP transceiver.



CAUTION:

Invisible laser radiation may be emitted from disconnected fiber optic cables or connectors. Do not look into beams and never view directly with optical instruments. Laser radiation can cause permanent damage to the eye.

- 1 Clean each connector on the fiber optic cable. For cleaning instructions, refer to *Care and Cleaning of Optical Connectors* on page 91.
- 2 Verify the optical specifications of the transceiver against those of the equipment being connected. The optical power level and wavelength must be within range for proper operation.
- 3 Remove the dust caps from the optical ports.
- 4 Attach one end of a fiber optic cable to the TX port of the transceiver and the other end to the RX port of the GbE interface on the receiving equipment.
Important: Optical GbE SFP transceivers are equipped with a transmitter and receiver as indicated on top of their housing with TX, RX or arrow indicators. Always connect transmitters to receivers.
- 5 Attach one end of a fiber optic cable to the RX port of the transceiver and the other end to the TX port of the GbE interface on the transmitting equipment.

Cabling an Electrical GbE SFP Transceiver

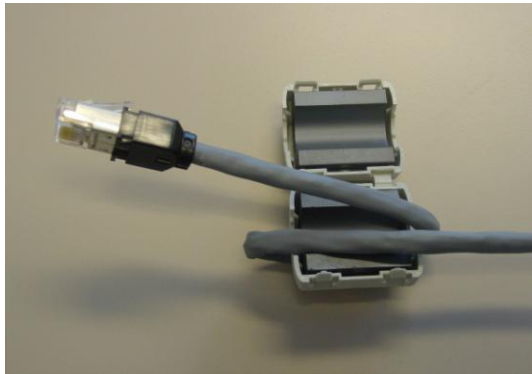
To ensure compliance with the most stringent international EMC standards, a snap-on ferrite core to reduce EMI emissions is required on the Cat 5E or Cat 6 STP (shielded twisted pair) or SFTP (shielded foiled twisted pair) GbE cable. Ferrite cores are supplied automatically when ordering electrical SFP GbE transceivers. You may also order additional ferrite cores for use on third party electrical SFP GbE transceivers.

**CAUTION:**

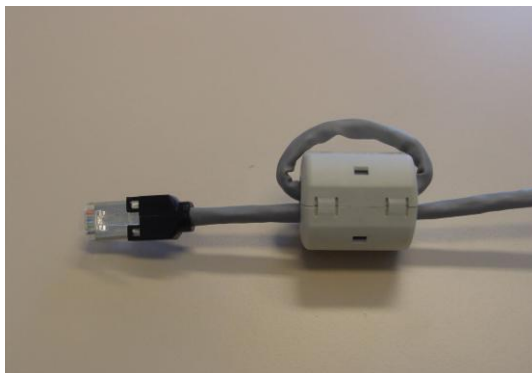
Never use UTP cabling. The use of SFTP (shielded foiled twisted pair) cabling with the most possible shielding efficiency is recommended in order to guarantee and maintain EMC properties of the unit and the installation.

Perform the following steps to snap a ferrite core on the ethernet cable.

- 1 Position the ferrite core as close as possible to the RJ-45 connector.
- 2 Loop one full turn of the cable around the ferrite core.



- 3 Clip the ferrite core on the cable.



Perform the following steps to cable an electrical GbE SFP transceiver.

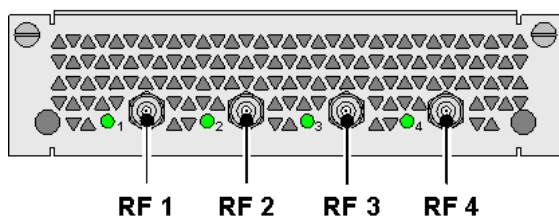
- 1 Connect one end of the ethernet cable (CAT5 or CAT6) to the electrical SFP transceiver inserted into the GbE I/O card.
- 2 Connect the other end to the IP network connection point.

Connecting RF Ports

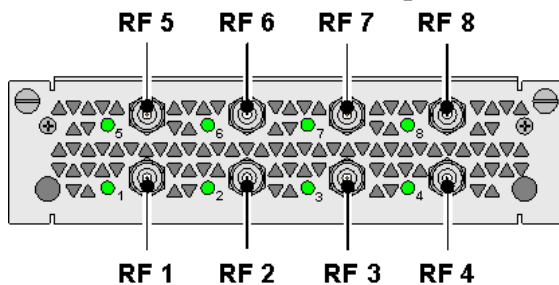
Introduction

The following illustrations show the RF port location of an 8-VSB Interface Cards with 4 RF inputs and with 8 RF inputs and a DVB S2/CI Interface Cards with 2 RF inputs and with 4 RF inputs:

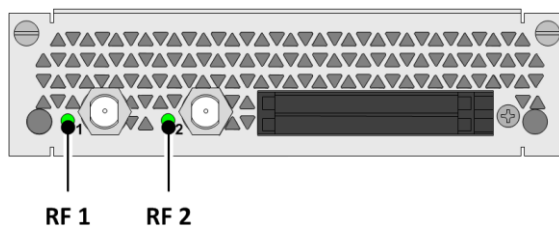
■ 8-VSB Interface Card: 4 RF Inputs



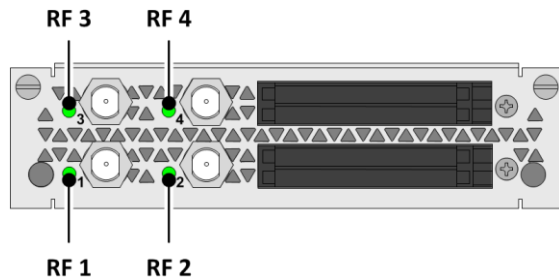
■ 8-VSB Interface Card: 8 RF Inputs



■ DVB-S2/CI Interface Card: 2 RF inputs and 2 DVB-CI slots



■ DVB-S2/CI Interface Card: 4 RF inputs and 4 DVB-CI slots



Important:

- The antenna ports of the 8-VSB and DVB-S2/CI Interface Card shall be protected by an external surge protector with a maximum let-through voltage of 600 volts

when subjected to an 8/20uS surge.

- For a DVB-S2/CI Interface Card with 4 RF inputs and 4 DVB-CI slots, only RF input port 1 and 2 support LNC-bias.

Required Cable

Use coaxial CATV cable (75 Ω) of good quality, for instance double braided or better, with F-type connectors for connecting the RF signals.

Important: F-type connectors should only accept a coaxial cable center conductor between 0.56 mm (0.022") and 1.07 mm (0.042") in diameter.



CAUTION:

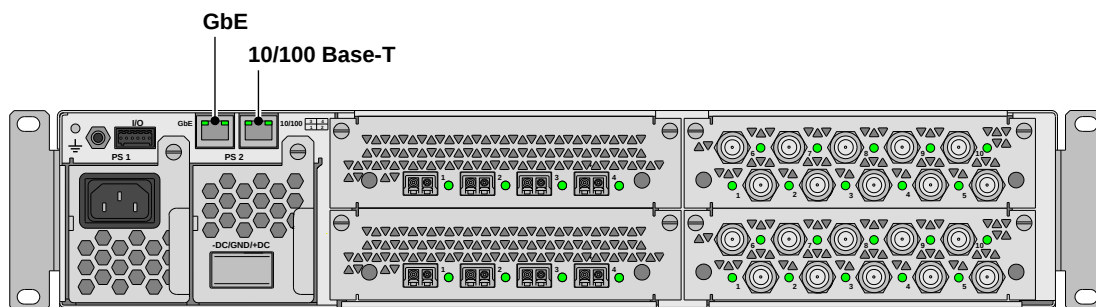
Coaxial cable center conductor larger or smaller than these diameters should not be used. If used, it may result in damage or loss of signal at the F-type connector.

Due to the fact that the larger diameter center conductor (for example greater than 1.07 mm (0.042")) will spread the contacts of an F-type connector further apart, once a larger diameter is inserted into a F-type connector, a smaller diameter center conductor should not be used in its place. If used, it may result in loss of signal at the F-type connector.

Cabling the Management Ports

Introduction

The following illustration shows the location of the 10/100 Base-T and 1GbE management port of the DCM.



Required Cable

Use Category 5 (CAT5E, minimum) STP Ethernet cable for connecting the management ports.

Important:

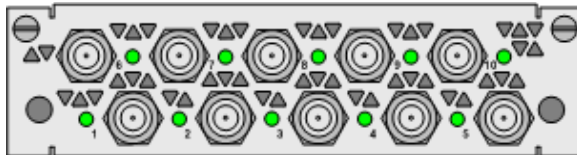
- Before integrating the management ports into the network, an initial setup must be done, see chapter *Operation* on page 51.
- The DCM can be configured and monitored via its user interface that can be opened via the web browser of a PC. It is strongly recommended to connect the PC via a network to the 10/100 Base-T management port of the DCM.
- Similar to the GbE ports with electrical SFP transceivers, an Ethernet cable connected to the management ports must be provided with snap-on ferrite to reduce EMI emissions. The procedure to snap a ferrite core on an Ethernet cable is describes in topic *Cabling an Electrical GbE SFP Transceiver* on page 41.

Connecting the ASI Interfaces

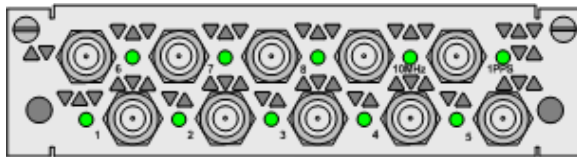
Introduction

The ASI and ASI SFN Interface Card of the DCM are provided with a number of ASI interfaces, which can be configured as input interface or output interface using the embedded GUI of the DCM. The following illustration depicts the back panel of the ASI Interface Card and ASI SFN Interface Card.

■ ASI Interface Card



■ ASI SFN Interface Card



Note: In the illustration, the numbers beside the ports are the numbers of the ASI ports used by the embedded GUI of the device.

Required Cable

Use coaxial CATV cable (75 Ω) of good quality, for instance double braided or better, for connecting the ASI in- and output signals.

Connecting the GPIO Contact Closure

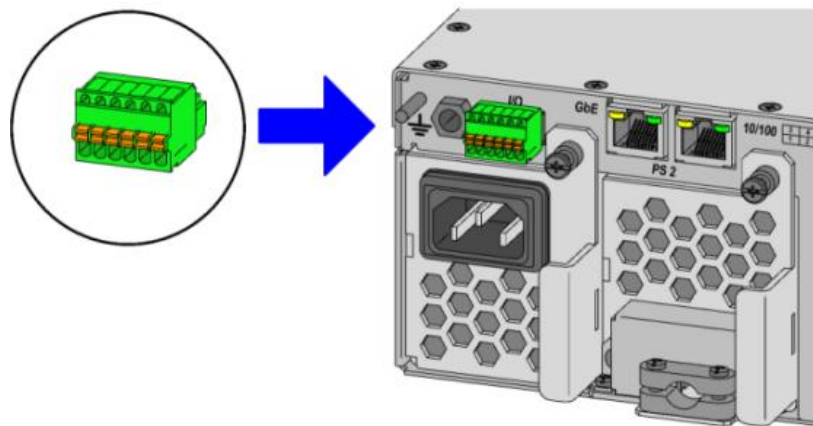
Introduction

The DCM is equipped with 5 General Purpose Input Output (GPIO) pins. With the exception of the first GPIO pin, which can be used to bypass for instance IPsec (Security Overrule), the GPIO pins can be configured to...

- trigger a Primary to Insertion Channel or an Insertion to Primary Channel substitution (digital program insertion)
- trigger a service backup transition
- reboot the DCM (Warm Restart)

More information concerning the GPIO contact closure functionality can be found in the *Digital Content Manager (DCM) Configuration Guide*.

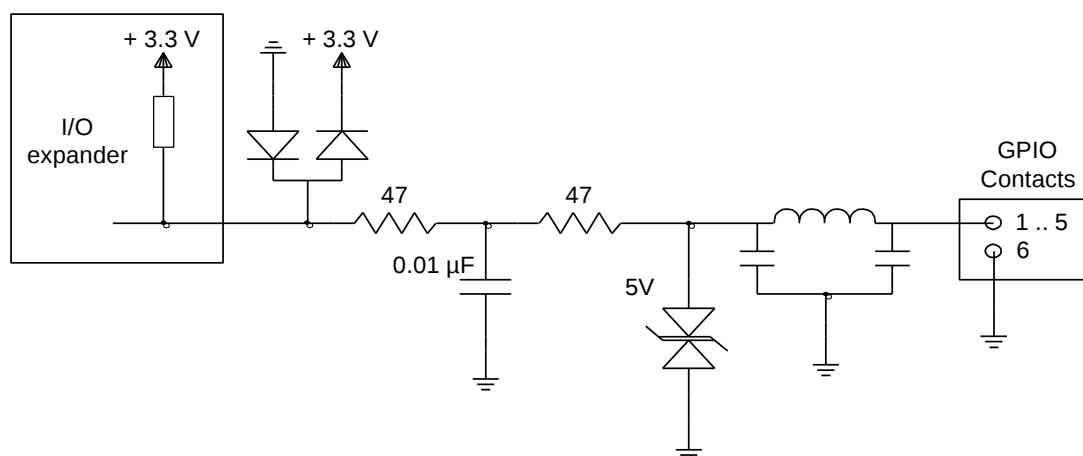
The following illustrations depict the GPIO contact closure location with mating *field-wiring* connector.

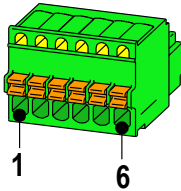


The connector for field wiring is available in the accessory set shipped with the device.

GPIO Contact Information

The following illustration depicts the schematic representation of the GPIO contacts.



Pin Layout	Pin	Signal	Function
	1	3.3 V dc	IP sec
	2	3.3 V dc	Configurable
	3	3.3 V dc	Configurable
	4	3.3 V dc	Configurable
	5	3.3 V dc	Configurable
	6	Ground	

For correct use of the connector, refer to the following table.

For US

Wire size	AWG 26 to 20
Strip length	0,315 in.

International

Wire diameter	0,4 to 0,8 mm
Wire area	0,13 to 0,52 mm ²
Strip length	8 mm

Required Cable

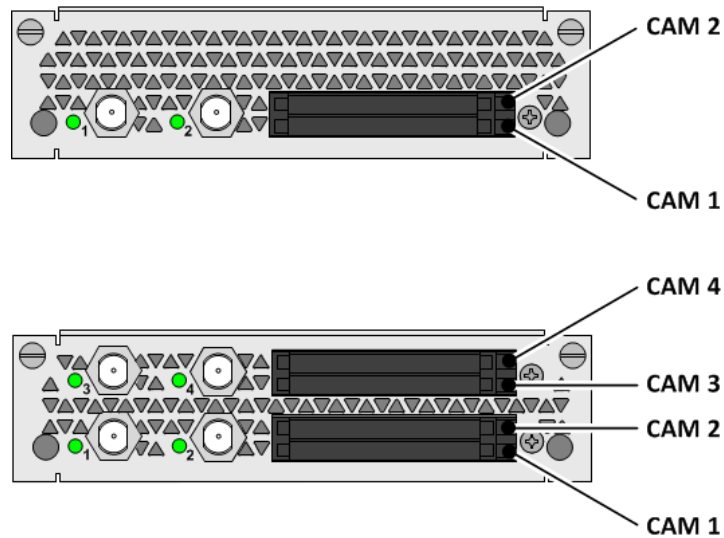
Use shielded cable with the shield ground connected to the ground (pin 6) connector pin terminal.

Tip: Using ferrules for flexible wires is strongly recommended.

Inserting and Removing CI-CAMs and Smart Cards

Introduction

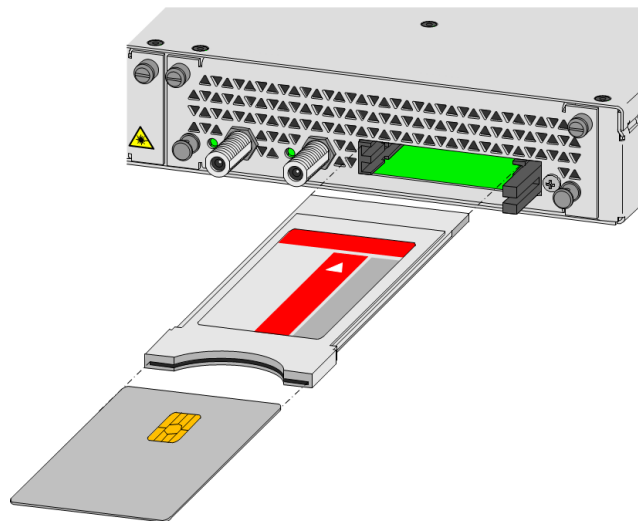
The following illustration shows the location of the CAM slots for both card versions.



Note: For a list with supported CAMs, please contact your Cisco representative.

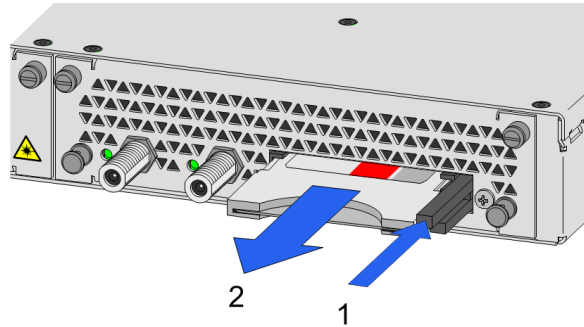
Inserting or Removing CI-CAMs

To insert the CI-CAM into a slot of the DVB S2/CI Interface Card, slide the CI-CAM with its label side up carefully into the slot until the CI-CAM locks into the slot. The eject button is pushed out.



Inserting and Removing CI-CAMs and Smart Cards

To remove the CI-CAM, push in the eject button beside the CI-CAM until the CI-CAM ejects from the slot.



Inserting and Removing Smart Cards

Inserting a smart card into a CI-CAM can be done by sliding the card, with the PAD layout of the integrated circuit up, carefully into the slot of the CI-CAM until the card touches the stop of the CI-CAM. Removing a smart card from a CI-CAM can be done by pulling the card carefully out the CI-CAM.

3

Operation

Introduction

This chapter covers the initial setup of a DCM. Since a DCM with software package version 8.5 or higher provides a number of security features to offer more network security, the initial setup for a DCM with software package version 8.5 or higher differs from a DCM with lower software package version.

In This Chapter

- Checking the Software Package Version 52
- Performing the Initial Setup of the DCM with Software
Version lower than 8.5 55
- Performing the Initial Setup of a DCM with Software Package
Version 8.5 or higher 57
- Accessing the Embedded Graphical User Interface..... 80
- Configuring and Monitoring the DCM 82

Checking the Software Package Version

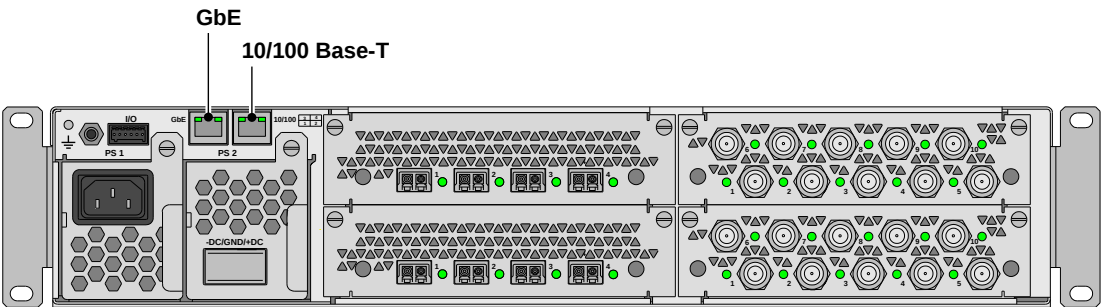
Introduction

The procedure to execute the initial setup of a DCM depends on the installed software package version. A DCM with software package version 8.5 or higher provides additional security features for which security settings must be configured during the initial setup.

Note: The management ports of a DCM with software package version 10.10 or higher can be integrated into IPv4/IPv6 dual-stack networks. During the initial security configuration, only IPv4 addresses can be assigned to the management ports of the DCM. Once this initial security configuration is completed, IPv6 addresses can be assigned as described in the configuration guide or online help of the DCM.

Connecting a PC to the DCM

Checking the version of the software that is installed on the DCM must be done by connecting a PC directly to a management port of the DCM. The DCM provides a 10/100 Base-T and a GbE management port, use a crossover cable for a 10/100 Base-T to 10/100 Base-T connection or a straight cable for a GbE to GbE connection. The following illustration locates the management ports of the DCM housing.



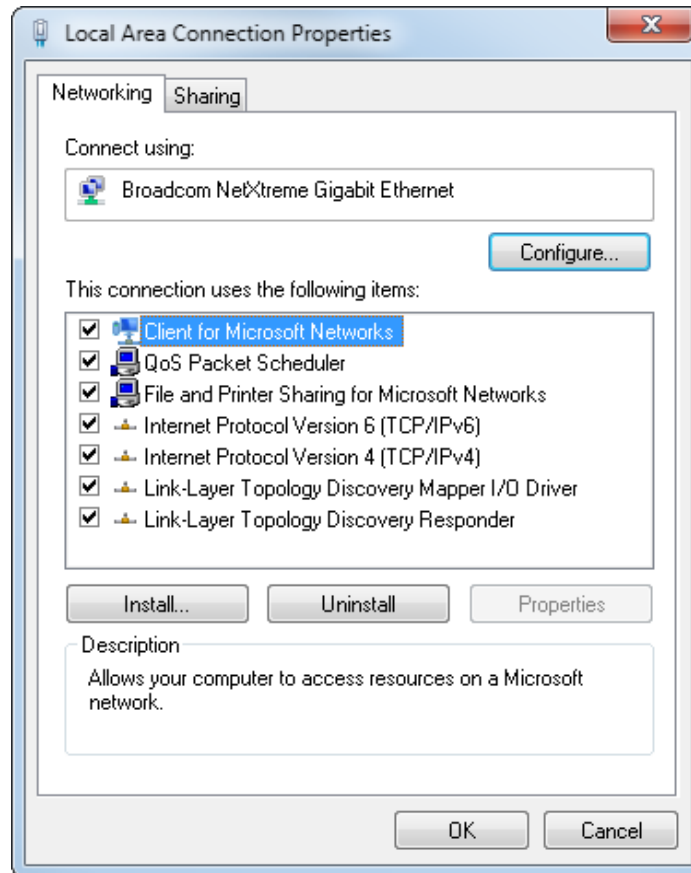
When the DCM leaves our assembly line, the management ports are provided with default network settings. These settings are:

Parameter	10/100Base-T	GbE
IP address	150.158.230.250	150.158.231.250
Subnet Mask address	255.255.255.000	255.255.255.000
Gateway	-	-

To establish connection, the network settings of the PC must be configured in such a way that it belongs to the same subnet. For example, to connect the GbE port of the DCM to a GbE port of a PC, the IP address of the PC's GbE port can be set to 150.158.231.1 and the subnet mask to 255.255.255.0. The following steps describe how to configure the IP settings of a PC running Windows 7.

