Hardware Reference Guide

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Revision B

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Trademark/Copyright Notices

Duet, Lyric, and CAL are Registered Trademarks of Chyron Corporation.

Windows 95 , Windows NT , and TrueType are Registered Trademarks of Microsoft Corporation.

Safety Statements

English

Caution - Identifies conditions or actions that could result in improper equipment operation, and/or damage to the equipment or other property.

Warning - Identifies conditions or actions that could result in personal injury.

Antistatic Wrist Strap

Warning: If using an antistatic wrist strap, the grounding cord must contain a 1 meg ohm to 10 meg ohm series isolation resistor.

Chassis Grounding

Warning: The chassis is grounded through the ground conductor of the A/C line cord. To prevent an electric shock hazard, only plug the line cord into a properly grounded A/C wall receptacle, as verified by a qualified installation technician.

Double Pole/Neutral Fusing

Warning: This unit may contain a neutral line fuse.

Fuse Replacement

Caution: For continued protection against fire, replace fuse with the same type and rating.

Power Cord

Caution: Only use the Line Cord which was supplied with the equipment, or a factory approved alternate. Do not use an extension cord.

Power Source

Caution: Equipment may only be operated at the specified line voltage and frequency.

Servicing

Warning: Servicing must only be performed by a qualified Service Technician. The removal of service access panels may expose an individual to hazardous voltages. Line cord should be disconnected before any servicing is performed.

FCC Statement of Compliance

Caution: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense. Changes or modifications not expressly approved by Chyron could void the user's authority to operate the equipment.

CE Mark EMC Statement of Compliance

Caution:When installed and used properly, as indicated in Chyron system manuals, this product meets Electromagnetic Environment requirements E2, as defined by Product Family standards EN55103-1:1997 and EN55103-2:1997. It is intended for

use in a commercial and light industrial environment (including, for example, theatres).

CSA Statement of Compliance

This class A digital apparatus complies with Canadian ICES-003.

Français

Mise en garde - Identifie des conditions ou des actions pouvant causer un fonctionnement incorrect du matériel et/ou des dommages au matériel ou à d'autres biens.

Avertissement - Identifie des conditions ou des actions pouvant causer des blessures corporelles.

Bracelet antistatique

Avertissement: Si vous utilisez un bracelet antistatique, le cordon de mise à la terre doit contenir une résistance d'isolation série de 1 mégohm à 10 mégohms.

Mise à la terre du chassis

Avertissement: Le châssis est mis à la terre par le biais d'un conducteur de mise à la terre du cordon d'alimentation c.a. Pour empêcher tout risque de choc électrique, branchez seulement le cordon d'alimentation dans une prise murale secteur correctement mise à la terre et inspectée par un technicien compétent en matière d'installation.

Fusible neutre/bipolaire

Avertissement: Cet appareil contient un fusible de ligne neutre.

Remplacement du fusible

Mise en garde: Pour assurer une protection continue contre les incendies, remplacez le fusible par un fusible du même type et de la même capacité nominale.

Cordon d'alimentation

Mise en garde: Utilisez seulement le cordon d'alimentation qui a été fourni avec le matériel ou un autre cordon agréé par le fabricant. N'utilisez pas de rallonge.

Source d'alimentation

Mise en garde: Le matériel ne peut être utilisé qu'à la tension du secteur et la fréquence spécifiées.

Réparations

Avertissement : Les réparations ne doivent être effectuées que par un réparateur agréé. Le retrait de panneaux d'accès risque d'exposer les personnes concernées à des tensions dangereuses. Le cordon d'alimentation secteur doit être déconnecté avant de réaliser de quelconques réparations.

Déclaration de conformité aux règlements de la FCC

Mise en garde: Ce matériel a été soumis à des tests qui ont permis de déterminer qu'il respecte les limites fixées pour un dispositif numérique de la Classe A, en vertu de la Partie 15 des règlements de la FCC. Ces limites sont conçues de façon à assurer une protection raisonnable contre les parasites perturbateurs lorsque le matériel est utilisé dans un environnement commercial. Ce matériel produit, utilise et peut rayonner de l'énergie haute fréquence et, s'il n'est pas installé et utilisé conformément au mode d'emploi, il risque de causer des parasites perturbateurs affectant les communications radio. L'utilisation de ce matériel dans une zone résidentielle causera vraisemblablement des parasites perturbateurs, auquel cas l'utilisateur sera tenu de mettre fin à ces parasites à ses propres frais. Les changements ou modifications n'ayant pas été approuvés explicitement par Chyron peuvent entraîner l'annulation du droit d'utilisation du

matériel par l'opérateur.

Déclaration de conformité en ce qui concerne la compatibilité électromagnétique – Marque CE

Mise en garde: Lorsqu'il est installé et utilisé correctement, conformément à ce qui est indiqué dans les manuels des systèmes Chyron, ce produit satisfait aux exigences concernant les environnements électromagnétiques E4, telles qu'elles sont définies par les normes EN55103-1:1997 et EN55103-2:1997 sur les familles de produits. Il est prévu pour un emploi dans un environnement à compatibilité électromagnétique contrôlée (par exemple, studios d'enregistrement ou de diffusion construits dans un tel but) ou dans un environnement rural extérieur (à distance suffisante des chemins de fer, des émetteurs, des lignes surélevées de transport d'électricité, etc.).