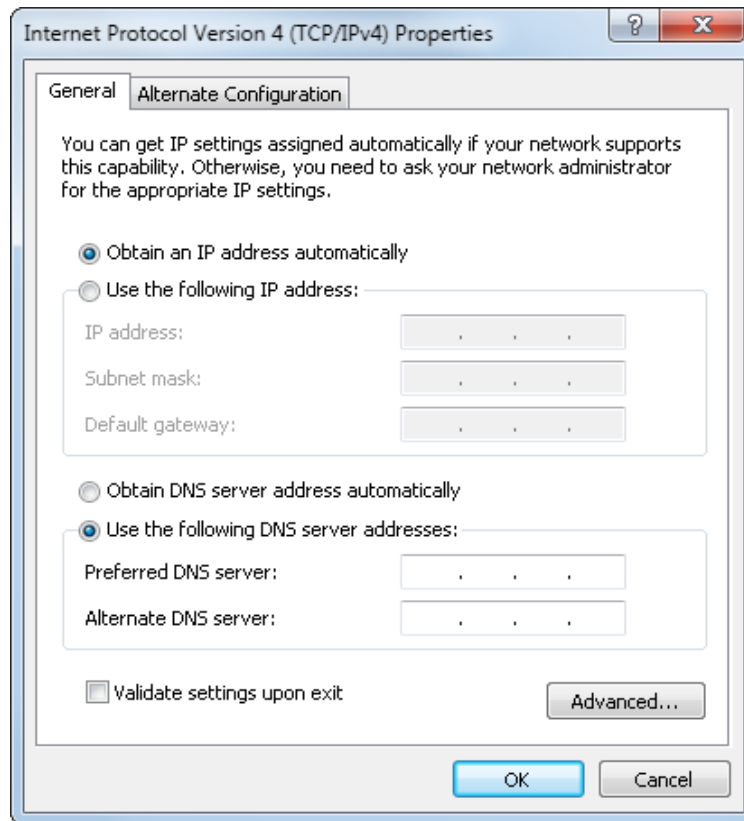
- 1 Open the **Control Panel** of Windows 7 by clicking on **Start** and then on **Control Panel**.
- 2 In the **Control Panel** window, double-click on **Network Connections** to open the network connections.
- 3 Right-click on the **Local Area Connection** of the port that is used to establish connection with the DCM and select **Properties**.

Result: The **Properties** dialog of the selected port appears.



- 4 In the **This connection uses the following items** box, select **Internet Protocol Version 4 (TCP/IP)** and click on **Properties**.

Result: The **Internet Protocol Version 4 (TCP/IP) Properties** dialog is displayed.



- 5 Select the **Use the following IP address** selection button and enter the IP address and subnet mask in the corresponding boxes.

Note: Leave all other fields blank.

- 6 Click on the **OK** button to confirm.

To check the Software Package Version

Once a PC is connected to one of the management ports of the DCM and the network settings of PC port are properly configured, the version of the software package installed on the DCM can be checked by entering the default IP address of the management port in the address bar of the web browser of the PC.

- 10/100 Base-T management port: 150.158.230.250
- GbE management port: 150.158.231.250

For a DCM with software package version lower than 8.5, the login page of the web browser user interface will be displayed. Do not disconnect the PC from the DCM and proceed with the procedures described in topic *Performing the Initial Setup of the DCM with Software Version lower than 8.5* on page 55.

For a DCM with software package version 8.5 or higher, the message *This Connection is Untrusted* (Mozilla Firefox) or *There is a problem with this website's security certificate* (Microsoft Internet Explorer) will be displayed. Do not disconnect the PC from the DCM and proceed with the procedures describes in topic *Performing the Initial Setup of a DCM with Software Package Version 8.5 or higher* on page 57.

Performing the Initial Setup of the DCM with Software Version lower than 8.5

Introduction

For a DCM with software package version lower than 8.5, the initial configuration setup consists of assigning network settings to both the 10/100 Base-T management port and GBE management port. This network assignment must be done using Cisco's IP Configuration Tool that can be found on the Client Tools CD-Rom (part number 4000976) shipped with the device.

Notes:

- Ethernet interfaces with conflicting IP address may cause serious network problems. Contact your network administrator for correct IP settings.
- Both management ports should be connected to a different subnet.
- Because only one gateway address may be assigned to both Ethernet ports, the ports must be configured as follows:
 - Configure the Ethernet port of which the gateway does not belong to the subnet. Specify *0.0.0.0* for the gateway address.
 - Configure the Ethernet port of which the gateway belongs to the subnet.

About Cisco's IP Configuration Tool

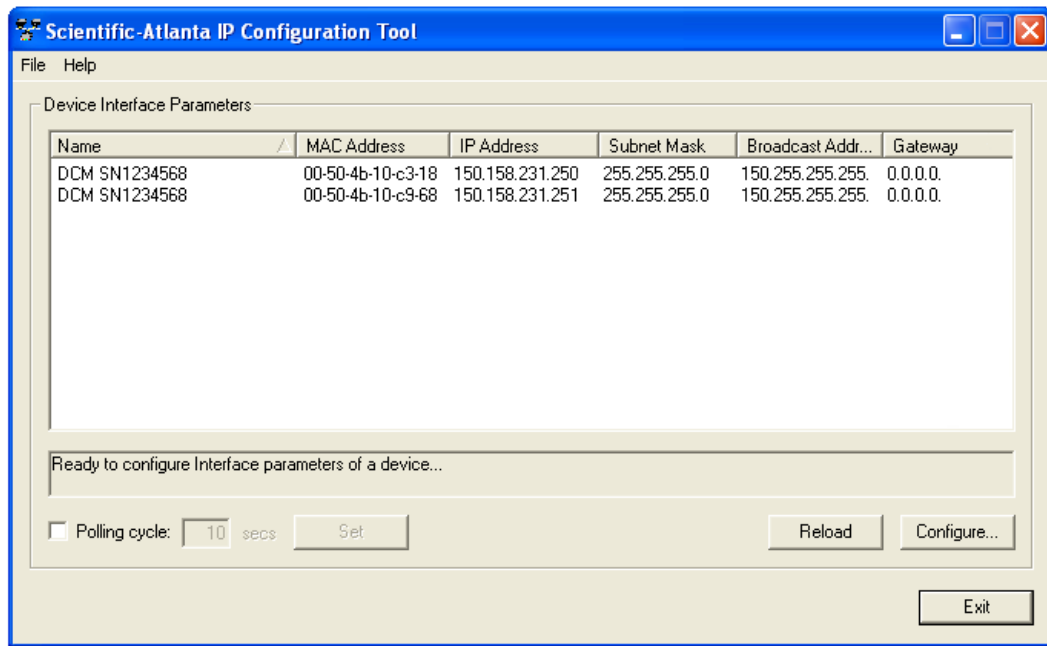
The IP Configuration tool is a software tool that allows changing IP settings from a remote location. This tool uses a multicast protocol to establish communication between IP-devices connected to the network and the PC running this software tool. An IP Configuration server is installed on the DCM and starts running at startup. The IP Configuration client runs on the remote PC connected via an IP network to the DCM. When the client starts the IP Configuration tool, it lists all available servers supporting the protocol.

To Adapt the IP Settings

Perform the following procedure to assign IP addresses to the DCM.

- 1 The PC is still connected to the DCM, see topic *Checking the Software Package Version* on page 52.
- 2 Close the web browser and start the **IP Configuration Tool** on the PC.

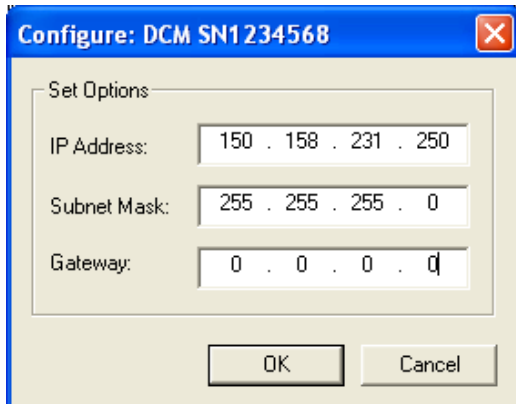
Result: The tool returns a list the management ports with the following information: MAC address, name, serial number, IP address, subnet mask address, broadcast address, and gateway address.



Hint: The GbE port is the port with the highest MAC address.

- 3 Select the port in question and press the **Configure** command button.

Result: The **Configure** dialog is displayed.



- 4 Enter the **IP Address**, the **Network Mask**, and the **Gateway** and press the **Apply** command button to confirm or the **Cancel** command button to abort the operation.
- 5 Repeat step 3 and 4 for the second Ethernet port.

The DCM is now ready to be integrated into the network of the application.

Performing the Initial Setup of a DCM with Software Package Version 8.5 or higher

Introduction

When the DCM with software package version 8.5 or higher leaves Cisco's assembly line, particular security settings must be configured before the device can be integrated into an application. This initial security configuration must be done together with the network configuration of the management Ethernet ports of the DCM housing during the initial login to the web browser user interface of the device.

The communication between the DCM and the PC running the web browser can be done using HTTP (Hypertext Transfer Protocol) or HTTPS (Hypertext Transfer Protocol Secure). For HTTPS, the DCM is provided with a CA certificate generator which can be used to create a CA certificate for the web browser. During the initial security configuration, the communication between the PC running the web browser and the DCM is done using HTTPS. Therefore a certificate must be created and installed into the web browser before starting this set up.

Notes:

- Ethernet interfaces with conflicting IP address may cause serious network problems. Contact your network administrator for correct IP settings.
- Both management ports should be connected to a different subnet.
- Only one gateway address can be assigned to both Ethernet ports,
- A CA certificate is valid for 10 years, after 10 years a new CA certificate is generated on the DCM and must be installed. Remark that the start time of this certificate is based on the clock of the device (current date and time). The procedure to install such certificate is described in the configuration guide that can be accessed via the web browser user interface of the DCM.

Downloading and Installing the Web Browser CA Certificate

Introduction

The procedure to install a CA certificate depends on the web browser and the software package version of the DCM. The following sub topics provide the procedure for:

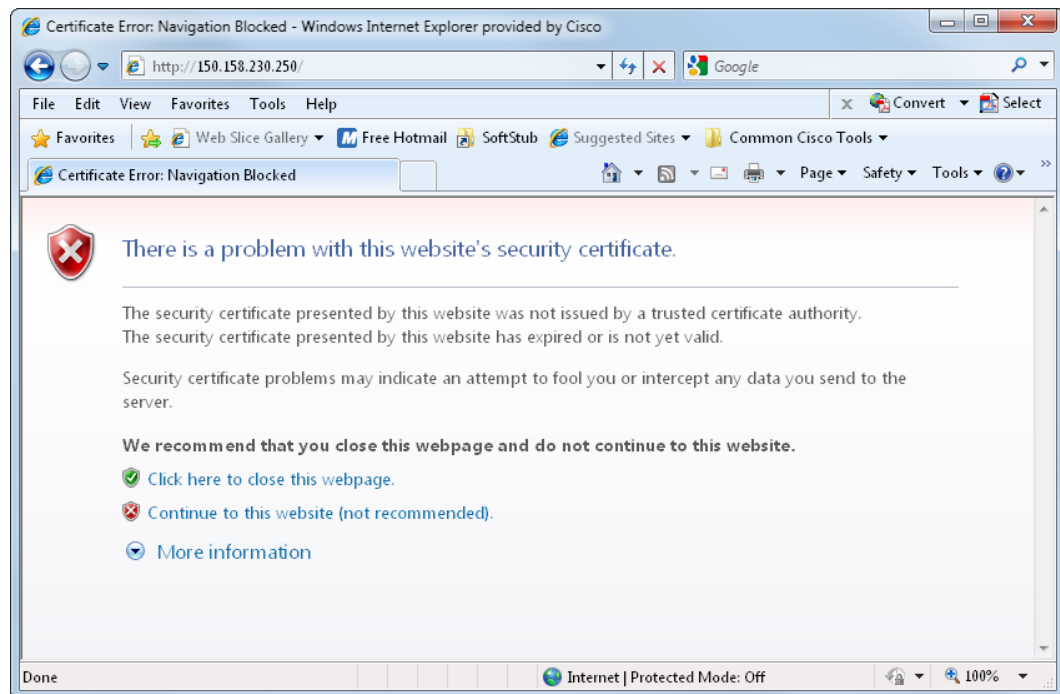
- Microsoft Internet Explorer and a DCM with software package version lower than 10.10
- Microsoft Internet Explorer and a DCM with software package version 10.10 or higher

- Mozilla Firefox and a DCM with software package version lower than 10.10
- Mozilla Firefox and a DCM with software package version 10.10 or higher

To Install the Certificate into the Microsoft Internet Explorer Web Browser for a Device with Software Package Version lower than 10.10

The following procedure describes how to install the certificate into the Microsoft Internet Explorer web browser for a device with software package version lower than 10.10.

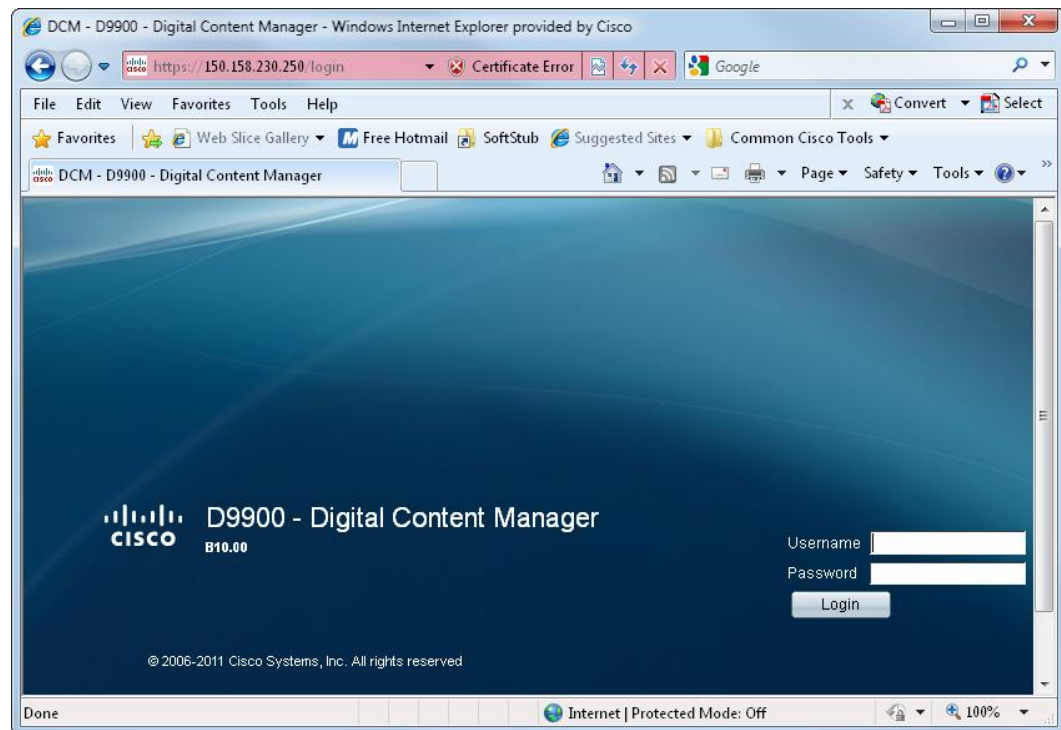
- 1 The PC is still connected to the DCM and the web browser shows the following page (see topic *Checking the Software Package Version* on page 52).



- 2 Click on the **Continue to this website (not recommended).** link.

Performing the Initial Setup of a DCM with Software Package Version 8.5 or higher

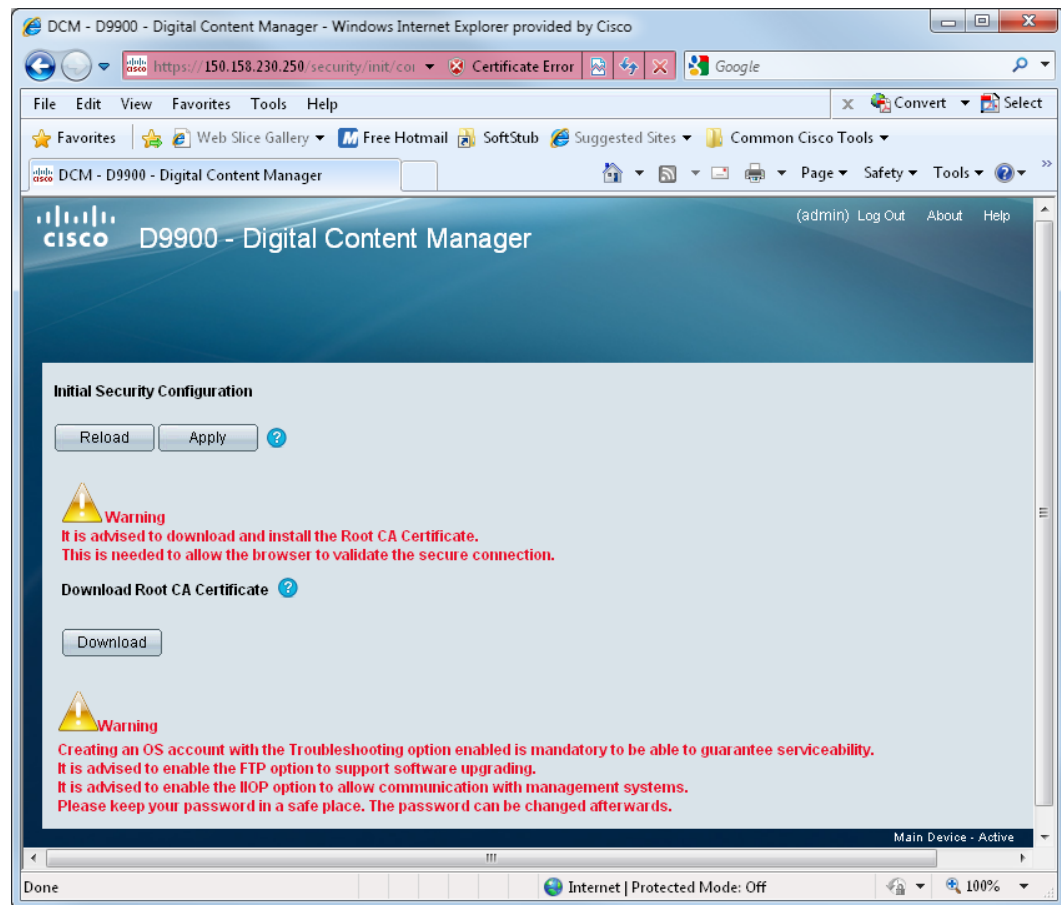
Result: The DCM login page appears.



- 3 Enter *admin* in both the **Username** and **Password** box and press the **Login** button.

Note: The username and the password are case sensitive.

Result: The **Initial Security Configuration** page is displayed.



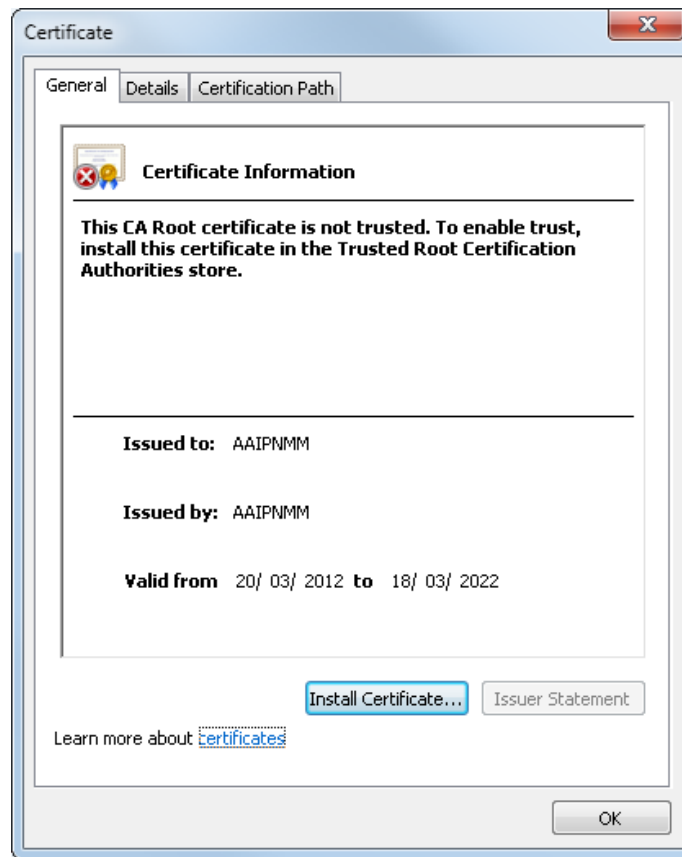
- 4 Under **Download Root CA Certificate**, press the **Download** button.

Result: The **File Download - Security Warning** dialog is displayed.



- 5 Point to the **Open** button.

Result: The **Certificate** dialog is displayed.

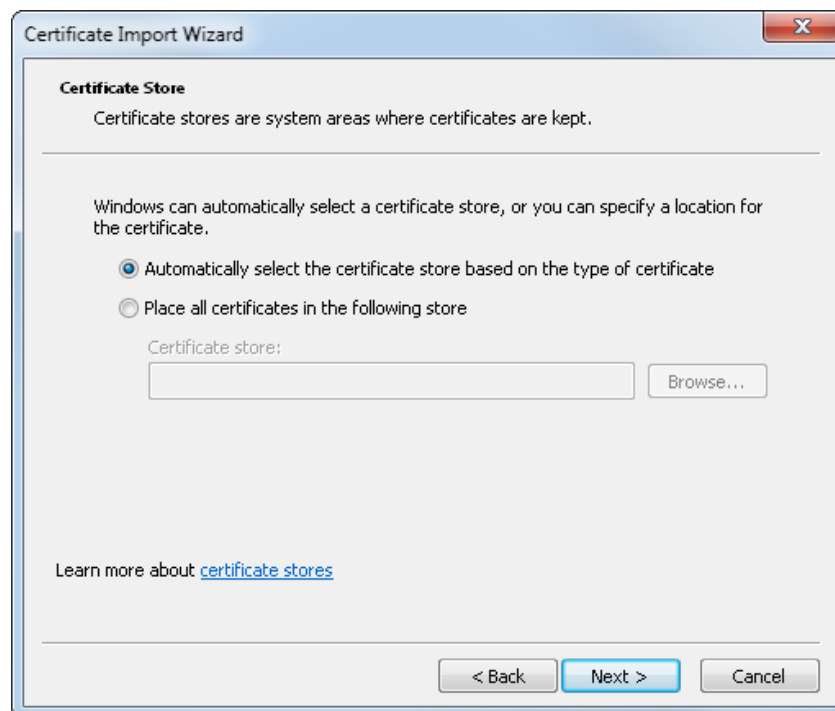


- 6 In the **General** tab page, point to **Install Certificate...** button.

Result: The **Certificate Import Wizard** dialog appears.

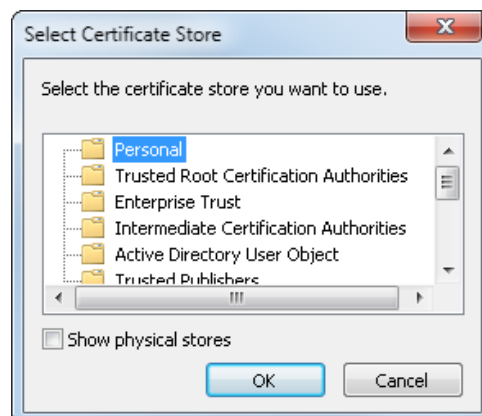


- 7 Point to the **Next >** button.



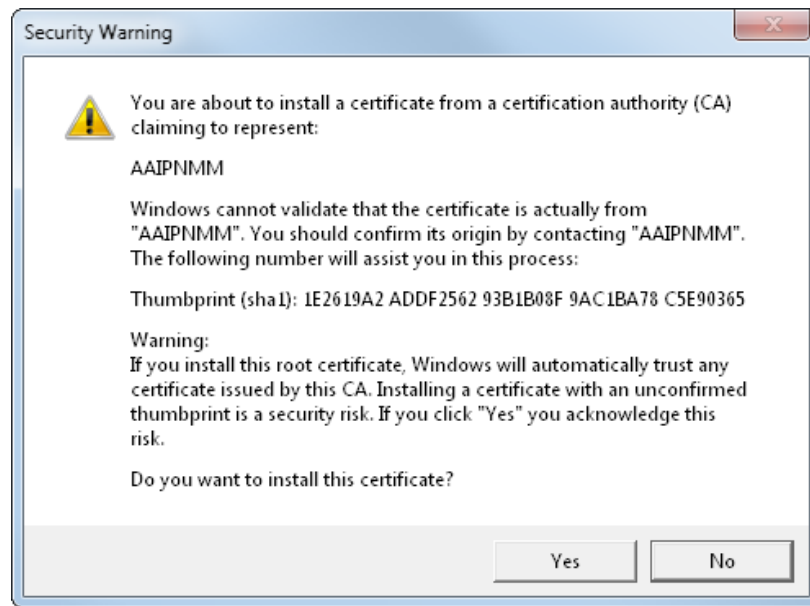
- 8 Select **Place all certificates in the following store** and click on **Browse...**

Result: The **Select Certificate Store** page is displayed.



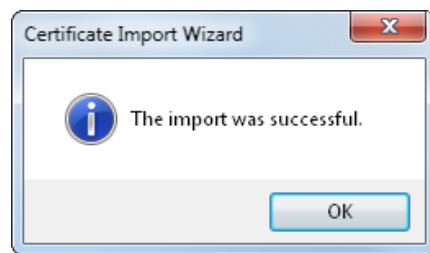
- 9 Select *Trusted Root Certification Authorities* and click on **OK** to confirm and to close the dialog.
- 10 In the **Certificate Import Wizard** dialog, click on **Next >**.
- Result:** The **Complete the Certificate Import Wizard** page appears.
- 11 Click on **Finish**.

Result: The following security warning is displayed.



12 Click on **Yes**.

Result: The following message appears.



13 Click on **OK**.

14 Close the **Certificate** dialogs by clicking on **OK**.

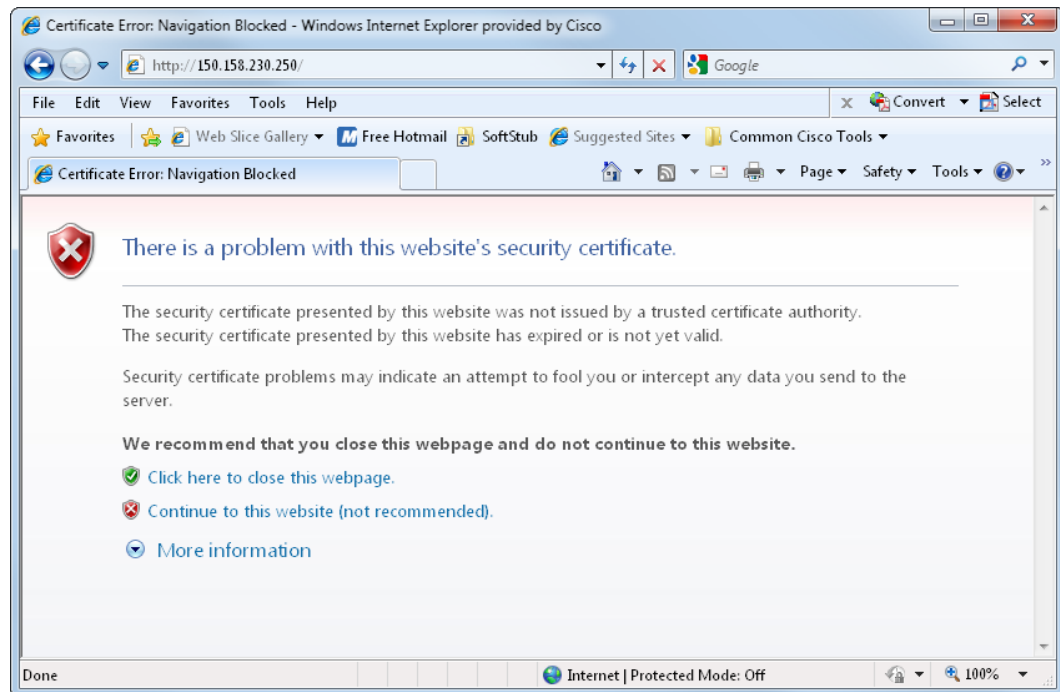
15 Close the web browser.

To Install the Certificate into the Microsoft Internet Explorer Web Browser for a Device with Software Package Version 10.10 or Higher

The following procedure describes how to install the certificate into the Microsoft Internet Explorer web browser for a device with software package version 10.10 or higher.

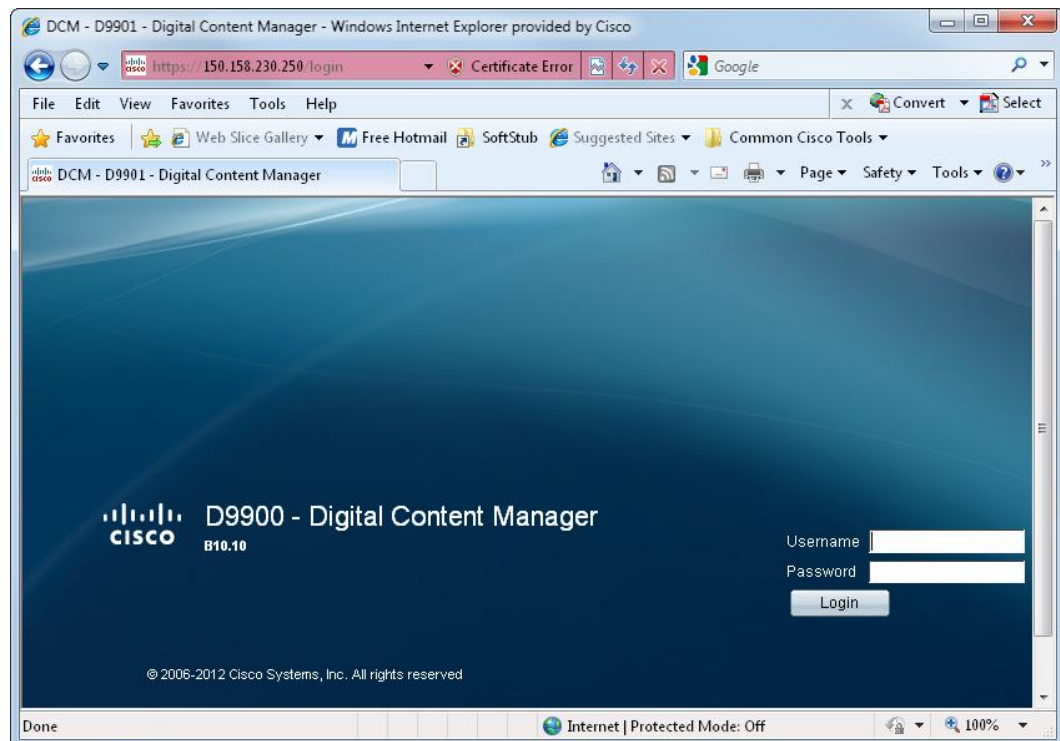
Chapter 3 Operation

- 1 The PC is still connected to the DCM and the web browser shows the following page (see topic *Checking the Software Package Version* on page 52).



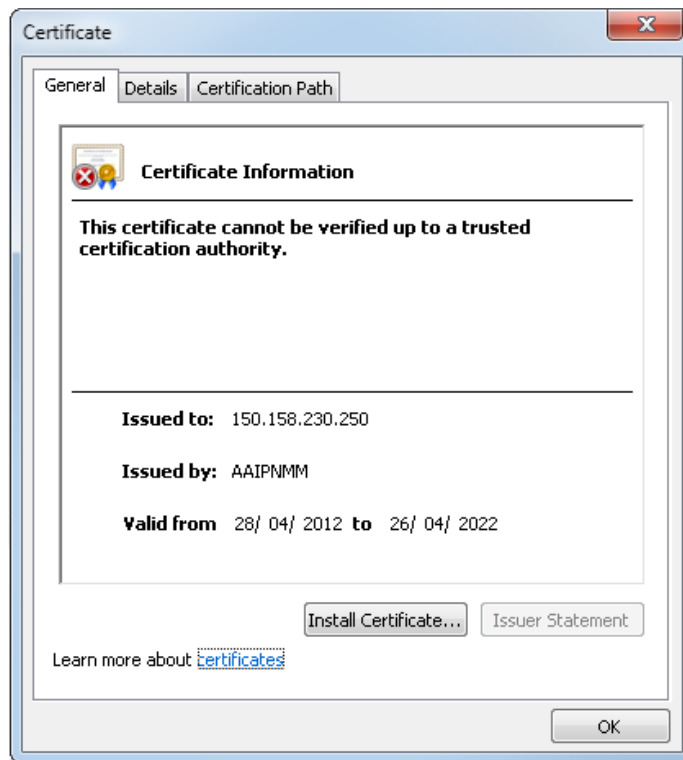
- 2 Click on the **Continue to this website (not recommended).** link.

Result: The DCM login page appears.



- 3 Click on **Certificate Error** in the address bar of the web browser and point to **View certificates** in the **Certificate Invalid** popup.

Result: The **Certificate** dialog appears.



- 4 Select the **Certification Path** tab.



- 5 In the **Certificate Path** box, select the root certificate and click on **View Certificate**.

Result: A new **Certificate** dialog with information of the root certificate is displayed.

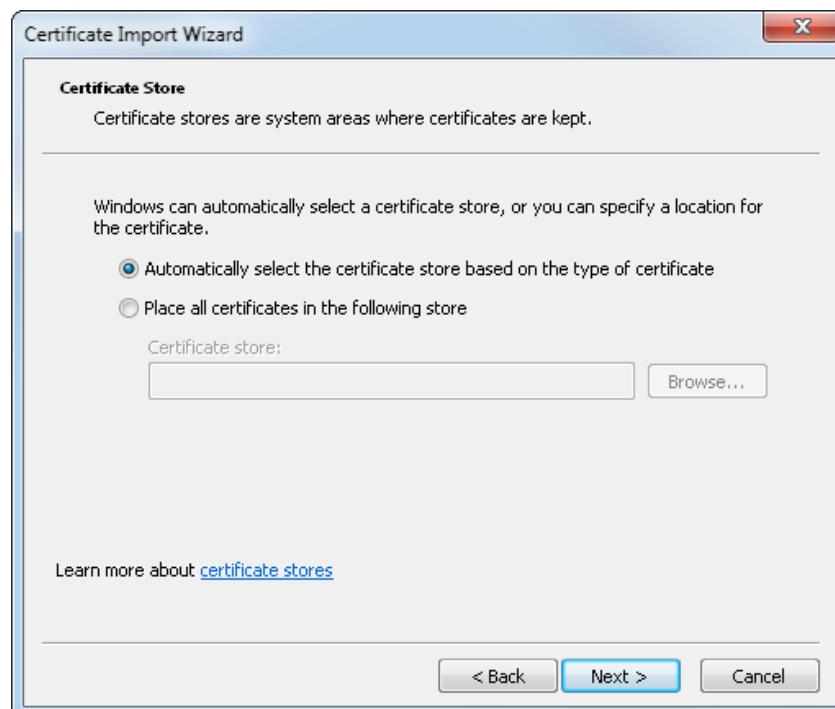
- 6 Click on **Install Certificate...**

Result: The **Certificate Import Wizard** appears.



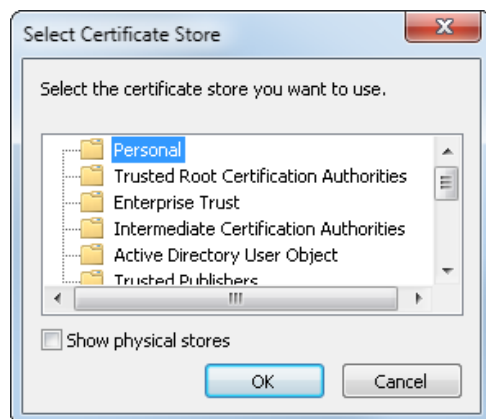
- 7 Click on **Next >**.

Result: The following wizard page appears.



- 8 Select **Place all certificates in the following store** and click on **Browse...**

Result: The **Select Certificate Store** dialog appears.



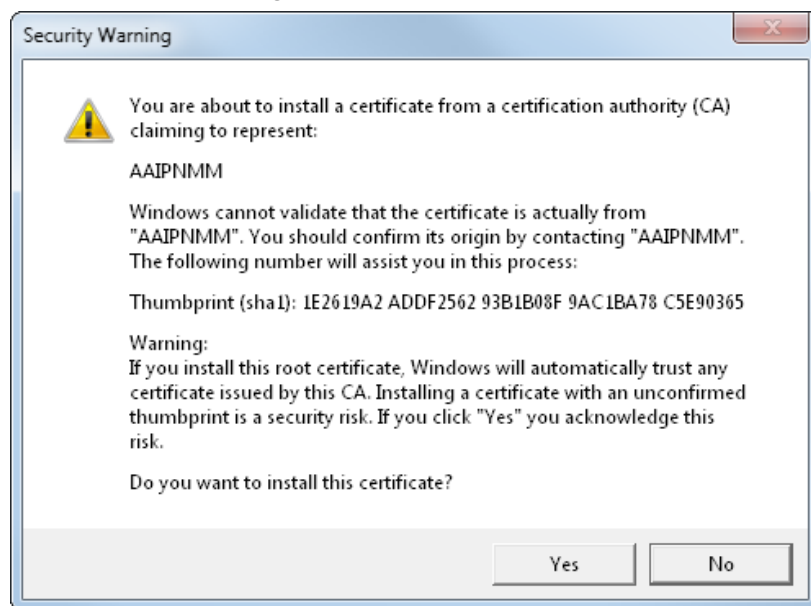
- 9 Select **Trusted Root Certification Authorities** and click on **OK** to confirm and to close the dialog.

- 10 In the **Certificate Import Wizard** dialog, click on **Next >**.

Result: The **Complete the Certificate Import Wizard** page appears.

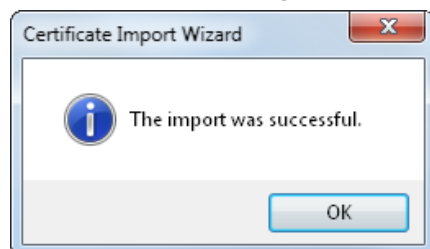
- 11 Click on **Finish**.

Result The following **Security Warning** popup appears.



- 12 Click on **Yes**.

Result: The following **Certificate Import Wizard** popup appears.

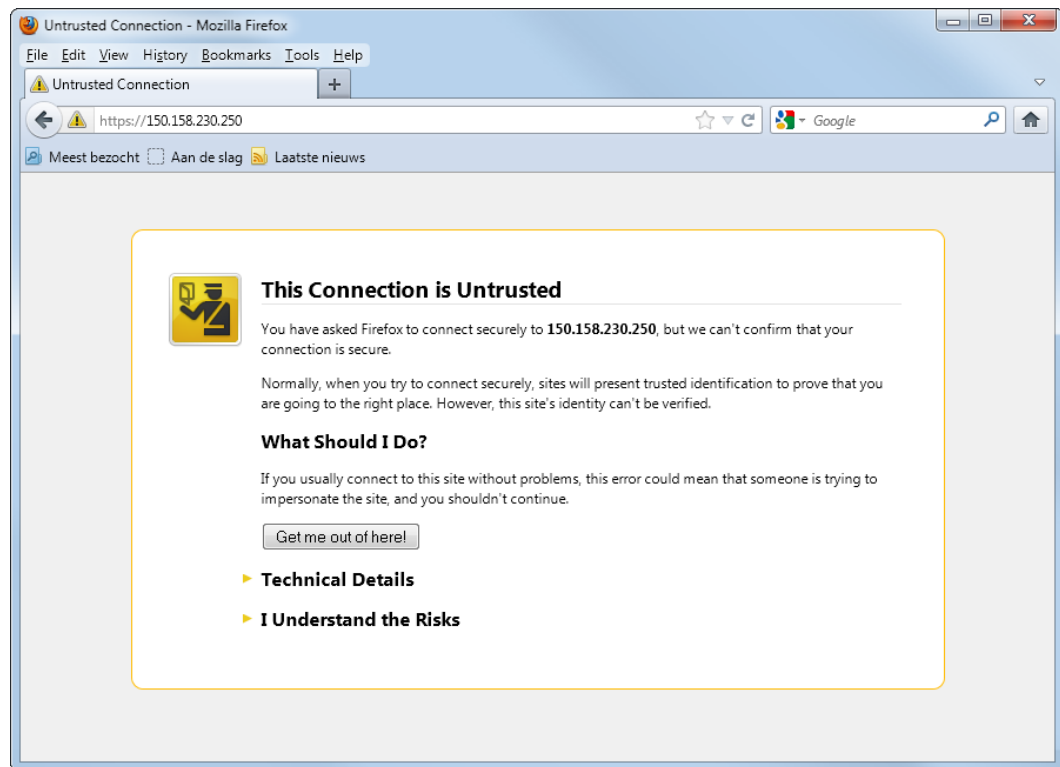


- 13 Click on **OK**.
- 14 Close the **Certificate** dialogs by clicking on **OK**.

To Install the Certificate into the Mozilla Firefox Web Browser for a Device with Software Package Version lower than 10.10

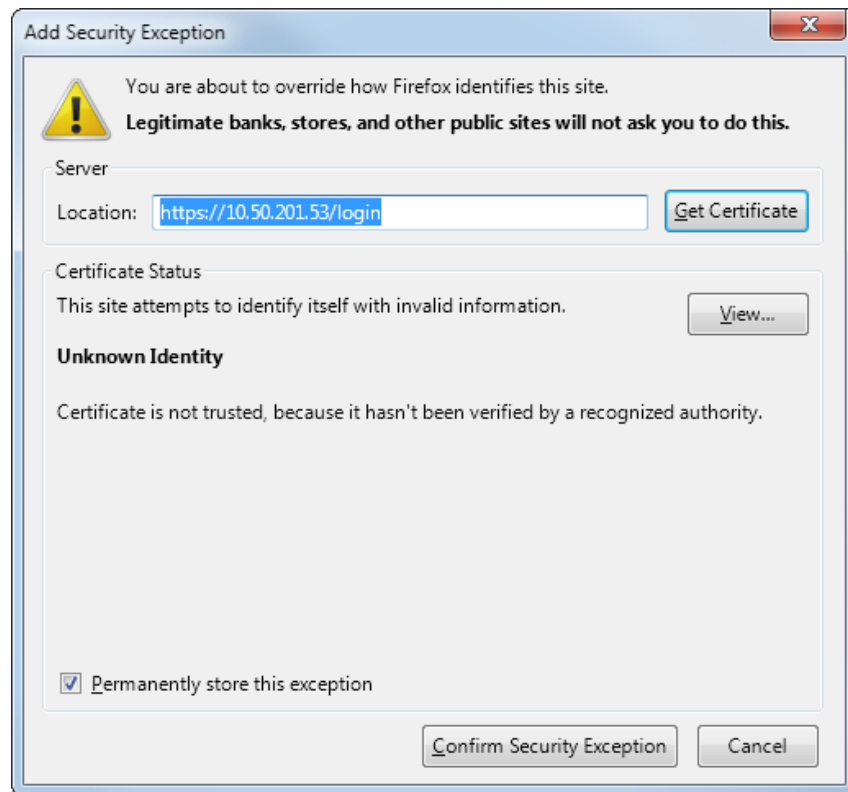
The following procedure describes how to install the certificate into the Mozilla Firefox web browser for a device with software package version lower than 10.10.

- 1 The PC is still connected to the DCM and the web browser shows the following page (see topic *Checking the Software Package Version* on page 52).



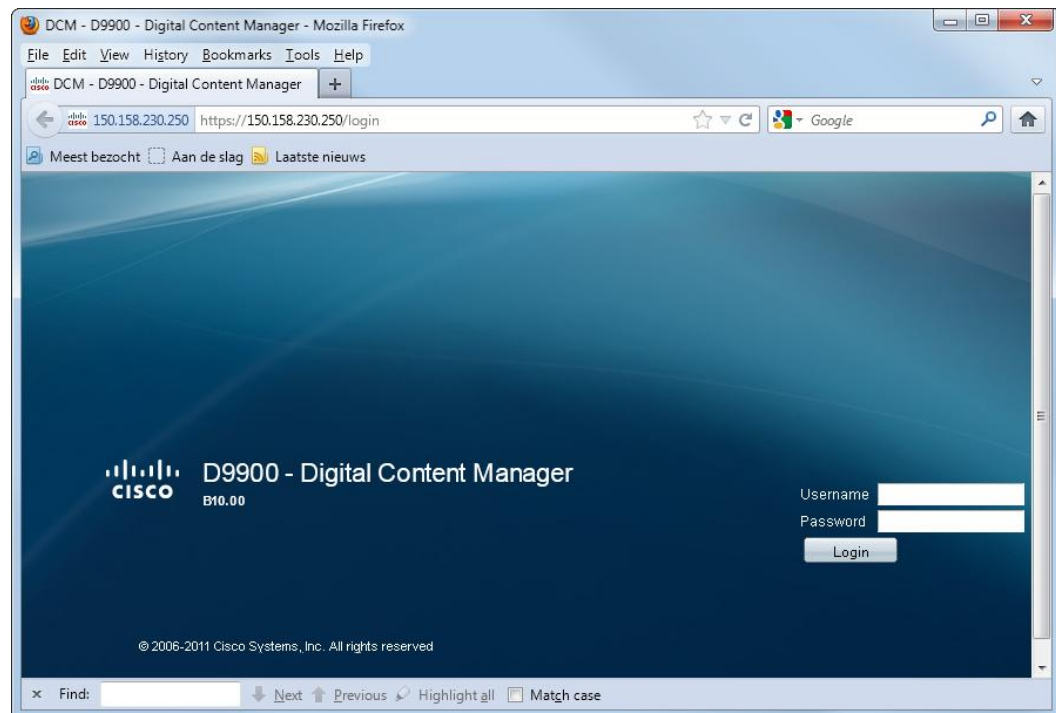
- 2 Click on the **I Understand the Risks** link and point to **Add Exception....**

Result: The **Add Security Exception** dialog is displayed.