Déclaration de conformité à l'ACNOR

Cet appareil numérique de la Classe A est conforme à la norme canadienne ICES-003.

Deutsch

Vorsicht - Identifiziert Zustände oder Maßnahmen, die zu unzulänglichem Betrieb des Gerätes führen und/oder das Gerät oder andere Gegenstände beschädigen können.

Warnung - Identifiziert Zustände oder Maßnahmen, die zu Körperverletzung führen können.

Antistatik-Armband

Warnhinweis: Bei Verwendung eines Antistatik-Armbands muss das Erdungskabel über einen in Serie geschalteten Isolierungswiderstand von 1 – 10 MÙ verfugen.

Chassiserdung

Warnhinweis: Das Chassis ist über den Erdungsleiter des Netzkabels geerdet. Um die Gefahr eines elektrischen Schlags zu vermeiden, muss das Netzkabel an einer ordnungsgemäß geerdeten Netzsteckdose angeschlossen werden, die von einem geschulten Elektriker überprüft wurde.

Zwei Pole und neutrale Sicherung

Warnhinweis: Dieses Gerät kann über eine Sicherung im Neutralleiter verfügen.

Sicherungswechsel

Achtung: Aus Brandschutzgründen darf die vorhandene Sicherung nur durch eine Sicherung gleichen Typs und gleicher Stärke ausgewechselt werden.

Netzkabel

Achtung: Für das Gerät sollte nur das mitgelieferte Netzkabel oder ein vom Werk genehmigtes Ersatzkabel verwendet werden. Kein Verlängerungskabel verwenden.

Stromversorgung

Achtung: Das Gerät darf nur mit der angegebenen Netzspannung und Frequenz betrieben werden.

Wartung

Warnhinweis: Wartungsarbeiten dürfen nur von einem geschulten Wartungstechniker ausgeführt werden. Durch Entfernen der Abdeckung können Personen gefährlichen Spannungen ausgesetzt werden. Vor Beginn der Wartungsarbeiten ist das Netzkabel zu trennen.

FCC-Konformitätserklärung

Achtung: Dieses Gerät wurde getestet und entspricht den für ein digitales Gerät der Klasse A geltenden Beschränkungen gemäß Teil 15 der FCC-Regelung. Diese Grenzwerte sollen angemessenen Schutz vor schädlichen Interferenzen beim Betrieb des Geräts in kommerziellen Umgebungen bieten. Dieses Gerät erzeugt und verwendet elektromagnetische Wellen und kann diese ausstrahlen. Wird das Gerät nicht unter Einhaltung der Anweisungen installiert und verwendet, kann dies zu ernsthaften Störungen bei Radio-, Fernseh- und Funkübertragungen führen. Beim Betrieb des Geräts in Wohngebieten können schädliche Störungen auftreten. Die Beseitigung dieser Störungen geht zu Lasten des Benutzers. Änderungen oder Modifikationen, die nicht ausdrücklich von Chyron genehmigt worden sind, können zum Erlöschen der Betriebserlaubnis führen.

CE-Zeichen – EMV-Konformitätserklärung

Achtung: Bei ordnungsgemäßer Installation und Gebrauch entsprechend den Systemhandbüchern von Chyron erfüllt dieses Produkt die Anforderungen für elektromagnetische Umgebungen E2 gemäß Definition in den Produktfamilien-Normen EN55103-1:1997 und EN55103-2:1997. Es ist für den Gebrauch in kommerziellen und leichten industriellen Umgebungen (z.B. in Theatern) vorgesehen.

CSA-Konformitätserklärung

Dieses digitale Gerät der Klasse A entspricht der kanadischen Norm ICES-003.

Italiano

Attenzione - Identifica una condizione o un'azione che potrebbe compromettere l'uso corretto dell'apparecchio, e/o provocare danni all'apparecchio stesso o ad altra proprietà.

Avvertenza - Identifica una condizione o un'azione che potrebbe causare lesioni alle persone.

Fascia da polso antielettrostatica

Avvertenza: se si usa una fascia da polso antielettrostatica, il cavo di terra deve contenere un resistore di isolamento della serie da 1 meg ohm a 10 meg ohm.

Collegamento a terra del telaio

Avvertenza: il telaio viene collegato a terra tramite il conduttore di terra del cavo della linea a c.a. Per evitare rischi di scosse elettriche, collegare il cavo di linea solo ad una presa sul muro a c.a. dotata di collegamento a terra verificato da un impiantista qualificato.

Doppia polarità/fusibile neutro

Avvertenza: questa unità potrebbe contenere un fusibile di linea neutro.

Sostituzione dei fusibili

Attenzione: per garantire una protezione continua da incendi, sostituire il fusibile con uno dello stesso tipo e della stessa potenza nominale.

Cavo di alimentazione

Attenzione: usare solo il cavo di linea fornito in dotazione con l'apparecchiatura o un altro cavo approvato dalla fabbrica. Non usare prolunghe.

Alimentazione

Attenzione: l'apparecchiatura può essere usata solo alla tensione di linea e alla frequenza specificate.

Assistenza

Avvertenza: gli interventi di assistenza devono essere effettuati solo da tecnici addetti all'assistenza qualificati. La rimozione dei pannelli di accesso per interventi di assistenza possono esporre le persone a tensioni pericolose. Prima di effettuare eventuali interventi di assistenza scollegare il cavo di linea.