- 3 Clear the **Permanently store this exception** check box and point to the **Confirm Security Exception** button.

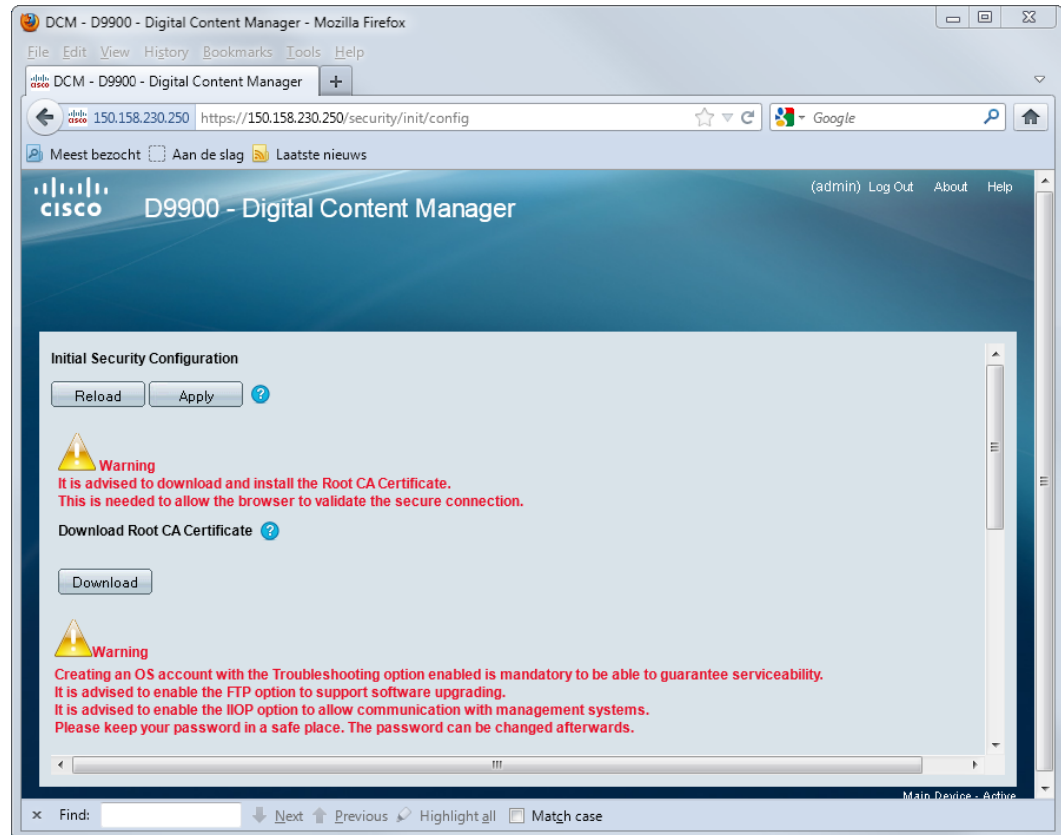
Result: The login page of the DCM web browser user interface.



- 4 Enter *admin* in both the **Username** and **Password** box and press the **Login** button.

Note: The username and the password are case sensitive.

Result: The **Initial Security Configuration** page is displayed.

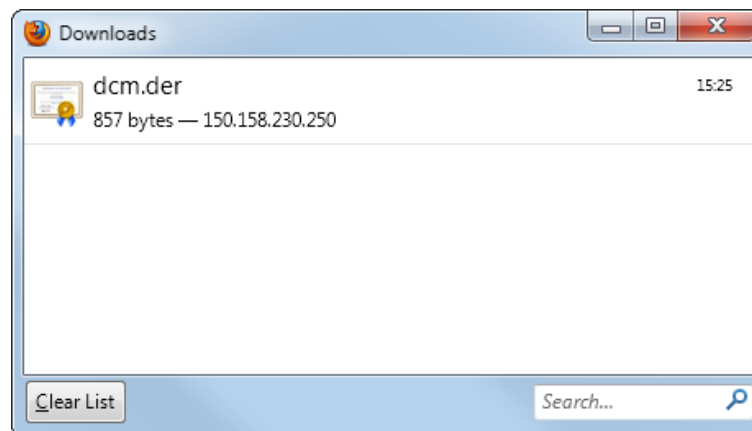


- 5 Press the **Download** button.

Result: The **Opening** dialog is displayed.

- 6 Select the **Save File** selection button and point to **OK** button.

Result: The **Downloads** list appears.



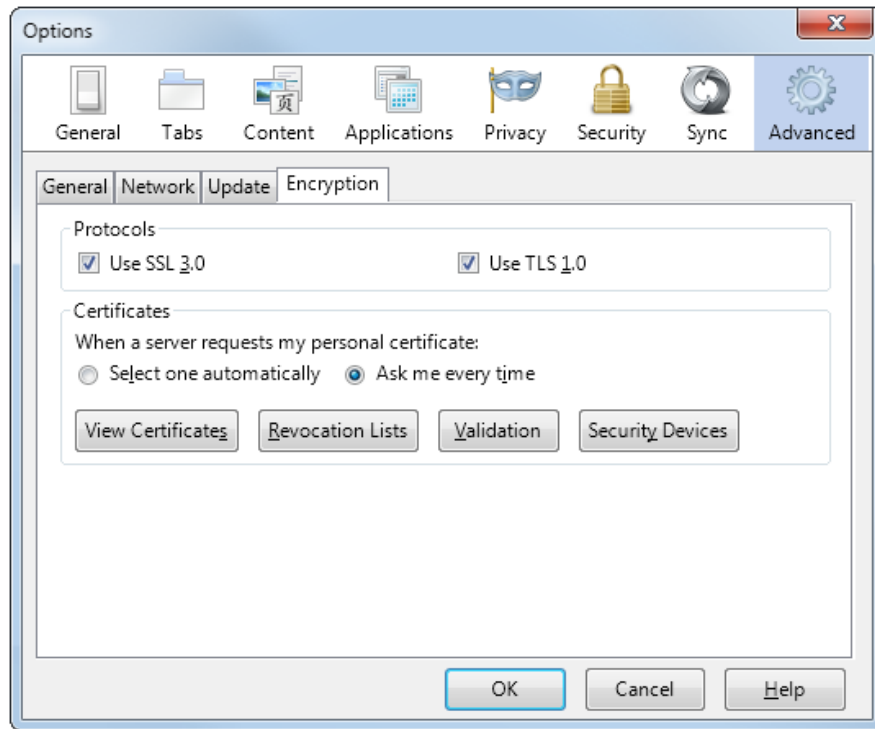
Hint: Right-click on the *dcm.der* file and point to **Open Containing Folder** in the short-cut menu to see the location where the file is saved.

- 7 Close the **Downloads** list.
- 8 In the menu bar of the web browser, click on **Tools** and select **Options**.

Result: The **Options** dialog appears.

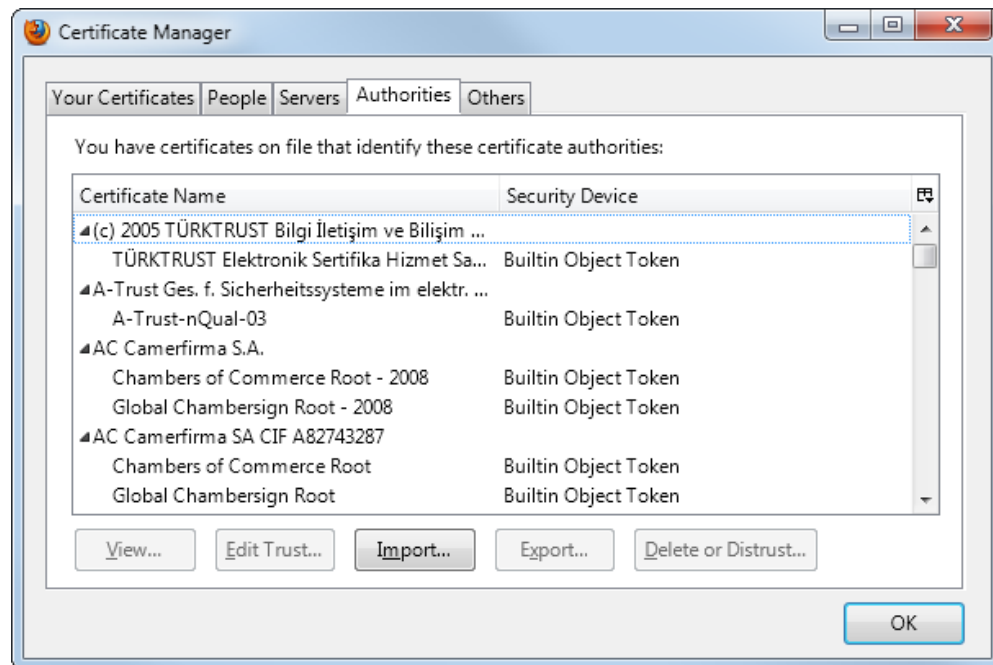
- 9 Point to **Advanced** and select the **Encryption** tab.

Result: The **Encryption** tab page is displayed.



- 10 Click on the **View Certificates** button.
Result: The **Certificate Manager** dialog is displayed.
- 11 Click on the **Authorities** tab.

Result: The **Authorities** tab page appears.



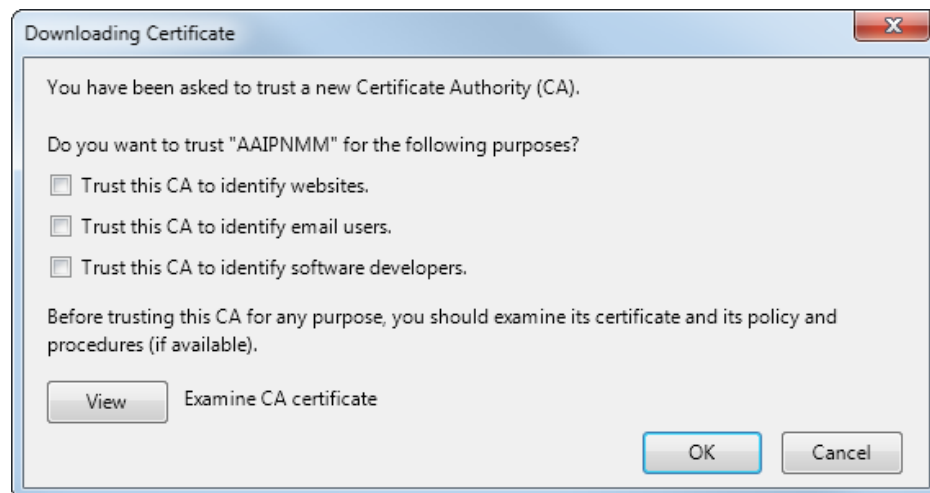
- 12 Point to **Import...**

Result: The **Select File containing CA certificate(s) to import** dialog is displayed.

- 13 Browse to the location of the DCM certificate (*dcm.der*).

- 14 Select this certificate and point to **Open**.

Result: The **Downloading Certificate** dialog is displayed.



- 15 Verify if the field in quotes in the **Downloading Certificate** dialog corresponds with the Host ID of the DCM.

- 16 Tick the **Trust this CA to identify web sites.** check box and point to **OK**.

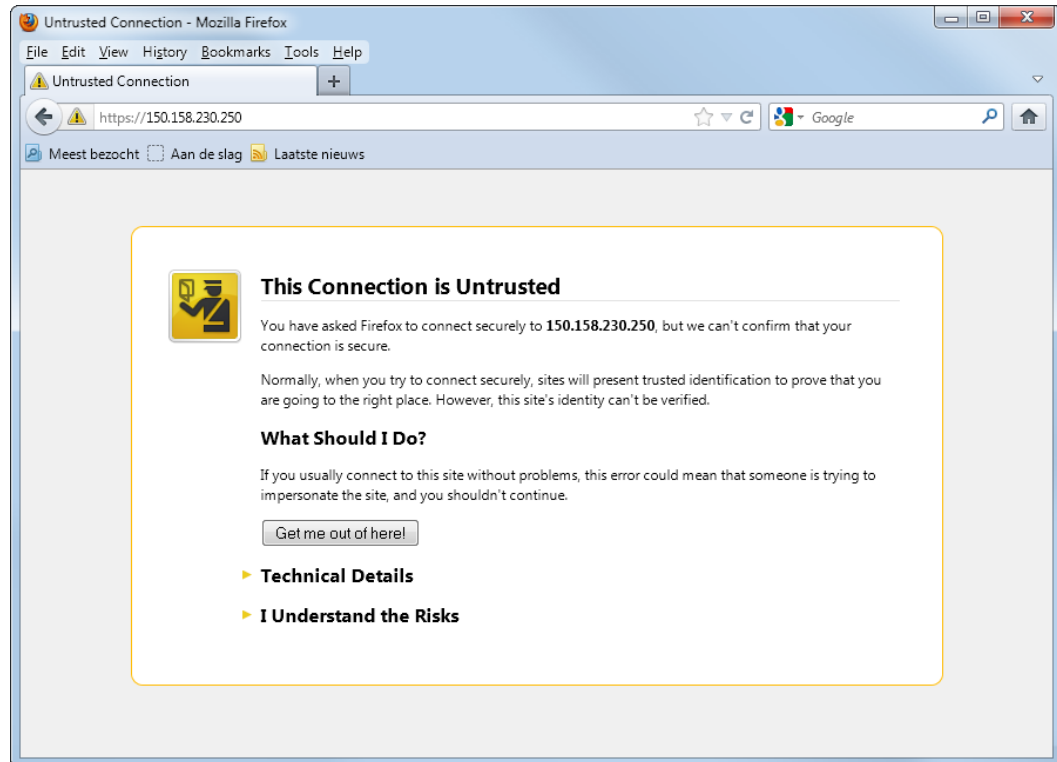
Result: The **Downloading Certificate** dialog is closed and the certificate is added to the web browser.

- 17 Close the **Certificate Manager** and **Options** dialog.
- 18 Close the web browser.

To Install the Certificate into the Mozilla Firefox Web Browser for a Device with Software Package Version 10.10 or Higher

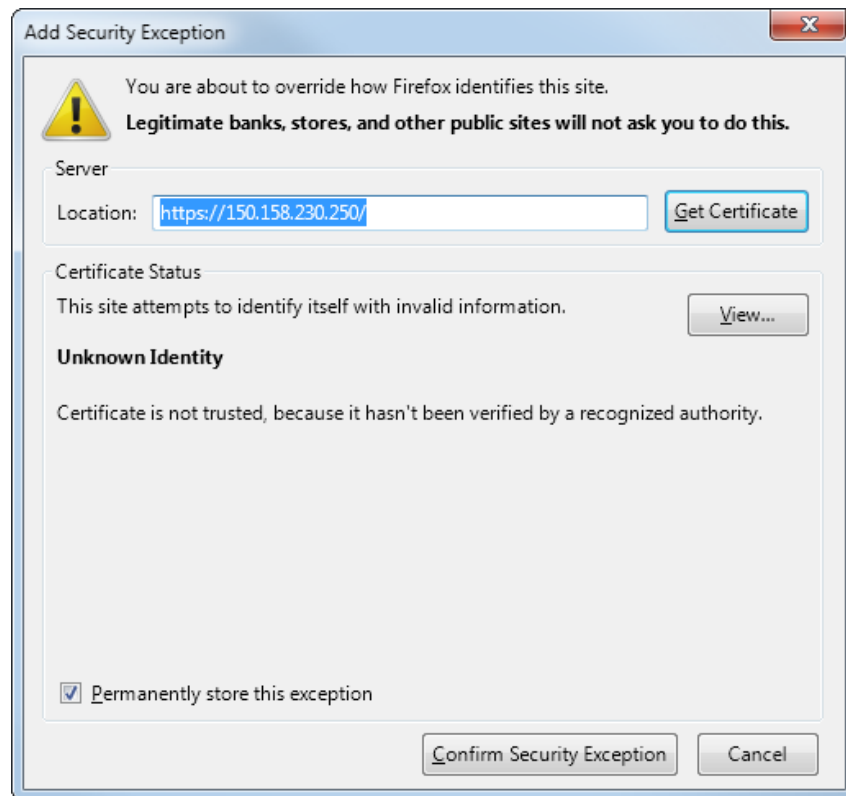
The following procedure describes how to install the DCM certificate into the Mozilla Firefox web browser.

- 1 The PC is still connected to the DCM and the web browser shows the following page (see topic *Checking the Software Package Version* on page 52).



- 2 Click on **I Understand the Risks** link, and point to **Add Exception....**

Result: The **Add Security Exception** dialog is displayed.



- 3 Click on **View...**

Result: The **Certificate Viewer** dialog appears.

- 4 Select the **Details** tab.

- 5 In the **Certificate Hierarchy** box, select the root certificate and point to **Export...**

Result: The **Save Certificate To File** dialog appears.

- 6 Browse to the location where the certificate can be stored and press **Save**.

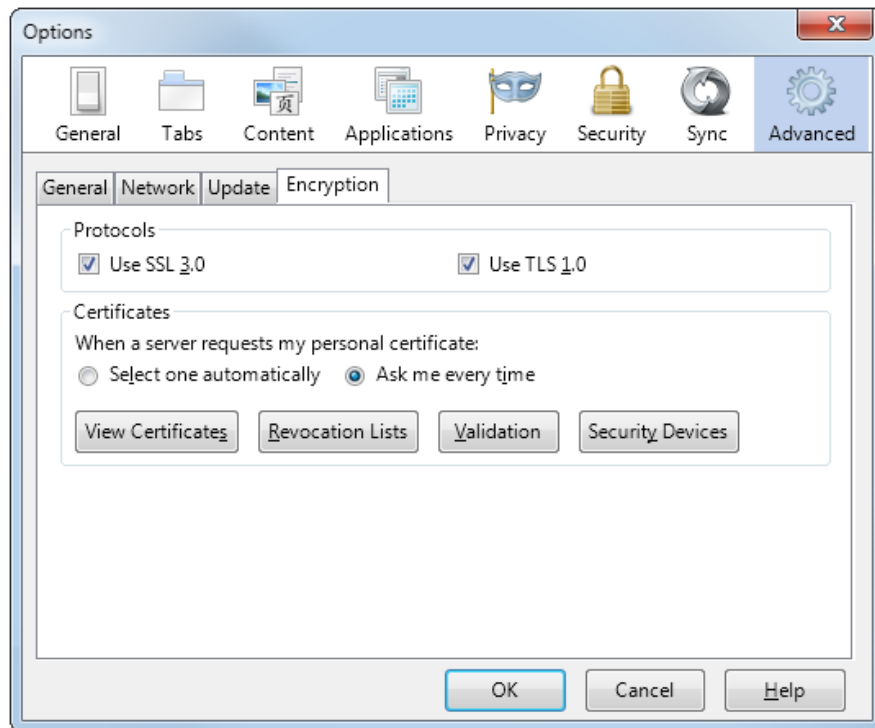
- 7 Close the **Certificate Viewer** and **Add Security Exception** dialog.

- 8 In the menu bar of the web browser, click on **Tools** and select **Options**.

Result: The **Options** dialog appears.

- 9 Point to **Advanced** and select the **Encryption** tab.

Result: The **Encryption** tab page is displayed.

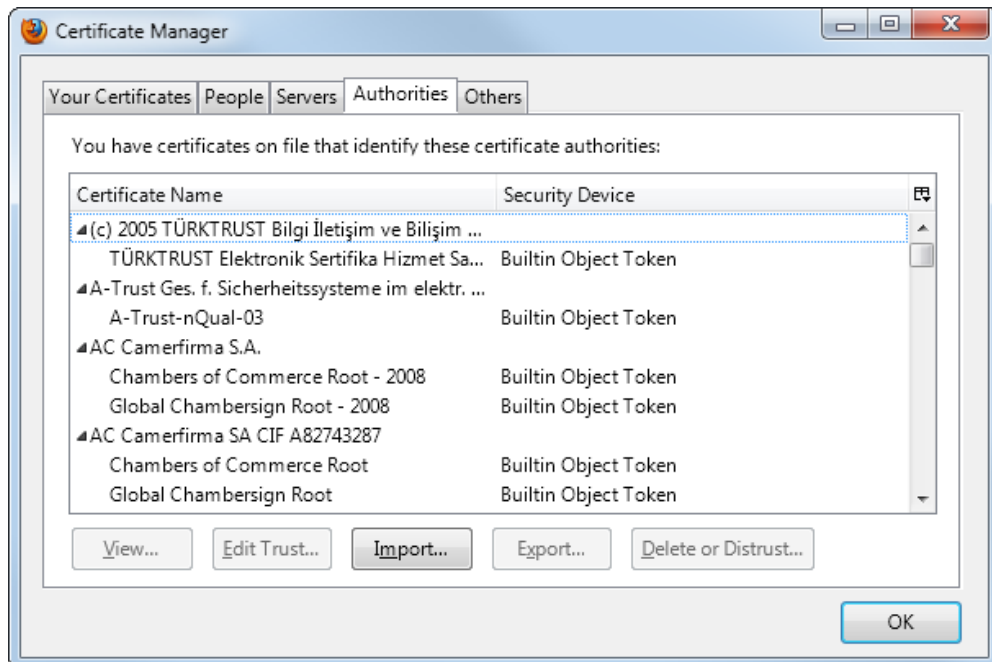


10 Click on **View Certificates**.

Result: The **Certificate Manager** dialog is displayed.

11 Click on the **Authorities** tab

Result: The **Authorities** tab page appears.



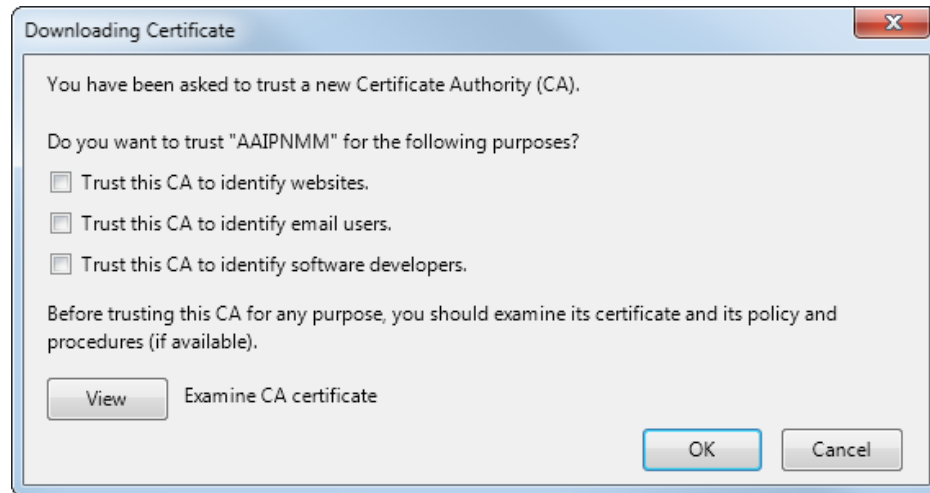
12 Point to **Import...**

Result: The **Select File containing CA certificate(s) to import** dialog is displayed.

- 13 Browse to the location of the DCM certificate (XXXXXX.crt).

- 14 Select this certificate and point to **Open**.

Result: The **Downloading Certificate** dialog is displayed.



- 15 Verify if the field in quotes in the **Downloading Certificate** dialog corresponds with the Host ID of the DCM.

- 16 Tick the **Trust this CA to identify web sites.** check box and point to **OK**.

Result: The **Downloading Certificate** dialog is closed and the certificate is added to the web browser.

- 17 Close the **Certificate Manager** and **Options** dialog.

Setting Up the Initial Security Configuration

Introduction

The following list gives more information about the initial security configuration settings.

■ About Password Policy, Security Accounts, and Security Groups

The DCM can be accessed using its user interface or using FTP, IIOP, SSH, SNMP, or telnet (further called *external IP services*). To protect the configuration of the DCM from inappropriate access by users or to protect the device from hacker-attacks, the DCM is provided with a password security feature that confirms the identity of the user who is attempting to access the device.

DCM's password security is set up by defining security accounts. A security account consists of a unique user name with password. By adding security accounts to security groups, particular access permissions and rights can be given to users. Security accounts can be defined to access the DCM via its user interface (further called GUI accounts) and accounts can be defined to access the DCM by external IP services (further called Operation System accounts). To

access the DCM using its user interface, the following security groups are defined: *Administrators* (full control), *Automation* (external triggers), *Guests* (read-only control), *Users* (read-write), and *DTF Administrator* (DTF Key Configuration).

During the initial security setup, a GUI account belonging to the *Administrator* security group and an *Operating System* account must be created. The Operating System account gets automatically access to the DCM for troubleshooting (SSH and telnet), access via FTP or IIOP is optional.

To prevent people from using weak passwords to access the DCM user interface or to use external IP services for accessing the DCM, the following password policy is used:

- The password may not contain more than 80 characters.
- The password must contain characters from at least three of the following classes: lower case letters, upper case letters, digits, and special characters.
- No character in the password can be repeated more than three times consecutively.
- The password cannot be the same as the associated username, and not be the username reversed.
- The password cannot be *cisco*, *ocsic*, or any variant obtained by changing the capitalization of letters therein, or by substituting *1* | or *!* for *i*, and/or substituting *0* for *o*, and/or substituting *\$* for *s*.

■ About External IP Services

The DCM can be accessed using external IP services like FTP for upgrading device software, SSH and telnet for troubleshooting purposes, and IIOP and SNMP for external management purposes. When the device leaves our assembly line all these external IP services are disabled. During the initial security setup, the external IP services required for your application can be enabled.

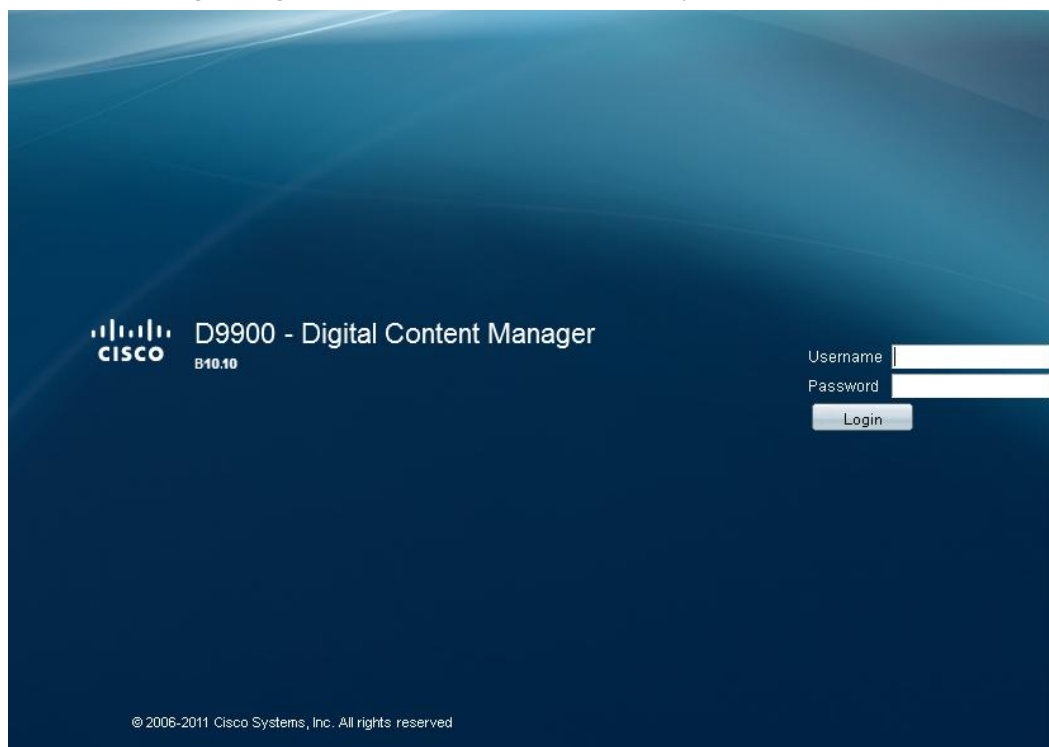
Hint: Enabling IPConfig can be useful for applications where the IP addresses of the management ports of a DCM are frequently changed. The IPConfig tool is able to retrieve the IP addresses from a DCM. More information concerning this tool can be found in the system guide shipped with the DCM.

To Set Up the Initial Security Configuration

The following steps explain how to configure the network settings of the management ethernet ports of the DCM housing and the initial security settings.

- 1 Open a web browser and enter the factory IP address of the connected ethernet port in the address bar.

Result: The login page of the user interface is displayed.



- 2 Enter *admin* in both the **Username** and **Password** box and press **Login**.

Note: The username and the password are case sensitive.

Result: The **Initial Security Configuration** page appears.

- 3 In the **Accounts** table, complete the following settings for both the *GUI Administrator* and *Operating System* account:

Accounts ?				
Type	User Name	Password	Re-enter Password	Options
GUI Administrator				
Operating System				☐ FTP ☒ Trouble Shooting (SSH and Telnet) ☐ IIOP

- a In the **User Name** box, enter a name for this account (max. 40 characters).
- b In the **Password** and **Re-enter Password** boxes, enter a password (max. 80 characters) that meets DCM's password policy (see introduction).
- c For the *Operating System* account, tick the options check boxes of the external IP service(s) required for this account.

Note: The following OS account names cannot be used: *root*, *scriptengine*, *nobody*, and *sshd*.

Performing the Initial Setup of a DCM with Software Package Version 8.5 or higher

- 4 In the **External IP Services** table, tick the **Enabled** check boxes of the external IP services required for your application.

External IP Services ?		
Service	Enabled	Used for
IIOIP	☒	External management using IIOIP
SSH	☒	Troubleshooting
FTP	☒	Software upgrade
SNMP	☒	External management using SNMP
IPConfig	☒	Retrieving the IP interface network settings
Telnet	☒	Troubleshooting (Not recommended, SSH is preferred)
HTTPS	☒	Use HTTPS between the browser and the device

- 5 In the **Network Settings** table, complete the following settings for both ethernet ports of the DCM housing (10/100 and GbE port).

Network Settings ?					
Port	MAC Address	IP Address	Subnet Mask	Default Gateway	IPsec ?
10/100 Port	00:23:BE:5E:42:ED	150.158.230.250	255.255.255.0	☐ -	Allow All Traffic ▼
GbE Port	00:23:BE:5E:42:F0	150.158.231.250	255.255.255.0	☐ -	Allow All Traffic ▼

- a In the **IP Address** box, enter the IP address (IPv4) for the port.
- b In the **Subnet Mask** box, enter the subnet mask.
- c For a default gateway address, tick the **Default Gateway** selection button and enter the IP address in the corresponding box.

Notes:

- The octets of the IP addresses must be separated by dots.
- All management ports should be connected to a different subnet.

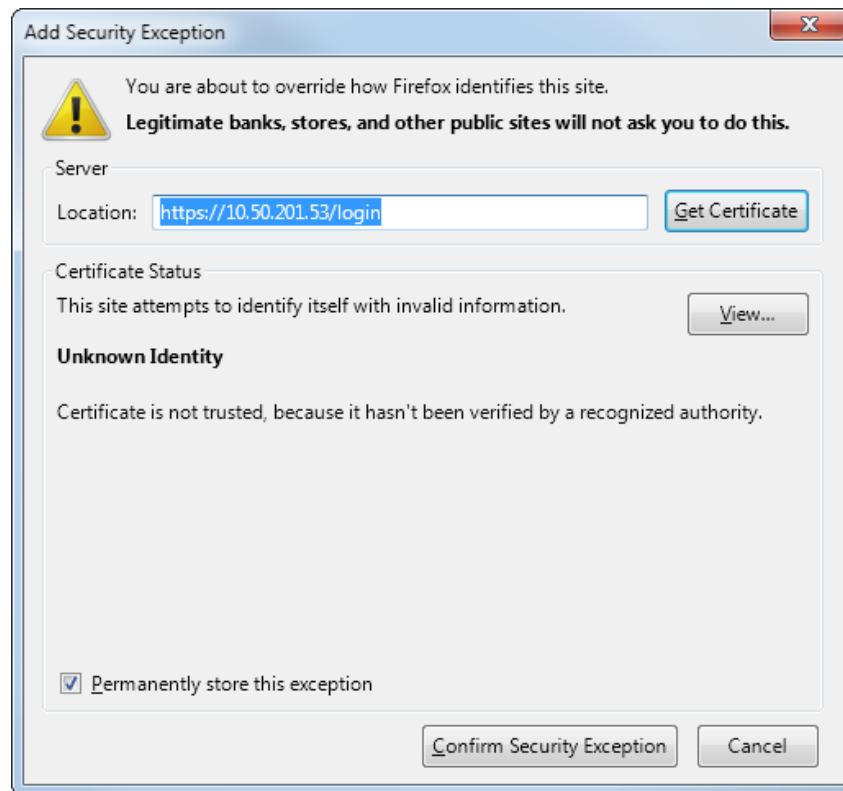
- 6 Press **Apply** to confirm or **Reload** to abort the operation.
- 7 Close the user interface.

Accessing the Embedded Graphical User Interface

After setting up the initial configuration and after integrating the device into the network, the login page of the web browser user interface of the DCM can be opened via each PC in the network by entering the IP address of the DCM management port, which is connected to this network, in the address bar of the PC's web browser.

Note: For a DCM with software package version 8.5 or higher and a PC for which the DCM's CA certificate is not yet installed in the web browser of the PC, the **This Connection is Untrusted** page (Mozilla Firefox) or the **There is a problem with this website's security certificate** page (Microsoft Internet Explorer) will be displayed.

- For Microsoft Internet Explorer, click on the **Continue to this website** (*not recommended*) link.
- For Mozilla Firefox, click on the **I Understand the Risk** link, press the **Add Exception...** button. In the **Add Security Exception** dialog that appears, clear the **Permanently store this exception** check box and click on the **Confirm Security Exception** button.



Hint: The procedure to create, to download, and to install a CA Certificate for the DCM into a web browser is described in topic *Installing and Removing CA Certificates* in appendix *Additional Configuration of the Configuration Guide*.

The following picture shows the login page of DCM's web browser user interface.



Login with following account settings:

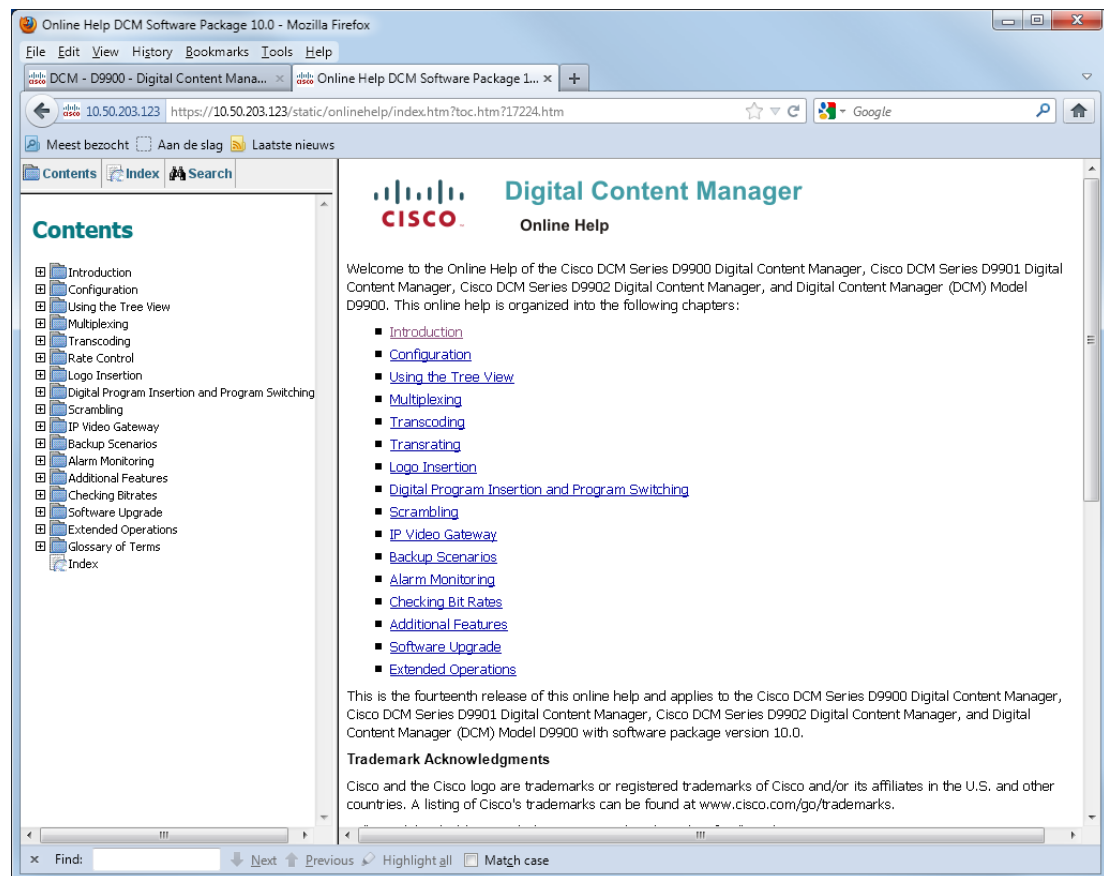
- For a DCM with software package version lower than 8.5:
 - Administrator account (full control): **Username** and **Password** = *Administrator*
 - User account (read-write): **Username** and **Password** = *User*
 - Guest account (read-only): **Username** and **Password** = *Guest*
- For a DCM with software package version 8.5 or higher: Login with the Administrator account as specified during the initial security configuration setup.

Important: **Username** and **password** are case sensitive.

Configuring and Monitoring the DCM

The DCM can be configured and monitored using the embedded Graphical User Interface. The procedures to configure the DCM can be found in the *Digital Content Manager (DCM) - Configuration Guide* or in the context sensitive *online help*. The configuration guide can be opened by pressing the **User Manual** link on the **Help** page of the embedded GUI of the DCM. The context sensitive online help can be opened by pressing the **Online Help** link on the **Help** page. Pressing the help button (?) on a particular item on the GUI opens the online help with related information.

The following picture shows the context sensitive online help of the DCM.



4

Maintenance

Introduction

This chapter provides information to assist the operator in maintaining the Cisco Series DCM D9900 Digital Content Manager.

Qualified Personnel

Only appropriately qualified and trained personnel should attempt to install, operate, or maintain the DCM.



WARNING:

Allow only authorized and trained service personnel to install, operate, maintain, and service this product. Otherwise, personal injury or equipment damage may occur.

In This Chapter

■ Maintenance	84
■ Cleaning the Air Filter.....	85
■ Replacing a Blown Fuse	86
■ Replacing a Defective Fan.....	88
■ Care and Cleaning of Optical Connectors.....	91

Maintenance

Maintaining the DCM

To ensure optimal performance, the following maintenance is recommended.

Frequency	Maintenance Required
Weekly	■ Check all parameters
Quarterly	■ Make sure all cables are mated properly. ■ Inspect cables for stress and chafing. ■ Make sure all retaining screws are tight.
Every six months	■ Clean the air filter.
Every two or three years	■ Renew the air filter.
When needed	■ Carefully clean the module with a soft cloth that is dampened with mild detergent.

Cleaning the Air Filter

Introduction

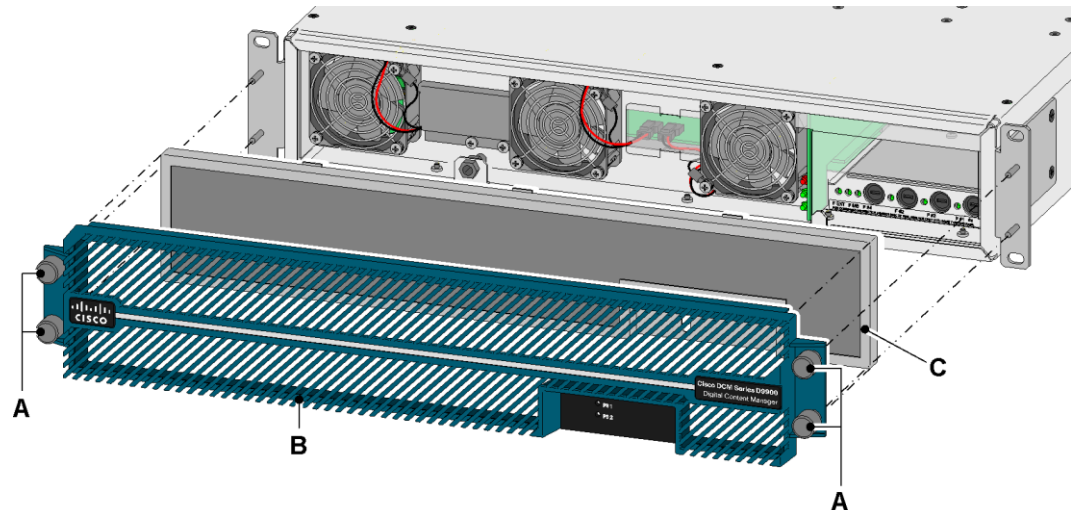
Air filter life span strongly depends upon maintenance and care of the filter media, application and environmental conditions. The filter should be cleaned or replaced every three to six months using slightly compressed air and/or vacuumed. You may also clean the air filter using clean water on condition that you allow enough time for drying afterwards. You may use a spare filter during the drying time. Even though the air filter may be cleaned, replacement is recommended every two to three years to ensure optimal air flow.

Part number air filter: 4031595

Removing and re-installing the Air Filter

The following steps describe how to remove and to re-install the air filter.

- 1 Loosen the four thumb screws and remove the front cover carefully.
- 2 Loosen screws **A** and remove cover **B** holding the air filter **C**.



- 3 Clips the air filter **C** out the front cover **B**.
- 4 Clips the cleaned or new air filter into the front cover.
- 5 Position the front cover carefully on the housing and tighten its four screws **A**.



CAUTION:

- To continue to comply with EMC regulations, cover **B** provided with air filter must immediately be re-installed after cleaning or replacing the air filter and it is not allowed to install the cover without air filter.
- Make sure that the cooling works properly during the operation of the device. Insufficient cooling of the device may cause permanent damage of the device.

Replacing a Blown Fuse

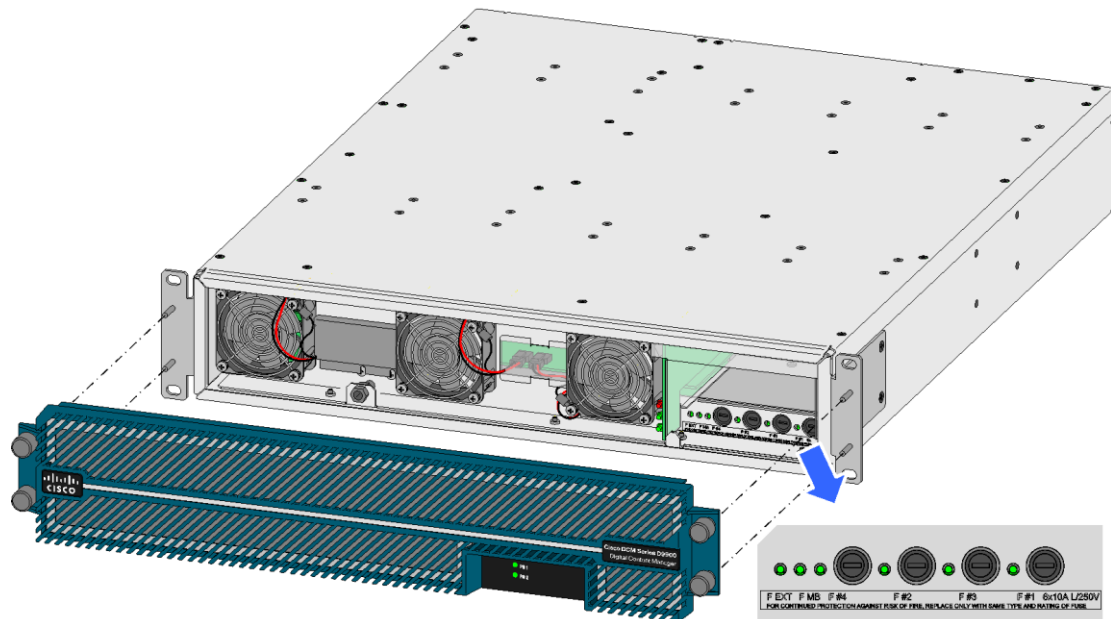
Introduction

The DCM is equipped with a number of fuses to protect the different cards. The following table lists the different fuses.

Fuse	Description
F MB	Main board
F EXT	Future use
F #1	Interface card, chassis position 1
F #2	Interface card, chassis position 2
F #3	Interface card, chassis position 3
F #4	Interface card, chassis position 4

Note: With the exception of the F MB fuse and F EXT fuse, all fuses are replaceable.