Dichiarazione di conformità FCC

Attenzione: questa apparecchiatura è stata collaudata ed è risultata conforme ai limiti applicabili ai dispositivi digitali di Classe A, secondo la parte 15 delle norme FCC. Lo scopo di questi limiti è fornire una protezione ragionevole da interferenze nocive quando l'apparecchiatura viene usata in ambiente commerciale. Questa apparecchiatura genera, utilizza e può emettere energia di radiofrequenza e, se non è installata e usata in conformità con il manuale di istruzioni, può causare interferenze nocive alle comunicazioni radio. L'uso di questa apparecchiatura in un'area residenziale può causare interferenze nocive, in tal caso l'utente dovrà rimediare a tali interferenze a proprie spese. Eventuali modifiche o alterazioni non espressamente approvate dalla Chyron possono invalidare l'autorità dell'utente all'uso dell'apparecchiatura.

Dichiarazione di conformità EMC - marchio CE

Attenzione: quando è installato e usato correttamente, secondo quanto indicato nei manuali dei sistemi Chyron, questo prodotto è conforme alle norme per gli ambienti elettromagnetici E2 (Electromagnetic Environments E2), secondo la definizione fornita dagli standard EN55103-1:1997 e EN55103-2:1997 per famiglia di prodotti. Il prodotto è indicato per l'uso in un ambiente commerciale e industriale leggero (ad es., teatri).

Dichiarazione di conformità CSA

Questa apparecchiatura digitale di Classe A è conforme allo standard canadese ICES-003.

Español

Precaución: Identifica condiciones o acciones que pueden provocar el uso indebido del equipo o daños al equipo u otros bienes.

Advertencia: Identifica condiciones o acciones que pueden ocasionar lesiones personales.

Muñequera antiestática

Advertencia: Cuando se use una muñequera antiestática, el cable de conexión a tierra debe contener un resistor de aislamiento en serie de entre 1 y 10 megaohmios.

Conexión a tierra del chasis

Advertencia: El chasis está conectado a tierra a través del conductor de tierra del cable de alimentación de CA. Para evitar el peligro de descargas eléctricas, el cable de alimentación sólo debe enchufarse a una toma de corriente mural de CA debidamente conectada a tierra, y comprobada por un técnico de instalación cualificado.

Fusible bipolar neutro

Advertencia: Esta unidad puede contener un fusible de red neutro.

Cambio de fusibles

Precaución: Como protección constante contra incendios, sólo se debe cambiar un fusible por otro del mismo tipo y graduación.

Cable de alimentación

Precaución: Sólo puede utilizarse el cable de alimentación suministrado con el equipo u otro aprobado por el fabricante. No deben utilizarse cables de extensión.

Fuente de alimentación

Precaución: El equipo sólo puede utilizarse con el voltaje y la frecuencia de red especificados.

Servicio técnico

Advertencia: Las operaciones de servicio técnico sólo deben realizarlas técnicos cualificados del Servicio técnico. Al retirar los paneles de acceso para el servicio técnico puede producirse la exposición a voltajes peligrosos. El cable de alimentación debe desconectarse antes de realizar cualquier operación de servicio técnico.

Declaración de conformidad con la FCC (comisión federal de comunicaciones estadounidense)

Precaución: Se ha comprobado que este equipo cumple los límites de los dispositivos digitales de clase A, de acuerdo con la parte 15 de las reglas de la FCC. Estos límites están concebidos para ofrecer una protección razonable contra interferencias perjudiciales cuando el equipo se utilice en entornos comerciales. Este equipo genera, utiliza y puede emitir energía de radiofrecuencia; si no se instala y emplea de acuerdo con el manual de instrucciones, puede causar interferencias perjudiciales en las comunicaciones de radio. Es probable que este equipo cause interferencias perjudiciales si se utiliza en un área residencial, en cuyo caso el usuario tendrá que correr con los gastos derivados de la corrección de las interferencias. Los cambios o modificaciones que

Chyron no haya aprobado expresamente pueden anular la autorización del usuario para utilizar el equipo.

Declaración de conformidad con la compatibilidad electromagnética del marcado «CE»

Precaución: Si se instala y utiliza correctamente de la forma indicada por los manuales del sistema de Chyron, este producto cumple la regla para entornos electromagnéticos E2 (Electromagnetic Environments E2), tal como definen las normas Product Family EN55103-1:1997 y EN55103-2:1997. Este dispositivo está diseñado para utilizarse en un entorno comercial e industrial ligero (que incluye, por ejemplo, teatros y salas de espectáculos).

Declaración de conformidad con la CSA (asociación Canadiense de estándares)

Este dispositivo digital de clase A cumple la normativa canadiense ICES-003.

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1 - Duet Introduction

1.1 Welcome!

Duet is a real-time, multi-purpose, media processing platform. Based on CHYRON-proprietary hardware which integrates a Pentium III processor running Windows NT, Duet is Chyron-reliable, yet open-platform compliant.