The following illustration depicts the location of the interface card fuses in the DCM.



Tools and Parts to Replace a Fuse

The following tools and accessories are required to replace a fuse.

- Flat-bladed screwdriver
- Spare fuse (same type and with same ratings, refer to the ratings label stuck on

the cover plate of the fuses)

To Replace a Fuse

The following procedure explains how to replace a blown fuse.

- 1 Power off the DCM.



CAUTION:

To power off a DCM equipped with main and backup power supply, you have to disconnect the power source of both power supplies.

- 2 Loosen the four screws and remove the front cover carefully.
- 3 Turn the fuse coverlid of the blown fuse with a quarter turn counterclockwise.
- 4 Replace the blown fuse by a spare fuse with the same ratings.
- 5 Tighten the fuse coverlid.
- 6 Position the front cover on the housing and tighten the four screws.
- 7 Power up the device by connecting the power cord(s) to the housing.

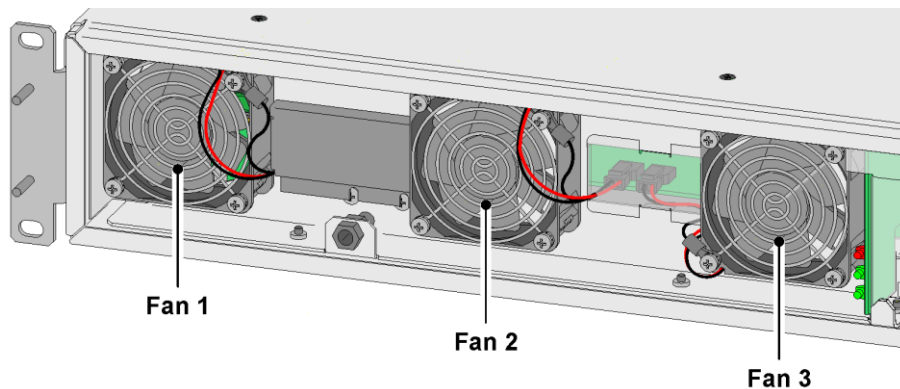
For more information concerning the power cord(s) connection to the DCM, please refer to chapter *Installation* on page 25.

Note: A blown fuse indicates a defective card or defect in the power circuit feeding the card. Troubleshoot and clear the reason for the blown fuse before replacing the defective fuse.

Replacing a Defective Fan

Introduction

The DCM is provided with three fans, which are continuously monitored by the processor on the Main Card. When one of the fans fails, an alarm message will be generated indicating the fan position of the defective fan. The following illustration depicts the fan positions.



Tools and Parts to Replace a Fan

The following tools and accessories are required to replace a fan.

- Cross-headed screwdriver, type Phillips No 2
- Spare fan, part number 4023455



CAUTION:

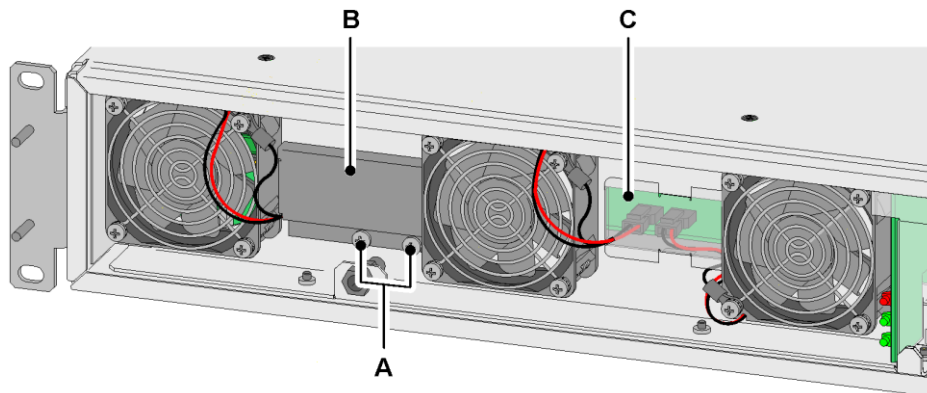
When a spare fan is brought from a cold into a warm environment, the fan should be acclimated to the environment temperature and humidity conditions for at least 30 minutes. Non-acclimated components may not meet the technical specifications as described. Powering up a non-acclimated component may result in damage to the component and/or chassis.

To Replace a Defective Fan

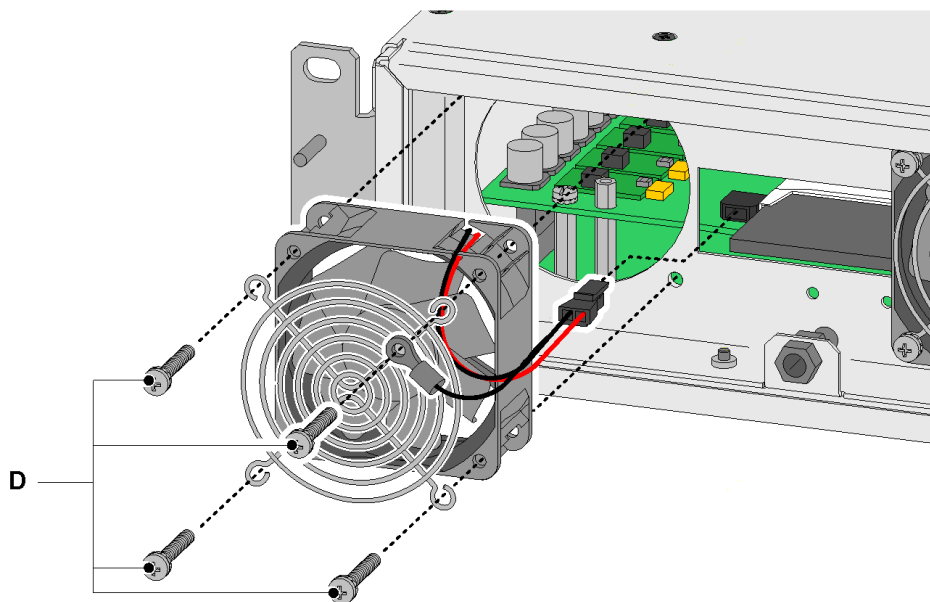
The following steps explain how to replace a defective fan.

- 1 Loosen the four thumb screws and remove the front cover carefully.

- 2 Loosen screws **A** and remove aluminum cover **B** for replacing fan 1 or remove plastic clip **C** for replacing fan 2 or 3.



- 3 Disconnect the fan cable from the Main Card by unlocking the connector and pulling out horizontally (do not force or bend the connector).



- 4 Loosen screws **D** and remove the defective fan.
- 5 Position the new fan on the fan plate of the device and tighten screws **D** with a torque of 1.25 Nm.

Notes:

- The eye strap of the black wire must be fixed between the screw (nearest the cable outlet of the fan) and the fan grill.
- Assure the front to rear air direction of the DCM. An arrow on the fan indicates the air direction of the fan.

- 6 Connect the fan cable to the connector on the Main Card (do not force or bend the connector).
- 7 Position the front cover carefully on the housing and tighten its four screws.



CAUTION:

- To continue to comply with EMC regulations the front cover of the DCM must immediately be re-installed after replacing a defective fan.
- Make sure that the cooling works properly during the operation of the device. Insufficient cooling of the device may cause permanent damage of the device.

Care and Cleaning of Optical Connectors

Introduction

Optical connectors are cleaned at assembly, but require recleaning when the equipment is installed. Both the connector attached to the bulkhead adapter in the equipment and the jumper connector that will be attached to the bulkhead adapter must be cleaned. This section describes recommended cleaning instructions for both halves of the connection.

Guidelines

Proper care and cleaning of optical connectors is critical to equipment operation. Follow these guidelines when working with optical connectors:

**WARNING:**

Laser light hazard. Never look into the end of a fiber cable or connector. Failure to observe this danger can result in eye damage or blindness.

- The working surfaces of optical connectors are highly polished and designed for precision alignment. Keep them microscopically clean and free of scratches.
- Optical power readings and signal quality can seriously degrade if optical connectors or bulkheads are mishandled or allowed to become dirty.
- Optical bulkheads on transmitters and receivers and the connector faces of optical cables are shipped with protective caps. Do not remove caps until ready to make connections.
- Do not touch unprotected optical connector faces. Do not allow dirt to touch the connector to the bulkheads. Small scratches, minute traces of dirt or skin oils can degrade signal quality.

Materials for Cleaning

The following materials are required for cleaning.

- Lint-free Wipes (tissues)
- Ethyl or Isopropyl Alcohol, >91% purity (Do not use a lesser grade. Do not use common rubbing alcohol.)
- Filtered Canned Air
- Lint-free Swabs

Cleaning of Connectors in a Bulkhead Adapter

Perform the following steps to clean optical connectors in a bulkhead adapter.

- 1 Remove the protective cap from the bulkhead adapter.
- 2 Blow dust particles from the interior surface of the bulkhead adapter using filtered canned air as follows:



CAUTION:

Be sure to hold the air can in upright position so that liquid from the can cannot enter the air tube. Do not shake the can. Do not blow air directly on the fiber. Failure to observe this caution may damage the connector or cause contaminants to be placed on the surface being cleaned.

- Hold the air can upright. Position the can extension tube approximately 6 inches (15.3 cm) from the surface to be cleaned.
 - Gently blow into the adapter.
- 3 Swab the bulkhead adapter using a lint-free swab as follows:



CAUTION:

Do not use alcohol less than 91% pure. Do not use common rubbing alcohol. Failure to observe this caution will deposit contaminants on the fiber surface.

- Moisten a lint-free swab with > 91% pure ethyl or isopropyl alcohol.
 - Insert the moistened swab into the bulkhead adapter until it touches the interior connector face.
 - Apply light pressure and rotate the swab approximately eight to ten turns.
 - Remove the swab.
 - Insert a dry, lint-free swab and gently turn several times
- 4 Blow dust particles from the interior surface of the bulkhead adapter using filtered canned air as follows:



CAUTION:

Be sure to hold the air can in upright position so that liquid from the can cannot enter the air tube. Do not shake the can. Do not blow air directly on the fiber. Failure to observe this caution may damage the connector or cause contaminants to be placed on the surface being cleaned.

- Hold the air can upright. Position the can extension tube approximately 6 inches (15.3 cm) from the surface to be cleaned.
 - Gently blow air into the adapter.
- 5 Insert a recently cleaned connector into the bulkhead adapter.

Cleaning of Connectors Not in Bulkhead Adapter

Perform the following steps to clean optical connectors that are not installed in a bulkhead adapter.

- 1 Remove the protective cap from the optical connector.

Note: Do not reinstall the protective cap after the cleaning procedure. Protective caps are designed to protect the connector ferrule from damage, not to keep the connector clean.

- 2 Place a dry, lint-free wipe on a solid surface.



CAUTION:

Avoid contamination of lint-free wipes. Handle wipes by the edges. Discard each wipe immediately after use. Failure to observe this caution may result in contaminants on the surface being cleaned.

- 3 Place another dry, lint-free wipe on top of the first wipe.
- 4 Moisten the top wipe with >91% pure ethyl or isopropyl alcohol.



CAUTION:

Do not use alcohol less than 91% pure. Do not use common rubbing alcohol. Failure to observe this caution will deposit contaminants on the fiber surface.

- 5 Gently wipe the connector ferrule and endface. For APC connectors only, wipe with one continuous motion in the direction of the angle.
- 6 Discard the wipes.
- 7 Place a dry, lint-free wipe on a solid surface and gently slide the connector endface across the wipe. For APC connectors only, wipe with one continuous motion in the direction of the angle.
- 8 Blow dust particles from the connector using filtered canned air as follows:



CAUTION:

Be sure to hold the air can in upright position so that liquid from the can cannot enter the air tube. Do not shake the can. Do not blow air directly on the fiber. Failure to observe this caution may damage the connector or cause contaminants to be placed on the surface being cleaned.

- Hold the air can upright. Position the can extension tube approximately 6 inches (15.3 cm) from the surface to be cleaned.
 - Gently blow air across the connector end or surface to be cleaned.
- 9 Promptly insert the connector into the cleaned bulkhead adapter.

5

Upgrading

Description

This chapter describes the procedures to upgrade a Cisco Series DCM D9900 Digital Content Manager. It is assumed that all safety precautions and guidelines have been followed prior to performing a device upgrade.

It is recommended that the entire upgrade procedure is read prior to perform the installation

Qualified Personnel

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



WARNING:

Allow only authorized and trained service personnel to install, operate, maintain, and service this product. Otherwise, personal injury or equipment damage may occur.

In This Chapter

- Upgrading the DCM Device Software..... 96
- Adding or Removing DCM Hardware..... 102

Upgrading the DCM Device Software

Introduction

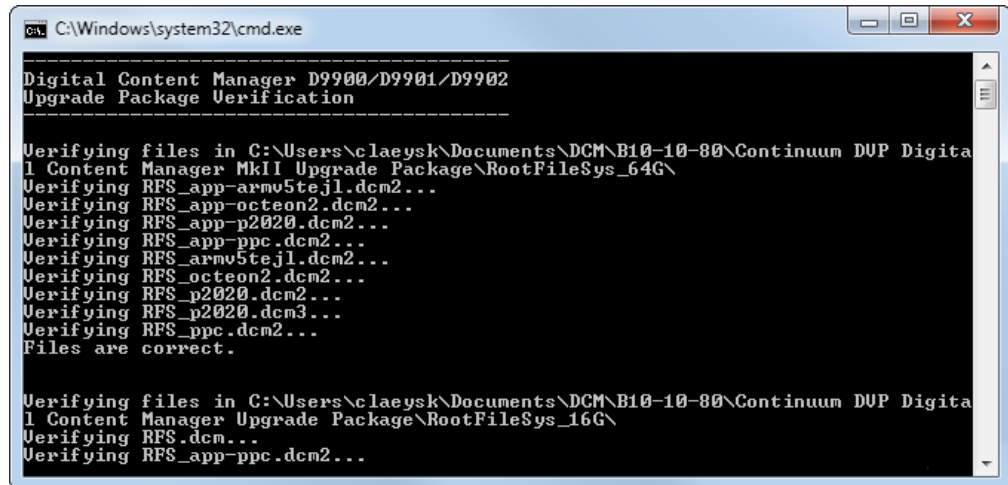
To facilitate the software upgrade of a DCM, we have developed the Upgrade-It software. The Upgrade-It software runs as a stand-alone application on a remote PC, which is connected to the same LAN as the 10/100Base-T or GbE port of the DCM. This software tool can be found in the tools directory of the DCM software upgrade package. Please contact your Cisco representative to obtain such software upgrade package.

Important:

- To upgrade a DCM, the Upgrade-It software use FTP. For a DCM with software package version lower than 8.5, the Upgrade-It software uses the build-in OS account to login to the DCM. For a DCM with software package version 8.5 or higher, this build-in OS account is not longer usable and an OS account for which the FTP option is enabled must be created. The procedure to create accounts can be found in the configuration guide of the DCM.
- Upgrading a DCM with software package version lower than 8.5 to a version 8.5 or higher automatically creates two OS account.
 - An account for which the FTP and IIOP external IP services are enabled with following account parameters:
 - **Account Name:** *guest*
 - **Password:** *guest*
 - An account for which the external IP service for troubleshooting is enabled with following account parameters:
 - **Account Name:** *engineering*
 - **Password:** *engineering*

More information about the security settings can be found in the configuration guide of the DCM.

Hint: During downloading a software package for the DCM particular errors may arise (for instance an incomplete download). To ensure that the software package is error free, it can be checked by running *verify.bat*. This *verify.bat* file can be found in the package.



```

C:\Windows\system32\cmd.exe
Digital Content Manager D9900/D9901/D9902
Upgrade Package Verification

Verifying files in C:\Users\claeysk\Documents\DCM\B10-10-80\Continuum DUP Digital Content Manager MkII Upgrade Package\RootFileSys_64G\
Verifying RFS_app-armv5tej1.dcm2...
Verifying RFS_app-octeon2.dcm2...
Verifying RFS_app-p2020.dcm2...
Verifying RFS_app-ppc.dcm2...
Verifying RFS_armv5tej1.dcm2...
Verifying RFS_octeon2.dcm2...
Verifying RFS_p2020.dcm2...
Verifying RFS_p2020.dcm3...
Verifying RFS_ppc.dcm2...
Files are correct.

Verifying files in C:\Users\claeysk\Documents\DCM\B10-10-80\Continuum DUP Digital Content Manager Upgrade Package\RootFileSys_16G\
Verifying RFS.dcm...
Verifying RFS_app-ppc.dcm2...
  
```

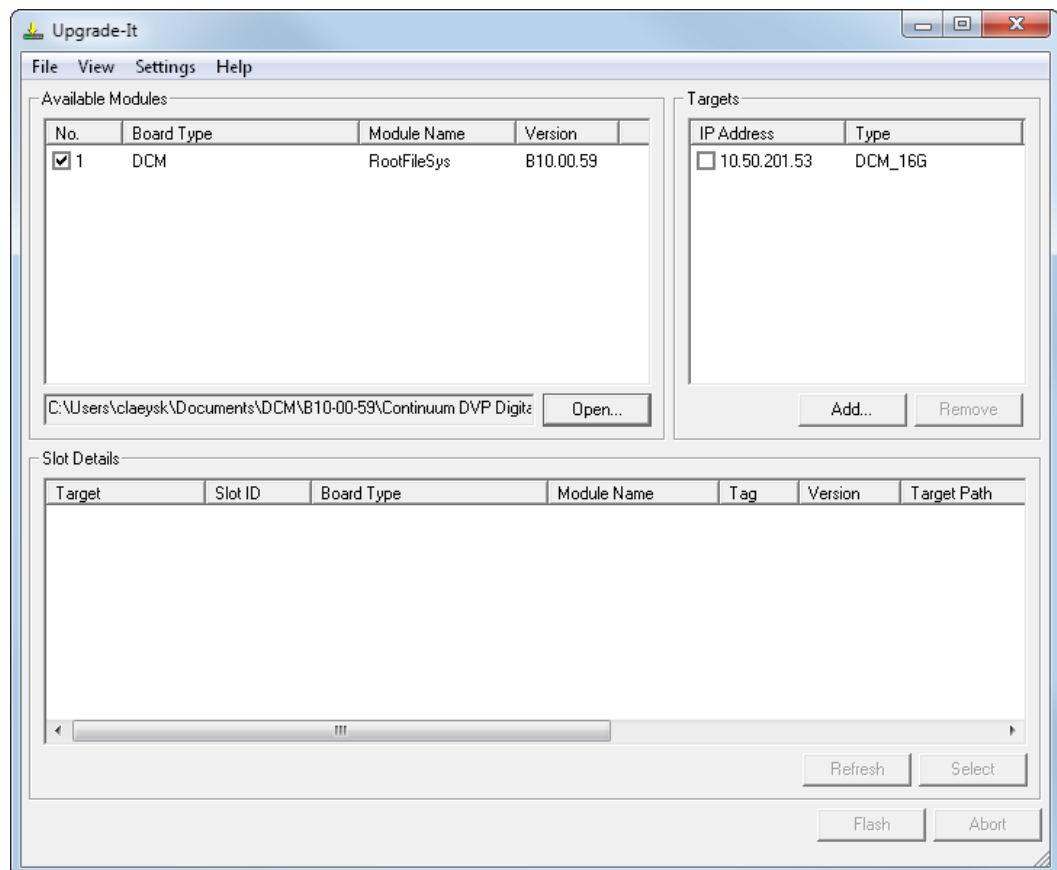
Upgrading the DCM Software

Opening the Upgrade-It Tool

Perform the following steps to open the Upgrade-It tool.

- 1 In the start menu, click on the **Start** button and browse to the **Upgrade-It** application.

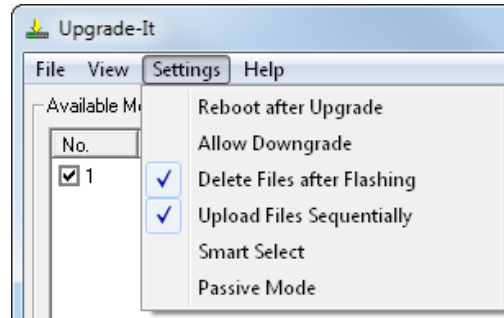
Result: The **Upgrade-It** dialog is displayed.



Notes:

- The Upgrade-It tool is provided with a **Reboot after Upgrade** function that gives an additional and unnecessary reboot command to the DCM after the upgrading-process when enabled.

Disabling this function can be done by pointing to the **Settings** menu and unchecking the **Reboot after Upgrade** menu item.



- The Upgrade-It tool is provided with an option that removes installation files after flashing. When this option is enabled during a DCM upgrade a number of error messages will be displayed. These errors have no effect on the upgrading process. Disabling this function can be done by pointing to the **Settings** menu and unchecking the **Delete Files after Flashing** menu item.

Selecting the Software Module

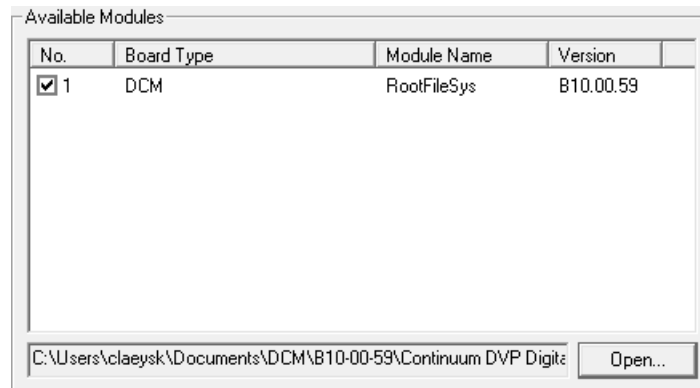
Perform the following steps to select a software module to upgrade the DCM software.

- 1 In the **Available Modules** box, click on the **Open...** command button.
Result: The **Open** dialog is displayed.
- 2 Browse to the folder containing the software module/publication package (*.txt).
- 3 Select the file and point to the **Open** command button.

Note: The DCM can be equipped with a 1 GB or a 16 GB compact flash card. Select the file that corresponds with the installed compact flash card. The size of the installed compact flash card can be checked on the **Configuration - Version Info** sub page of the web browser user interface.

DCM ?	
Module Name	Version
Serial Number	~AAZUOLG
Package	B08.05.37
Source	B08.05.37
CompactFlash	16GB
GUI	V08.05.21

Result: The software module is displayed in the **Available Modules** box.



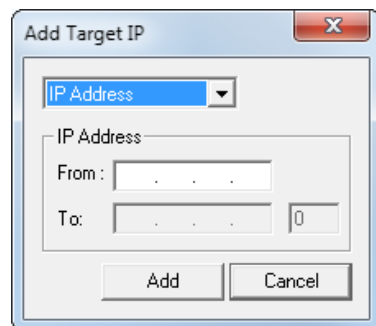
- 4 In the **Available Modules** box, check the software module that must be used to upgrade the DCM.

Selecting the Device

The following procedure explains how to select the DCM that should be upgraded.

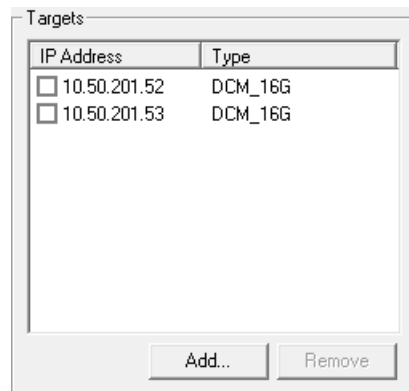
- 1 In the **Target** box, click on the **Add...** command button.

Result: The **Add Target IP** dialog is displayed.



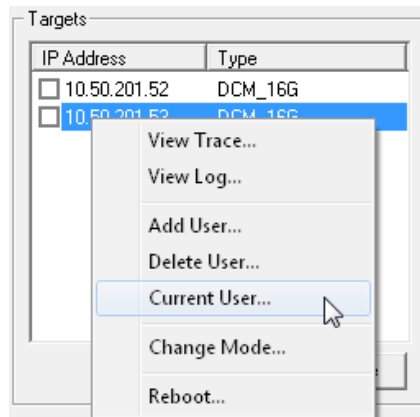
- 2 Select **IP Address** or **IP Address Range** in the drop down box.
- 3 Enter the IP address of the DCM or the beginning address of the IP address range in the **From** box.
- 4 If *IP Address Range* is selected in the drop down box, enter the ending address of the IP address range in the **To** box.
- 5 Press the **Add** command button to confirm or the **Cancel** command button to abort the operation.

Result: The devices corresponding the entered IP address or IP address range are reflected in the **Targets** box.



Note: The **Type** parameter in the **Targets** box originates from the target. For a DCM with software package version 8.5 or higher, the **Type** parameter shows *Unknown* and you have to login to the device using an OS account for which FTP is enabled. This can be done by doing following steps:

- In the **Targets** box, right-click on the DCM for which the software must be upgraded and point to *Current User...* in the short-cut menu.

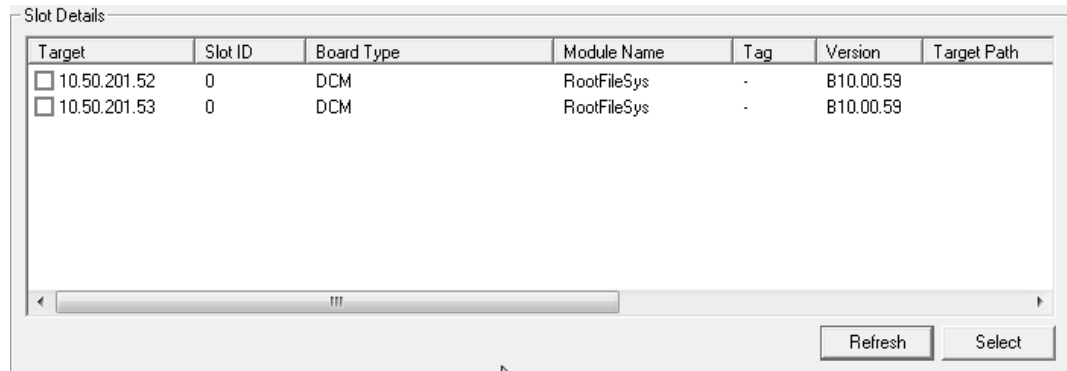


Result: The **Set Current User** dialog appears.



- In the **User Name** and **Password** box, enter the login settings of the OS account and click on the **OK** button.
- 6 In the **Targets** box, check the device(s) that should be upgraded.

- 7 Click on the **Refresh** command button to refresh the **Slot Details** of the selected targets.



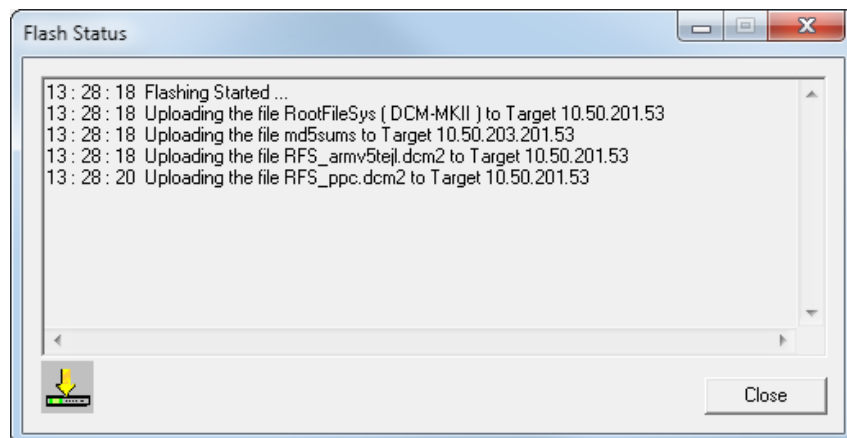
- 8 Select the file(s) to be upgraded by selecting the check box(es) manually in the **Slot Details** list or by pressing the **Select** command button.

Flashing the Software

The following procedure explains how to flash the software.

- 1 When **Available Modules**, **Targets**, and **Slot Details** are configured correctly, press the **Flash** command button to start the upgrading process.

Result: The **Flash Status** dialog box with the status of the software upgrade process is displayed.



Notes:

- After upgrading the software package, the device will automatically reboot, which takes several minutes.
- When the web browser user interface was open during the upgrading process, you have to restart the web browser because the browser's cache may contain erroneous data.

Adding or Removing DCM Hardware

Introduction

The DCM has four I/O slots and two PSU slots. A device with free I/O slots can be extended by a card. Particular options need additional hardware on cards, for instance the FEC option. Such option card can be added to the appropriate card. A device with free PSU slot can always be extended with a second PSU.

The following sub topics describe how to add DCM hardware to a device and how to remove hardware.

Remarks

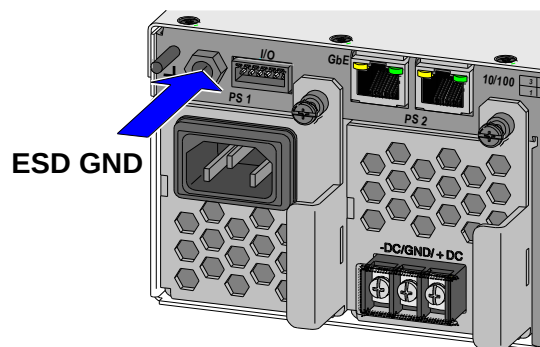
During adding or removing DCM hardware, consideration should be given to the following cautions and warnings.



CAUTION:

DCM hardware contains static-sensitive devices. Always follow proper electrostatic discharge (ESD) handling procedures (wristband with ground strap and ESD mat) when installing cards into the DCM. Follow Electronic Industries Association (EIA) standard EIA-625.

Note: When the DCM is connected to protective ground, a wristband with ground strap can be connected to the ESD socket at the rear of the chassis for ESD protection. Only use the ESD sockets for ESD purposes and not for protective grounding.



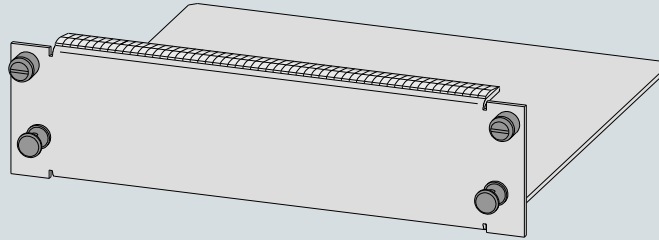
CAUTION:

When hardware is brought from a cold into a warm environment, the hardware should be acclimated to the environment temperature and humidity conditions for at least 30 minutes. Non-acclimated hardware may not meet the technical specifications as described. Inserting of non-acclimated hardware into a DCM may result in damage to the hardware and/or device.

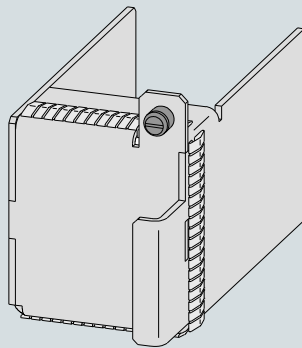
**WARNING:**

Since the DCM generates, uses, and can radiate frequency energy, all empty slots must immediately be covered by cover plates in order to continue to comply with EMC regulations.

- An empty I/O slot must be covered using cover plate with part number: 4008973, see illustration below.



- An empty PSU slot must be covered using cover plate with part number: 4010913, see illustration below.



Maximum Power Load

**WARNING:**

The power supply of the DCM has a limited output power capability. In order to avoid overload and/or shutdown of the unit, please check the total 12 V dc rail power consumption of all cards.

To do so, refer to the table below and assure that the total power consumption of the different cards installed does at no times and under no conditions exceed:

280 W if the unit is operated below 2000 m (6561.66 ft) Above Sea Level (ASL) or
247,5 W if the unit is operated between 2000 m (6561.66 ft) and 3000 m (9842.49 ft) ASL.

Power consumption of the individual cards:

Board Type	Power @ 12V (W)
DCM D9900 housing	33.5
ASI Interface Card	22

Board Type	Power @ 12V (W)
GbE Interface Card	26
8-VSB Interface Card, 4 ports	27.7
8-VSB Interface Card, 8 ports	39.5
DVB S2/CI Interface Card, 2 RF / 2 CI	52
DVB S2/CI Interface Card, 4 RF / 4 CI	65
FEC Card	16
Co-Processor Card	23.5
Transcoder Card	60
MFP-S Card	65

■ Example 1

DCM housing equipped with:

- 4x GbE Interface Cards
- 4x Co-Processor Cards
- 2x FEC Cards

Power consumption according to the table: $33,5 + (4 \times 26) + (4 \times 23,5) + (2 \times 16) =$
263,5 W

Conclusion: power consumption $280 > 263,5 > 247,5 \text{ W} \Rightarrow$ OK for use up to 2000 m (6561.66 ft) ASL only

■ Example 2

DCM housing equipped with:

- 2x GbE Interface Cards
- 2x Co-Processor Cards
- 2x FEC Cards.
- 2x Transcoder Cards

Power consumption according to the table: $33,5 + (2 \times 26) + (2 \times 23,5) + (2 \times 16) +$
 $(2 \times 60) =$ **284,5 W**

Conclusion: power consumption **284,5** $> 280 \text{ W}$

This combination of cards should not, under no condition be installed in a DCM housing.

The device is not safety certified for this condition.

Installing or Removing an Interface Card or Transcoder Card

Installing an Interface Card or Transcoder Card

When you have read the safety instructions in *Important Safety Instructions* earlier in this guide, you are ready to install an interface card, MFP-S Card, or Transcoder Card into a DCM.



CAUTION:

Follow proper ESD handling procedures. ESD may cause permanent damage to electric components.

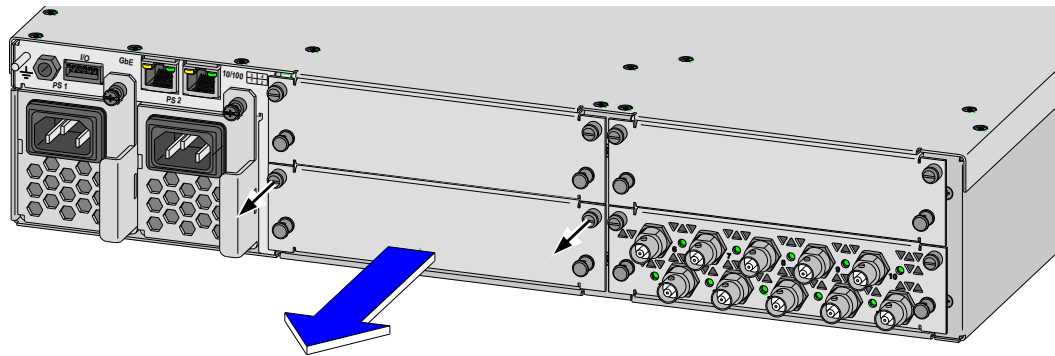
The following procedure explains how to install an interface card, MFP-S Card, or Transcoder Card into a device.

Note: The illustrations in the procedure below shows the installation of an interface card. The installation of an MFP-S Card or Transcoder Card is similar.

- 1 Power off the DCM.
- 2 Unpack the card.

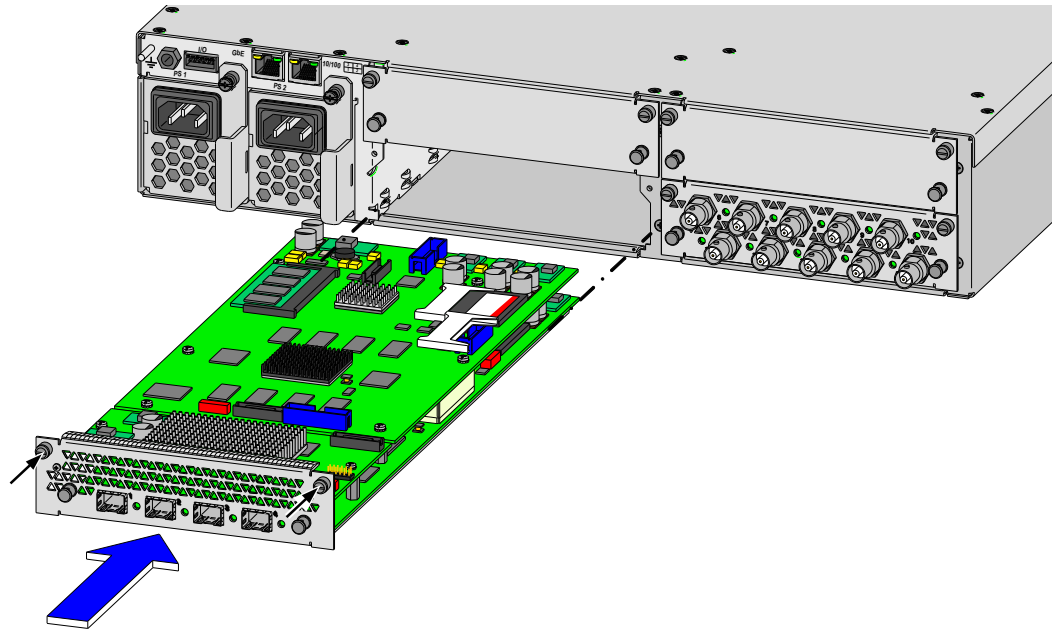
When unpacking a unit, examine it, the accessories, and the packing material for obvious signs of damage. Check the unit against the delivery/packing note. Retain the packing material, as it is required for warranty shipments and for later inspection by the carrier. Should any item be damaged, notify the carrier and our customer services department. See also appendix *Customer Information* on page 115.

- 3 Loosen both screws of the cover plate in a free card slot and remove the cover plate.



- 4 Take the card by its handles.

- 5 Locate the PCB guides in the device and slide the module gently into the slot. Make sure the PCB of the card is aligned with the PCB guides.



- 6 Gently push the card into the connector.
- 7 Tighten both screws of the card.
- 8 When an interface card is installed, cable the card.
Note: For more information concerning cabling an interface card can be found in chapter *Installation* on page 25.
- 9 Power on the device.

Removing an Interface Card or Transcoder Card

When you have read the safety instructions in topic *Important Safety Instructions* earlier in this guide, you are ready to remove a card from a DCM.

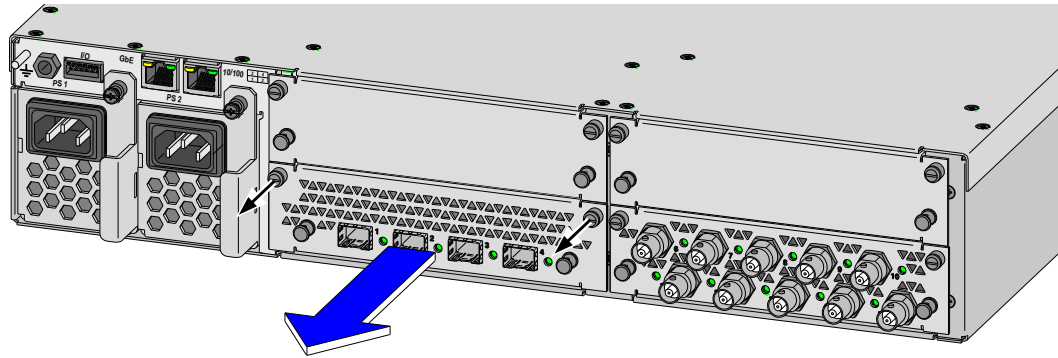


CAUTION:

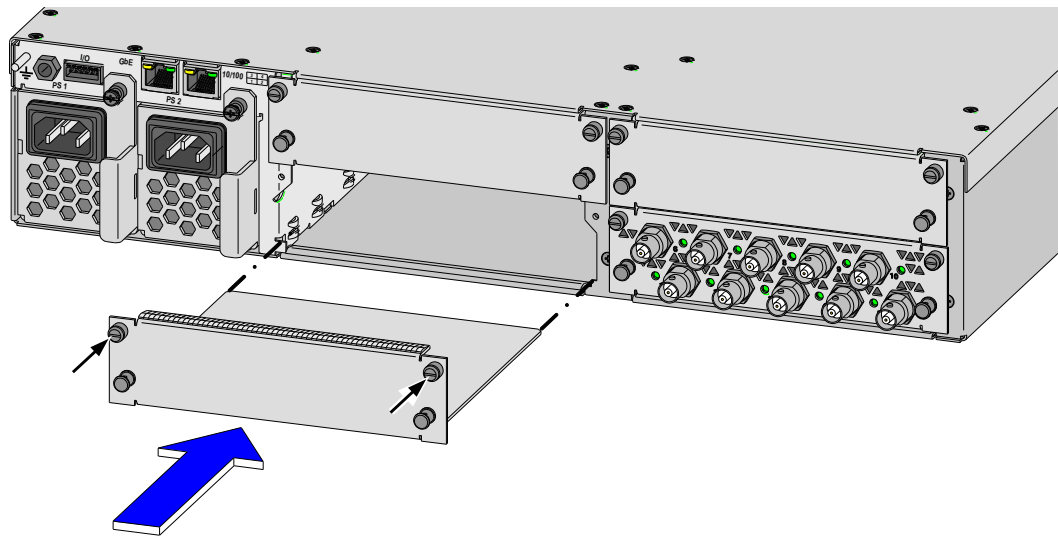
Follow proper ESD handling procedures. ESD may cause permanent damage to electric components.

The following procedure explains how to remove a card from the device.

- 1 Power off the DCM.
- 2 For an interface card, unplug the signal cables from the card.
- 3 Loosen both screws of the card.



- 4 Gently pull the module out the device using its handles.
- 5 When the removed card is not replaced by another card, the device slot must be covered by a cover plate. Therefore slide the interface card cover plate into the PCB guides of the device slot and tighten both screws.



- 6 Power on the device

Installing or Removing a Co-Processor Card

Introduction

The Co-Processor Card, which is used for advanced processing, can be mounted either on an ASI, ASI SFN, or GbE Interface Card. Since the Co-Processor Card manipulates the outgoing transport stream(s), the card must be installed on the interface card to which the outgoing transport stream belongs to.

To Install a Co-Processor Card

When you have read the safety instructions in topic *Important Safety Instructions* on page xi, you are ready to install a Co-Processor Card on an ASI or GbE Interface Card.



CAUTION:

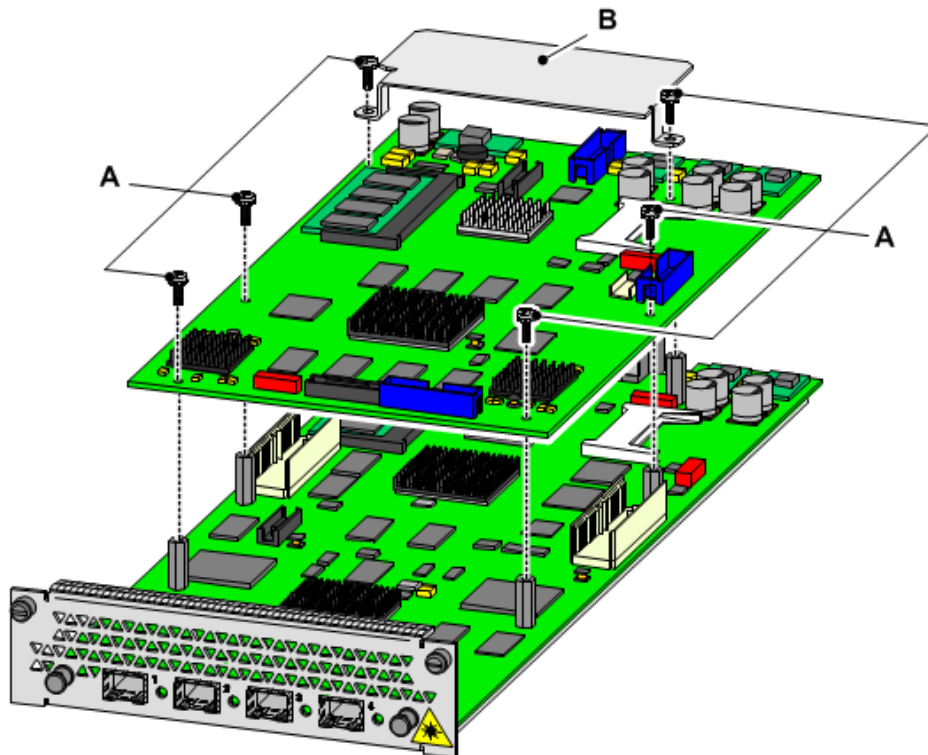
Follow proper ESD handling procedures. ESD may cause permanent damage to electric components.

The following steps explain how to install a Co-Processor Card on an interface card.

- 1 Unpack the Co-Processor card.

When unpacking a unit, examine it, the accessories, and the packing material for obvious signs of damage. Check the unit against the delivery/packing note. Retain the packing material, as it is required for warranty shipments and for later inspection by the carrier. Should any item be damaged, notify the carrier and our customer services department. See also appendix *Customer Information* on page 115.

- 2 Remove the interface card as described in topic *Installing or Removing an Interface Card* on page 105.
- 3 Position the Co-Processor Card on the interface card as indicated in the illustration below.



- 4 Gently plug the Co-Processor Card into the connectors of the interface card.
- 5 Position protection cover **B** as shown in the illustration and tighten the pan-head screws **A** (M3x6) with shakeproof washer.
- 6 Install the interface card with Co-Processor Card into the device as described in topic *Installing or Removing an Interface Card* on page 105.

To Remove a Co-Processor Card

When you have read the safety instructions in topic *Important Safety Instructions* on page xi, you are ready to remove a Co-Processor Card from an ASI, ASI SFN, or GbE Interface Card.