1.2 Duet Features and Specifications

- Rack-mountable chassis (6 rack units)
- High capacity auto-switching power supply
- High bandwidth YUV/RGB Chyron backplane, scalable for multiple DTV resolutions
- Seven (7) high-speed slots for Chyron video graphics boards, including:
  - Chyron YUV I/O board incorporating multiple SDI video/key inputs and outputs
  - SD or HD Mixer board (optional)
  - Up to five Chyron Video Graphics Engines. VGEs incorporate an object-based 3D graphics chip set for real-time 2D/3D graphics display and animation. *SD Duet includes **one VGE** as standard equipment. HD Duet includes **two VGE**s and an **HD Mixer** board as standard equipment.*
- Distributed processing with real-time operating system running on graphics boards and Windows NT O/S for user interface and peripherals.
- NLX computer board with Intel Pentium III CPU, and 10/100 BASE-T, serial, parallel, keyboard, and mouse ports.

- Microsoft Windows NT 4.0 operating system for GUI, disk I/O, networking, etc.
- Eight (8) slots on backplane for standard PCI based board solutions (Digital Audio, Display, SCSI & Networking).
- CAL Hardware Abstraction Layer compliance.

Duet Physical Specifications	
Length	24.33 inches
Width (with slide rails)	18.00 inches
Width (with mounting brackets)	19.00 inches
Height	10.44 inches
Weight (varies with system configuration)	65 lbs approx., typical
Operating Temperature	**0° - 40°**
Operating Humidity	**20% to 80% non-condensing**

Duet Electric Specifications	
AC Input	**90-264 VAC, 47-63 Hz, auto-ranging**
Power Capacity	**840 Watts**
Power Supply DC Outputs	**V1: +5Vdc @ 120A** **V2: +3.3 @ 75A** **V1 and V2 are current shared to a maximum combined capacity of 120A total.**
Peak Inrush Current	**115 VAC, less than 40 A** **230 VAC, less than 80 A**

1.3 About This Publication

This Hardware Reference Guide has been written for installation and maintenance personnel, OEM hardware/software developers, and broadcast engineers who wish

to familiarize themselves with Duet installation, hardware architecture, system maintenance, and related upkeep issues.

1.4 Organization

This Reference Guide is divided into the following sections:

- Introduction
- Installation and setup
- Hardware Overview
- Board Removal/Replacement procedures
- Upgrade/Maintenance
- Duet GPI/O Board installation and maintenance

1.5 Manual Conventions

1.5.1 Key Names/Directory Names

- Key names appear in a special "highlight" font (e.g. **CNTL L**.)
- Directory names in text examples also appear in this font (e.g. **C/Duet**).

1.5.2 Keystroke Representations

When a "**+**" does not appear between two keystrokes, the keystrokes can be performed in the order shown without having to hold one key down while pressing another. If a "**+**" appears between two keystrokes, you must keep the first key pressed while you press the second key. For

example, if you see **CNTL SHIFT + A**, press **CNTL** and release it, then press **SHIFT**, and while holding it down, press **A**.

1.5.3 Notes, Cautions and Warnings

These notices are included to highlight a particular useful fact, or to prevent you from damaging the equipment or harming yourself. Notices follow these conventions:

NOTE Provides useful additional information for a particular description or procedure.

CAUTION! Alerts the reader to a situation where the EQUIPMENT may be at risk, or where some critical function (such as on-air behavior) may be affected.

WARNING! Alerts the reader to a situation where he/she is at risk of bodily injury.

1.5.4 Artwork/Image Rendering

We make every effort to use the most realistic renderings of various screen images in CHYRON manuals.

However, some screen graphics in this manual do not look exactly like the matching displays on your system's monitor. This is because our most important goal is clarity; and a menu with a black background or small text may not reproduce in print as well as it does on video. Therefore, we have taken some artistic license, to reproduce graphics in such a way that the essential information carries through clearly.

2 - Installation And Setup

2.1 Installation Overview

This section describes Duet hardware installation, including chassis installation, electrical hookup, peripheral and data connections, and video input/outputs.

Begin by unpacking the system, saving the container in the event the unit has to be returned or shipped again. Check to see that everything on the packing list is there; if any components or accessories are missing or damaged, contact CHYRON Customer Service immediately at **1-888-4-CHYRON**.

2.2 Equipment and Material Supplied

Check to make sure that your Duet was shipped with:

- The main Duet chassis
- PC-type keyboard
- Mouse
- Mouse pad
- Hardware Reference Guide (this book)
- Quick Setup Reference Guide (2-sided poster)
- Power cable and hardware kit, including rack-mount slides
- Windows NT CD-ROM
- Duet Configuration CD-ROM
- Lyric application CD-ROM

The supplied keyboard is capable of all controlling all Duet and Lyric functions. However, a keyboard with special keys for Lyric shortcuts may be ordered separately. These “hotkeys” double as conventional PC function keys, but are grouped together at the left side of the keyboard for quick access. The special keys on the dedicated Duet Keyboard reduces (but does not eliminate) the need to use the mouse.

2.3 Chassis Mounting/Ventilation

CAUTION

Chyron does NOT recommend securing the Duet chassis to its rack by only the front flanges. The Duet chassis must be mounted using its rack slides! Failure to use the rack slides will cause unacceptable chassis flexing and potential system failure! With the rack slides bearing the chassis' weight, the flanges may be bolted to the rack for extra security.

Table 2-1: Chassis Dimensions

Length	**24.33 inches**	**61.80 cm**
Width (with slide rails)	**18.00 inches**	**45.72 cm**
Width (with mounting brackets)	**19.00 inches**	**48.26 cm**
Height	**10.44 inches**	**26.52 cm**
Weight (varies with system configuration)	**65 lbs approx.**	**29.48 kg approx.**

Duet is designed for standard **EIA** 19" rack mounting. Two mounting slides are already attached to each side of the chassis. Remove the rack-mounted slide tracks from the chassis (leaving the chassis-mounted slides in place) and secure them to each side of the rack. Insert the chassis-mounted slides into the tracks of the rack-mounted slides as shown in Figure 2-1. Once installed, use at least #12 hardware for attaching the chassis to the rack brackets, since it must be secured firmly.

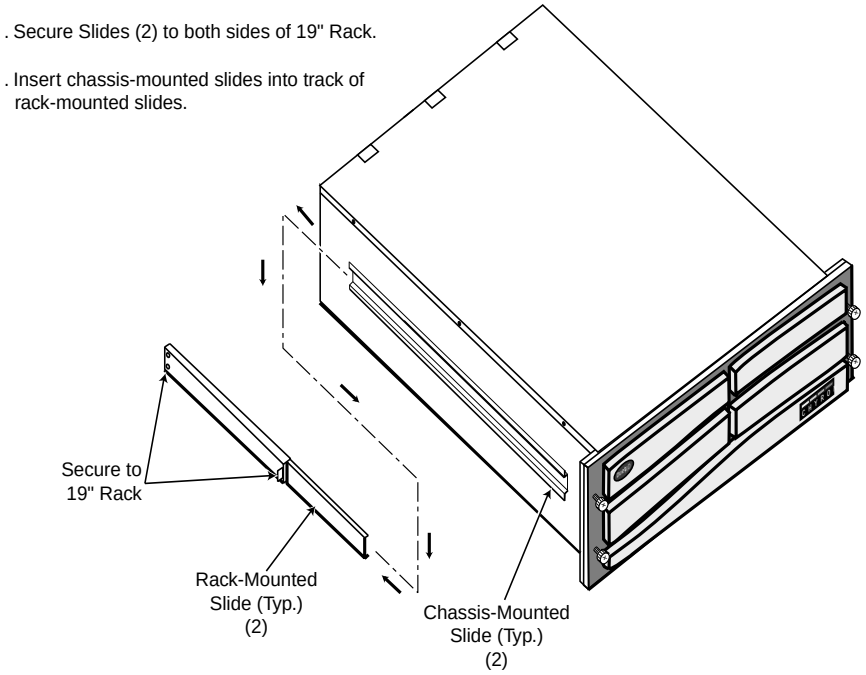


Figure 2-1. Chassis Installation

The main chassis generates a considerable amount of heat. Cooling fans draw air in from the front and left side of the unit, pull it through two filters, then exhaust it through the chassis rear panel. To ensure proper cooling, the top cover must be on at all times. Also, be sure that neither the intake nor outflow areas of the chassis are obstructed!

Be sure to check the main chassis air filters *at least* once a month to make sure they are clean. When necessary, vacuum the filters! See Section 5.7 “Air Filter Maintenance” for instructions.

2.4 Electrical Connection

The Duet Power Supply is a modular unit, which includes an auto-ranging AC input (90-264 VAC, 47-63 Hz), and an integrated Power Entry input module, with a rear-panel on/off

switch. The power supply module complies with all North American and international safety and EMC/RFI emissions requirements.

SD Duet: As part of a normal power on/off sequence, the main supply outputs are controlled via a low level TTL control signal from a switch on the front panel of the Duet chassis. The rear panel power switch is normally left in the **ON** position, except during periods of extended non-use and maintenance procedures. When the rear power switch is turned on, the fans and front panel lights go on briefly, then off. This is normal. Then, turn on the front power switch and normal Windows NT startup commences.

HD Duet: Use the rear power switch only. Normal Windows NT startup commences.

After physically installing Duet:

[ ] 1. Place the rear panel power switch in the OFF ("O") position.

[ ] 2. Connect the supplied power cord to the power entry module on the rear panel.

[ ] 3. Connect the power cord to a stable AC mains source, conforming to the system requirements (90-264 VAC, 47-63 Hz).

2.5 Data & Peripheral Connections

Duet requires (at minimum) a keyboard and mouse (supplied); most Duet systems will also be part of a network, requiring a cable to connect Duet's built-in 10/100BASE-T network port.

Refer to Figure 2-2 for rear panel data and peripheral connection diagrams.