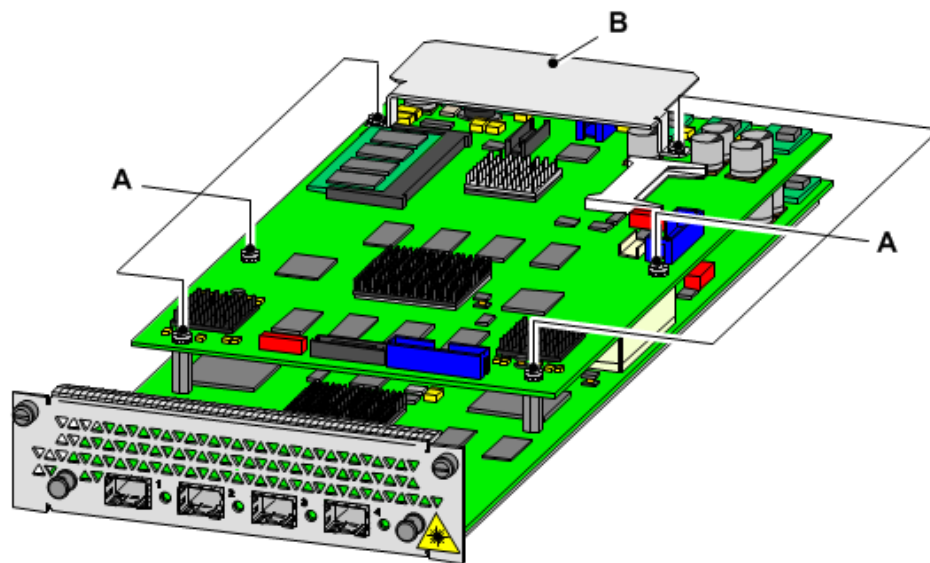


CAUTION:

Follow proper ESD handling procedures. ESD may cause permanent damage to electric components.

The following steps explain how to remove a Co-Processor Card from an interface card.

- 1 Remove the interface card containing the Co-Processor Card from the device as described in topic *Installing or Removing an Interface Card* on page 105.



- 2 Loosen the pan-head screws **A** and remove protection cover **B**.
- 3 Gently unplug the Co-Processor Card from the interface card.
Note: Keep card, protection cover, and screws together for future use.
- 4 Install the interface card back into the device as described in topic *Installing or Removing an Interface Card* on page 105.

Installing or Removing a FEC Card

Introduction

The card of the FEC option can only be installed on a GbE Interface Card supporting FEC (part number 4023050). Since a FEC Card processes incoming and outgoing transport stream(s), the card must be installed on the GbE Interface Card to which these transport streams belongs to.

To Install a FEC Card on a GbE Interface Card

When you have read the safety instructions in topic *Important Safety Instructions* on page xi, you are ready to install a FEC card on a GbE Interface Card.



CAUTION:

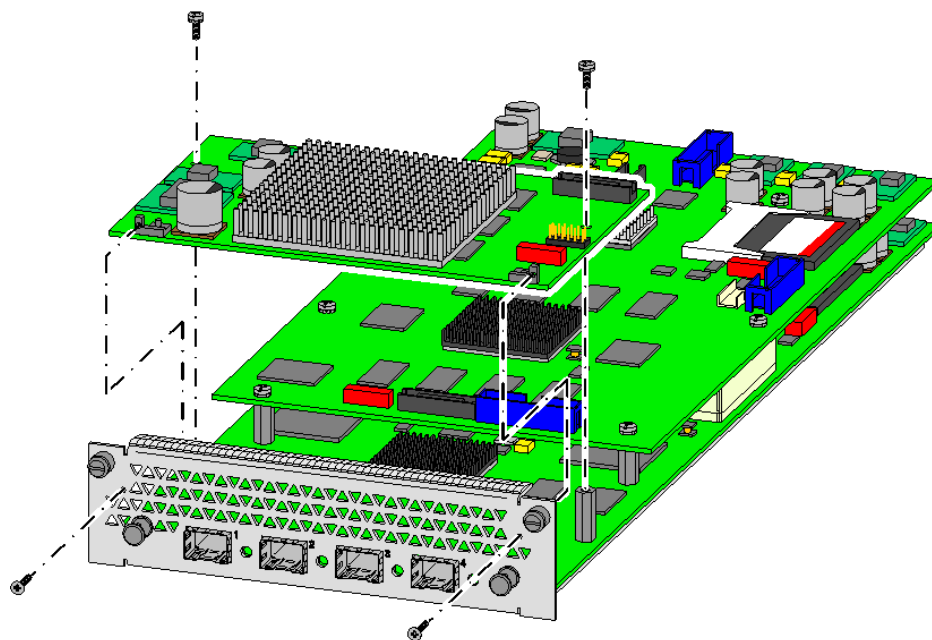
Follow proper ESD handling procedures. ESD may cause permanent damage to electric components.

The following steps explain how to install a FEC Card on an interface card.

- 1 Unpack the card of the FEC option.

When unpacking a unit, examine it, the accessories, and the packing material for obvious signs of damage. Check the unit against the delivery/packing note. Retain the packing material, as it is required for warranty shipments and for later inspection by the carrier. Should any item be damaged, notify the carrier and our customer services department. See also appendix *Customer Information* on page 115.

- 2 Remove the GbE Interface Card as described in topic *Installing or Removing an Interface Card* on page 105.
- 3 Position the card on the interface card as indicated in the illustration below.



- 4 Plug in the card in both connectors on the interface card and tighten the screws.
- 5 Install the interface card with FEC Card back into the device as described in topic *Installing or Removing an Interface Card* on page 105.

To Remove the FEC Card from a GbE Interface Card

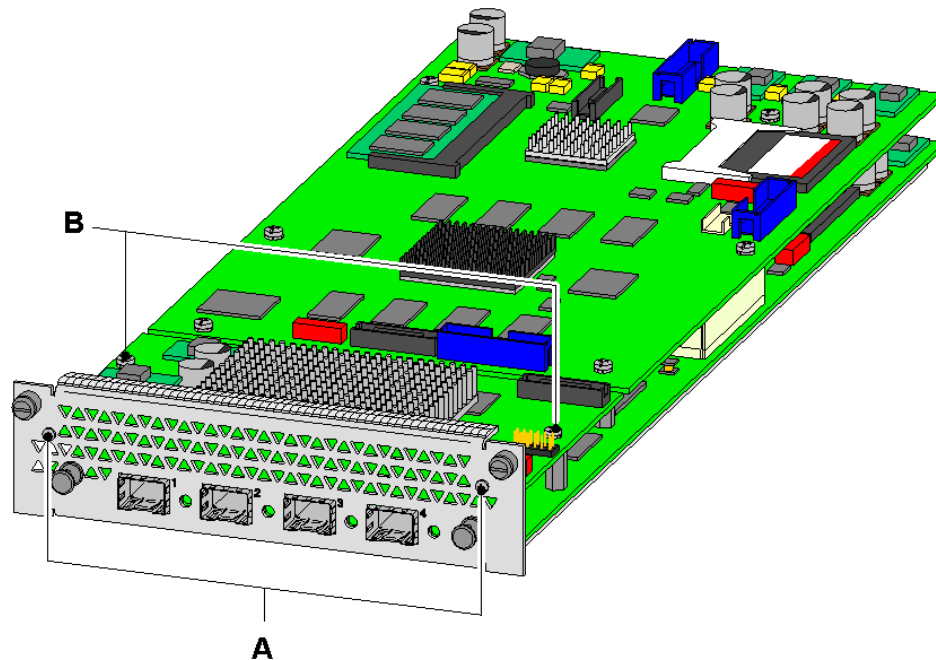
When you have read the safety instructions in topic *Important Safety Instructions* on page xi, you are ready to remove the FEC Card from a GbE Interface Card.

**CAUTION:**

Follow proper ESD handling procedures. ESD may cause permanent damage to electric components.

The following steps explain how to remove the FEC card from a GbE Interface Card.

- 1 Remove the GbE Interface Card containing the FEC card from the device as described in topic *Installing or Removing an Interface Card* on page 105.



- 2 Loosen the pan-head screws **A** and **B**.
- 3 Gently unplug the FEC card from the interface card.
Note: Keep card and screws together for future use.
- 4 Install the interface card back into the device as described in topic *Installing or Removing an Interface Card* on page 105.

Installing or Removing a PSU

Introduction

For redundancy reasons the DCM can be provided with two Power Supply Units (PSU). A device with one PSU can always be extended with a second PSU. Since the PSU is hot swappable, the device must not be powered off during insertion or removal of a redundant PSU.

To Install a PSU

When you have read the safety instructions in topic *Important Safety Instructions* earlier in this guide, you are ready to install a PSU module into the DCM.



CAUTION:

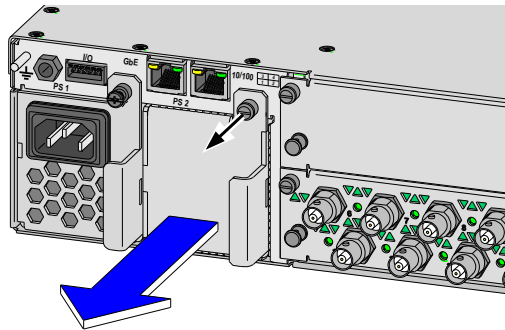
Follow proper ESD handling procedures. ESD may cause permanent damage to electric components.

The following steps explain how to install a PSU module into the device.

1 Unpack the PSU.

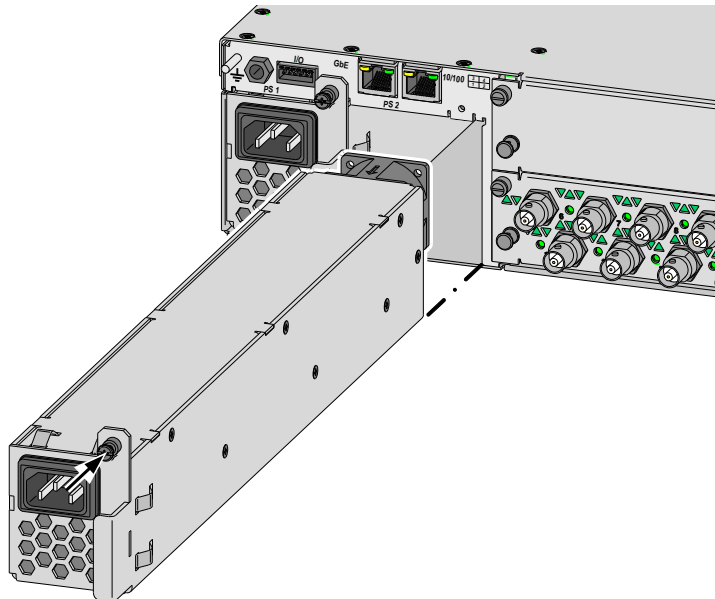
When unpacking a unit, examine it, the accessories, and the packing material for obvious signs of damage. Check the unit against the delivery/packing note. Retain the packing material, as it is required for warranty shipments and for later inspection by the carrier. Should any item be damaged, notify the carrier and our customer services department. See also appendix *Customer Information* on page 115.

2 Loosen the screw of the PSU cover plate that covers the free PSU slot.



3 Remove the PSU cover plate.

4 Carefully slide the new PSU into the PSU slot of the device.



5 Fix the new PSU by tightening its screw.

6 Power up the PSU module. More information concerning powering up a PSU module can be found in topic *Connection of a DCM to AC Power Sources* on page 33 or topic *Connection of a DCM to DC Power Sources* on page 34.

To Remove a PSU

When you have read the safety instructions in topic *Important Safety Instructions* earlier in this guide, you are ready to remove a PSU module from the DCM.

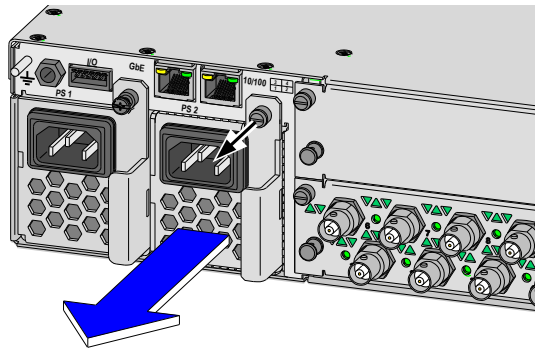


CAUTION:

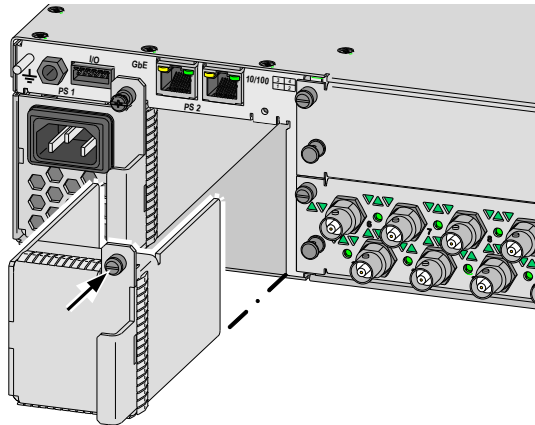
Follow proper ESD handling procedures. ESD may cause permanent damage to electric components.

The following steps explain how to remove a PSU module from the device.

- 1 Power off the PSU that must be removed. An AC version PSU is powered off by disconnecting the power cord and a DC version PSU by means of the disconnect branch circuit protection device on which the DC version PSU is connected.
- 2 Loosen the screw and pull out the PSU module.



- 3 When the removed PSU is not replaced by another one, the PSU slot must be covered using a PSU cover. Therefore slide the PSU cover into the PSU slot and tighten its screw.



A

Customer Information

Introduction

This appendix contains information on obtaining product support.

In This Appendix

■ Product Support.....	116
■ Return Products for Repair.....	118

Product Support

Obtaining Support

IF...	Then...
you have general questions about this product	contact your distributor or sales agent for product information or refer to product data sheets on www.cisco.com .
you have technical questions about this product	call the nearest <i>Technical Support</i> center or Cisco office.
you have customer service questions or need a return material authorization (RMA) number	call the nearest <i>Customer Service</i> center or Cisco office.

Support Telephone Numbers

This table lists the Technical Support and Customer Service numbers for your area.

Region	Centers	Telephone and Fax Numbers
North America	Cisco Services Atlanta, Georgia United States	For <i>Technical Support</i> , call: ■ Toll-free: 1-800-722-2009 ■ Local: 678-277-1120 (Press 2 at the prompt) For <i>Customer Service</i> , call: ■ Toll-free: 1-800-722-2009 ■ Local: 678-277-1120 (Press 3 at the prompt) ■ Fax: 770-236-5477 ■ Email: customer-service@cisco.com
Europe, Middle East, Africa	Belgium	For <i>Technical Support</i> , call: ■ Telephone: 32-56-445-197 or 32-56-445-155 ■ Fax: 32-56-445-061 For <i>Customer Service</i> , call: ■ Telephone: 32-56-445-444 ■ Fax: 32-56-445-051 ■ Email: service-elc@cisco.com
Japan	Japan	■ Telephone: 81-3-5908-2153 or +81-3-5908-2154 ■ Fax: 81-3-5908-2155
Korea	Korea	■ Telephone: 82-2-3429-8800 ■ Fax: 82-2-3452-9748 ■ Email: songk@cisco.com
China (mainland)	China	■ Telephone: 86-21-2401-4433 ■ Fax: 86-21-2401-4455 ■ Email: xishan@cisco.com
All other Asia Pacific countries & Australia	Hong Kong	■ Telephone: 852-2588-4746 ■ Fax: 852-2588-3139 ■ Email: saapac-support@cisco.com

Region	Centers	Telephone and Fax Numbers
Brazil	Brazil	■ Telephone: 11-55-08-9999 ■ Fax: 11-55-08-9998 ■ Email: fattinl@cisco.com or ecavalhe@cisco.com
Mexico, Central America, Caribbean	Mexico	For <i>Technical Support</i>, call: ■ Telephone: 52-3515152599 ■ Fax: 52-3515152599 For <i>Customer Service</i>, call: ■ Telephone: 52-55-50-81-8425 ■ Fax: 52-55-52-61-0893 ■ Email: sa-latam-cs@cisco.com
All other Latin America countries	Argentina	For <i>Technical Support</i>, call: ■ Telephone: 54-23-20-403340 ext 109 ■ Fax: 54-23-20-403340 ext 103 For <i>Customer Service</i>, call: ■ Telephone: 770-236-5662 ■ Fax: 770-236-5888 ■ Email: keillov@cisco.com

Return Products for Repair

Introduction

You must have a return material authorization (RMA) number to return a product. Contact the nearest customer service center and follow their instructions.

Returning a product to Cisco for repair includes the following steps:

- Obtaining a RMA number
- Obtaining a customer service center shipping address
- Packing and shipping the product

Obtaining an RMA Number and Shipping Address

You must have an RMA number to return products.

RMA numbers are valid for 60 days. If you already have a number, but it is older than 60 days, you must contact a customer service representative to revalidate the number. You can return the product after the RMA number is revalidated.

Follow these steps to obtain an RMA number and shipping address.

- 1 Contact a customer service representative to request a new RMA number or revalidate an existing one.

Refer to the earlier section titled **Support Telephone Numbers** to find a customer service telephone number in your area.

- 2 Provide the following information to the customer service representative:
 - Product name, model number, part number, serial number (if applicable)
 - Quantity of products to return
 - A reason for returning the product
 - Your company name, contact, telephone number, email address, and fax number
 - Any service contract details
 - Purchase order number of repair disposition authority, if available

Result: The customer service representative issues the RMA number and provides the shipping address.

Notes: If you cannot provide a purchase order number:

- A proforma invoice listing all costs incurred will be sent to you at the completion of product repair.

- Customer service must receive a purchase order number within 15 days after you receive the proforma invoice.
- Products can accrue costs through damage or misuse, or if no problem is found. Products incurring costs will not be returned to you without a valid purchase order number.
- Proceed to **Packing and Shipping the Product**.

Packing and Shipping the Product

Follow these instructions to pack the product and ship it to Cisco.

- 1 Are the product's original container and packing material available?
 - If **yes**, pack the product in the container using the packing material.
 - If **no**, pack the product in a sturdy, corrugated box, and cushion it with packing material.

Important:

- You are responsible for delivering the returned product to Cisco safely and undamaged. Shipments damaged due to improper packaging may be refused and returned to you at your expense.
 - Do not return any power cords or accessories.
- 2 Write the following information on the outside of the container:
 - Your name
 - Your complete address
 - Your telephone number
 - RMA number
 - Problem description

Note: Absence of the RMA number may delay processing of product repair and/or result in the equipment being returned unrepared. Include the RMA number in all correspondence.

- 3 Ship the product to the address provided by the customer service representative.

Note: Cisco does not accept freight collect. Be sure to prepay and insure all shipments.

Glossary

ac, AC

alternating current. An electric current that reverses its direction at regularly recurring intervals.

ASI

asynchronous serial interface. Allows the intermittent transfer of data one bit at a time rather than in a steady stream.

AWG

American Wire Gauge. A U.S. standard for wire conductor sizes.

BNC

A coaxial connector that uses two bayonet lugs on the side of the female connector. BNC stands for Bayonet Neill Concelman and is named after Amphenol engineer Carl Concelman.

CATV

community antenna television or cable television system. A broadband communications system capable of delivering multiple channels of programming from a centralized set of antennas, generally by coaxial cable, to a community. Many systems now integrate microwave and satellite links into their design.

CDRH

Centre for Devices and Radiological Health. The CDRH is responsible for ensuring the safety and effectiveness of medical devices and protecting consumers against harmful radiation from medical, occupational, and consumer products.

CENELEC

Comité Européen de Normalisation ELECtrotechnique. The European Committee for electro-technical standardization.

CSA

Canadian Standards Association.

Glossary

dc, DC

direct current. An electric current flowing in one direction only and substantially constant in value.

DCM

digital content manager.

DVI

digital video insertion.

DVP

digital video platform.

EMC

electromagnetic compatibility. A measure of equipment tolerance to external electromagnetic fields.

EN

European norm.

ESD

Electrostatic Discharge

FCC

Federal Communications Commission. Federal organization set up by the Communications Act of 1934 which has authority to regulate all inter-state (but not intra-state) communications originating in the United States (radio, television, wire, satellite, and cable).

FEC

forward error correction. System of data transmission in which redundant bits generated at the transmitted end are used by the receiver to detect, locate, and correct transmission errors before delivering the data to the local data communications link. This avoids requiring the transmitter to resend information.

GbE or GigE

gigabit ethernet. A LAN transmission standard that provides a data rate of 1 billion bits per second. Gigabit ethernet is defined in the IEEE 802.3z standard. Gigabit ethernet is carried primarily on optical fiber.

GUI

graphical user interface. A program interface that takes advantage of a computer graphics

capabilities to make the program visually easier to use.

I/O

input/output.

IEC

International Electro-technical Commission.

IP

Internet protocol. A standard that was originally developed by the United States Department of Defense to support the internetworking of dissimilar computers across a network. IP is perhaps the most important of the protocols on which the Internet is based. It is the standard that describes software that keeps track of the internetwork addresses for different nodes, routes, and outgoing/incoming messages on a network. Some examples of IP applications include email, chat, and Web browsers.

LAN

local area network. A communications link between two or more points within a small geographical area, such as between buildings. Typically permits data rates up to 100 Mbps. Smaller than a metropolitan area network (MAN) or a wide area network (WAN).

LED

light-emitting diode. An electronic device that lights up when electricity passes through it.

MPEG

Motion Picture Experts Group. A joint committee of the International Standards Organization (ISO) and the International Electrotechnical Commission (IEC). This committee develops and maintains the MPEG specification for a series of hardware and software standards designed to reduce the storage requirements of digital video and audio. The common goal of MPEG compression is to convert the equivalent of about 7.7 MB down to under 150 K, which represents a compression ratio of approximately 52 to 1. Current standards are MPEG-1, MPEG-2, and MPEG-4.

PC

personal computer.

PCR

program clock reference.

PSI

program specific information.

Glossary

PSU

power supply unit.

RMA

return material authorization. A form used to return products.

RU

rack unit. RU is the measuring unit of vertical space in a standard equipment rack. One RU equals 1.75" (44.5 mm).

RX

receive or receiver.

SELV

safety extra-low voltage.

SFP

small form-factor pluggable.

SI

system or service information. Tuning information sent from the DNCS to DHCTs which provides the information that DHCTs need to be able to tune to a particular service.

SNMP

simple network management protocol. A protocol that governs network management and the monitoring of network devices and their functions.

TX

transmit or transmitter.

UDP

user datagram protocol. A connectionless protocol, like TCP, that runs on top of IP networks. Unlike TCP/IP, UDP/IP provides very few error recovery services, offering instead a direct way to send and receive datagrams over an IP network without acknowledgements for guaranteed delivery.



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www.Cisco.com

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