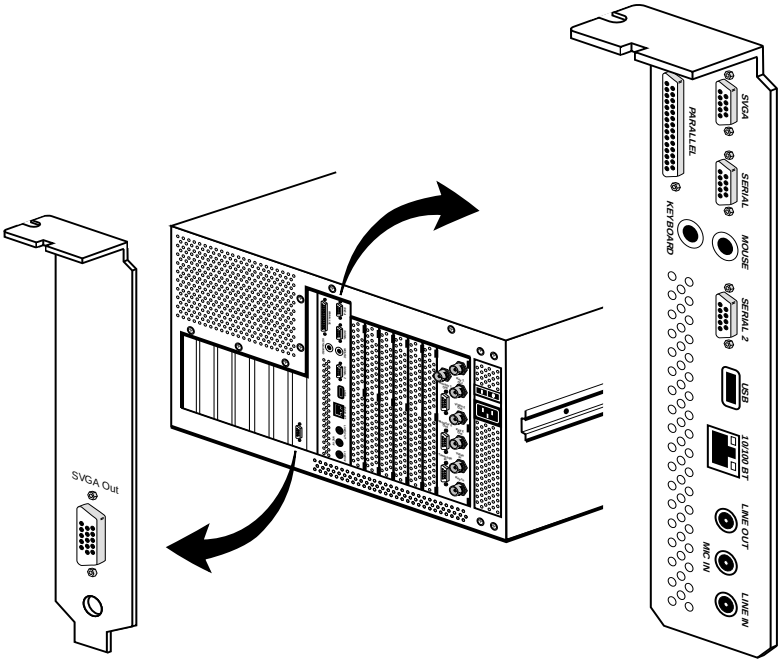


Figure 2-2. Data & Peripheral Connections

2.5.1 Keyboard & Mouse Connections

Refer to *Figure 2-2* to locate the two Keyboard and Mouse connectors on the Duet rear panel.

Attach the supplied Keyboard to either of the two connectors; then, attach the supplied Mouse to the other. *Please note that the rear panel Keyboard/Mouse connectors are interchangeable!*

2.5.2 LAN (10/100BASE-T) Connection

Refer to Figure 2-2 to locate the LAN connection on the Duet rear panel. Use a proper 10/100BASE-T cable to attach Duet to a network hub. Contact your facility's Network Administrator for assistance.

2.6 SVGA Video Display Installation

In its default configuration, Duet drives your system's SVGA monitor from a built-in AGP card. Alternately, the SVGA output on the CPU may also be used if the AGP card is removed. Refer to *§4.6.3* for more complete information.Connect an SVGA-type video display (not supplied) to either SVGA output on the Duet rear panel, as shown in Figure 2-3.

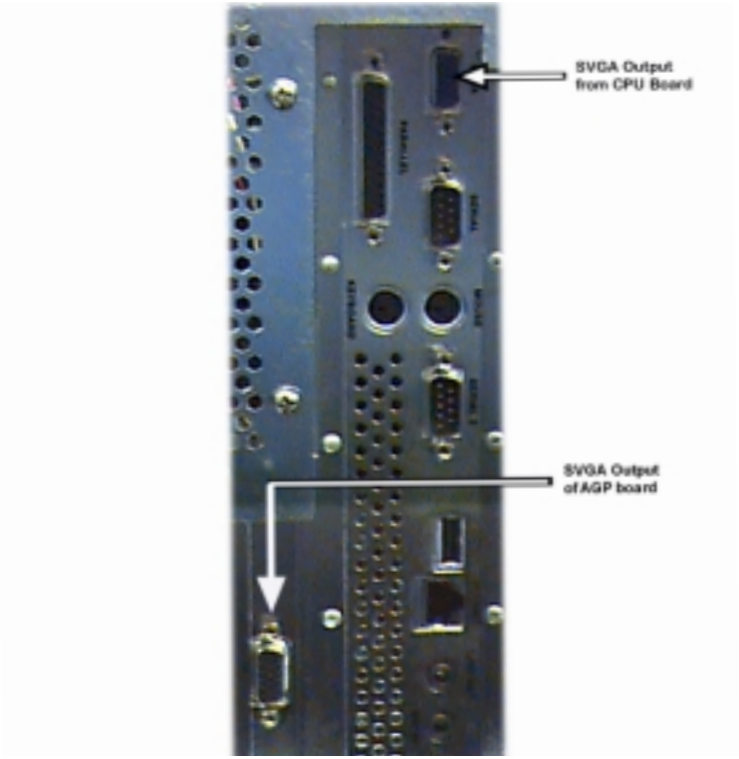
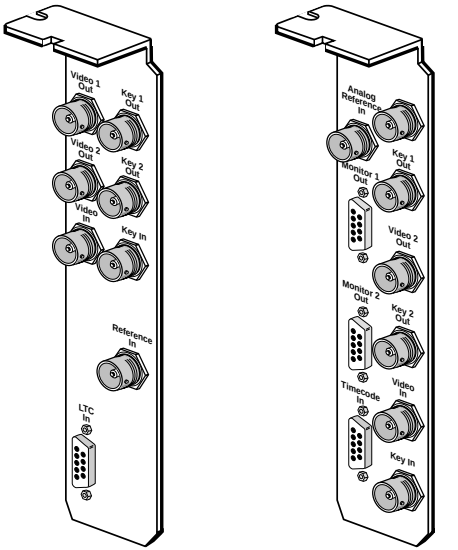


Figure 2-3. Duet SVGA Hookup

2.7 Video Inputs/Outputs

The Video I/O board provides video processing services for Duet. Serial Digital Interface I/O inputs and outputs are available on Standard Definition hardware; SMPTE 292 I/O is available on High Definition hardware. All hardware includes provisions for Analog Reference and Time Code.
Refer to Figure 2-4 and the next two paragraphs for hookup information.



Standard Definition Video I/O Board Connectors

High Definition Video I/O Board Connectors

Figure 2-4. Video I/O Board Connectors

Standard Definition Video I/O Board Connections	
Video In	10 bits SDI
Key In	10 bits SDI
Reference In	Analog Reference Input
LTC	Time Code input via RS422 serial differential time code format.
Video 1 Out	10 bits SDI, shaped or unshaped, with optional ANC data pass thru
Key 1 Out	10 bits SDI
Video 2 Out	10 bits SDI, shaped or unshaped, with optional ANC data pass thru
Key 2 Out	10 bits SDI

HD Duet Basic Configuration High Definition Video I/O Board Connections	
Reference In	Trilevel reference input
Video 1 Out	SMPTE 292 Graphics Output; Internal HD-Duet graphics*
Key 1 Out	SMPTE 292 Key Output; Internal HD-Duet key signal
Video 2 Out	SMPTE 292 Internal HD-Duet graphics keyed over Video In signal
Key 2 Out	SMPTE 292 re-timed and reclocked output of Video Input
Video In	Program video

In a dual channel system, the current VGE board is moved to Slot 3, a second VGE board is installed in Slot 4, and the cross-point board is installed in Slot 2. The crosspoint board directly connects the outputs of Slot 3's VGE to the 'A' input of the HD I/O board and Slot 4's VGE board to the 'B' input of the HD I/O board.

*With the Duet Dual Channel upgrade and Lyric Versions 1.2 and later, all of the outputs are software-selectable. Each has a separate control register.

Video 1 and Video 2 can both key internal HD Duet graphics over Video In.

NOTE

The recommended location of boards in Duet may change with software and hardware refinements and new options! **Carefully** read the installation instructions that accompany any field update you purchase, and when in doubt, call Chyron Customer Service for assistance.

2.8 Duet Hardware Control Panel

Concurrent with the release of Duet Drivers Version 2.71 and later, a new control panel has been created for Duet hardware. VGE boards, the GPI/O board and video mixer may now be set up in a Windows control panel without launching Lyric.

The control panel utility is installed **automatically** when the drivers are installed.

Chyron strongly suggests taking careful note of the default settings before making any changes to these control panels.

[ ] 1. Double-click the **Duet Hardware** icon, as seen in *Figure 2-5*.

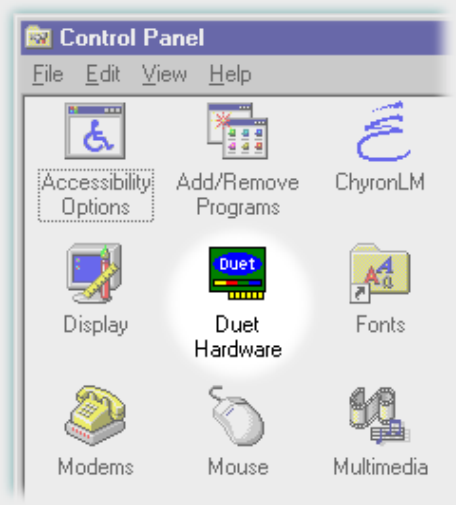


Figure 2-5. Duet Hardware Windows Control Panel

The **Duet Hardware Configuration** dialog box opens as seen in *Figure 2-6*.

Figure 2-6. Initial View Of Dialog Box

[ ] 2. Expand the 'Duet Hardware' entry to view the various devices that may be controlled from this utility.

Figure 2-7. Tree View Expanded

Click on any of the entries and the appropriate menu appears. (Read on for a section on each entry.)

2.8.1 Video I/O Board Controls

2.8.1.1 HD Video I/O Board Controls

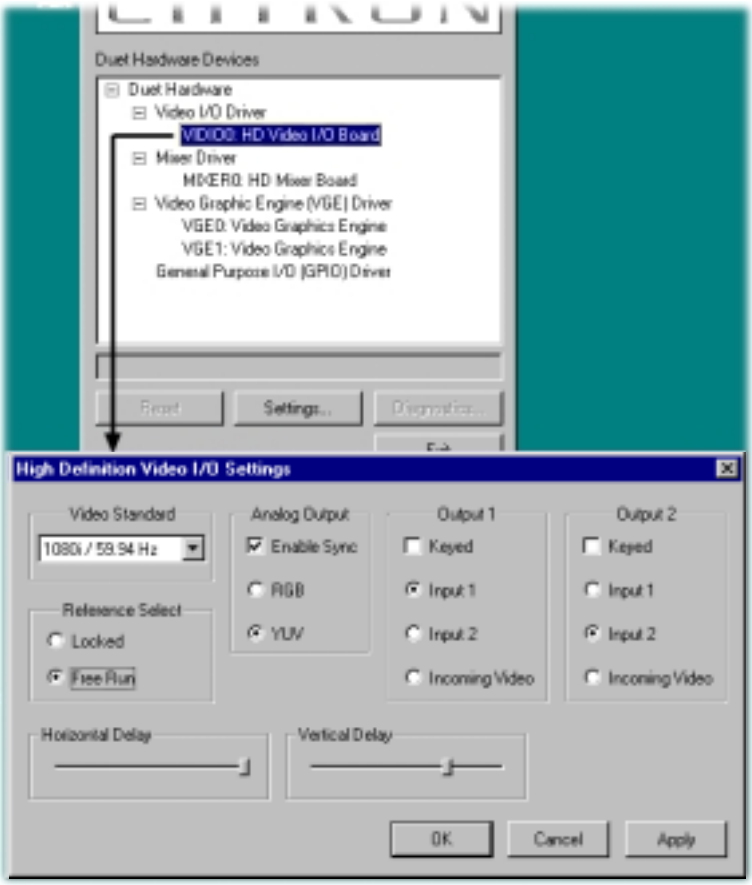


Figure 2-8. HD Video I/O Board Control Panel

Figure 2-8 shows the **default settings** for this control panel, with the exception of the **Video Standard** drop-down. This setting will vary in accordance with your facility's video standard.

[ ] 1. In the **VIDEO STANDARD** area, select your facility's standard with the radio buttons.

[ ] 2. In the **REFERENCE** area, click **LOCKED** to use a **tri-level sync** source applied to the **REF IN** BNC

connector. If such a reference source is unavailable or not needed, set the radio button to **Free Run**.

[ ] 3. In the **OUTPUT 1** area, select the output of the **HD Mixer Board** that you wish routed to Output 1. Select **Incoming Video** if you wish that signal routed to Output 1. If no HD Mixer is installed, the output of VGE 1 or VGE 2 may be selected.

[ ] 4. In the **OUTPUT 2** area, select the output of the **HD Mixer Board** that you wish routed to Output 2. Select **Incoming Video** if you wish that signal routed to Output 2. If no HD Mixer is installed, the output of VGE 1 or VGE 2 may be selected.

[ ] 5. In the **ANALOG OUTPUT** area, use the **RGB** and **YUV** radio buttons to select the type of output you wish to send to your system's analog monitor(s). The **Enable Sync** button adds a sync signal to the color outputs. **MON 1** is the analog monitor output of HD Duet's video being applied to the Video 1 output. **MON 2** is the analog monitor output of the HD Duet's video being applied to the Video 2 output.

These are analog video outputs that allow you to monitor the Digital Video outputs from Video 1 and Video 2. They can be connected directly to any SVGA monitor that is capable of supporting the required video standard. They can also be connected to an analog HD monitor with a standard 15-pin SVGA to BNC breakout cable.

In general, when using these connections with an HD monitor, the selection should be set for YUV with sync enabled on the video outputs. When used with an SVGA monitor, the selection should be set for GBR with sync disabled from the analog outputs. Most SVGA monitors do not work with tri-level sync and work better using the external horizontal and vertical sync supplied on the SVGA connector.

[ ] 6. The **HORIZONTAL OUTPUT POSITION** control moves the horizontal position of output sync as much as ½ scan line earlier or later than incoming reference. Nominal delay of video in to video out is 5 microseconds if the reference input is in time with the video input.

[ ] 7. The **VERTICAL OUTPUT POSITION** control sets the vertical position of output syncs with respect to incoming sync sources; the range is -4 scan lines to +3 scanlines.

[ ] 8. Click the **APPLY** button after you make you settings.

2.8.1.2 SD Video I/O Board Controls

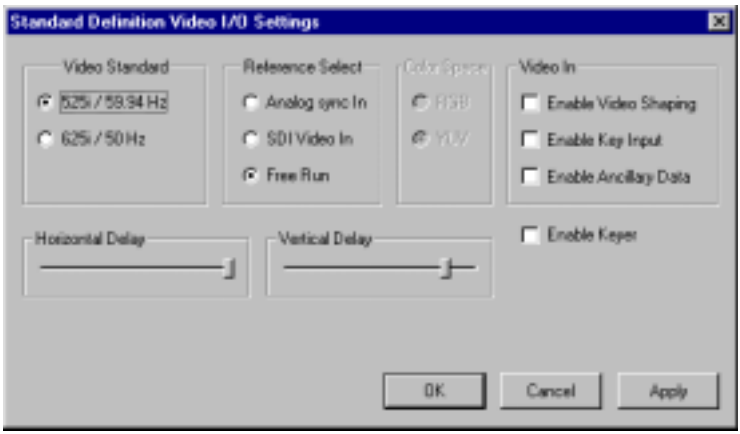


Figure 2-9. SD Video I/O Board Control Panel

Figure 2-9 shows the **default settings** for this control panel, with the exception of the **Video Standard** drop-down. This setting will vary in accordance with your facility's video standard.

[ ] 1. In the **VIDEO STANDARD** area, select your facility's standard with the radio buttons.

[ ] 2. In the **REFERENCE SELECT** area, select:

- **Analog sync in** (to use your facility's black burst signal)

- **SDI Video In** *or*
- **Free Run** (Duet supplies its own internal sync)

[ ] 3. The **VIDEO IN** area determines processing of video inputs to Duet; click:

- **Enable Key Input** to use Duet's internal keyer. Otherwise, the signal is passed at full value.
- **Enable Video Shaping** to attenuate input video to the key signal, so that color components do not exceed the key level.

[ ] 4. The **ANCILLARY DATA** checkbox causes Duet to pass all data in the incoming signal's blanking interval to the outputs.

[ ] 5. In the **OUTPUT** area, the **Keyed** checkbox causes the signal appearing at the SDI video input to be passed to the Duet output with Duet video keyed over.

[ ] 6. After all your selections are made, press **APPLY**.

2.8.2 HD Mixer Board Controls

NOTE

Be sure of the slot locations of your system's VGE boards when configuring your Duet. Improper settings could render your system unusable!

Refer to *Figure 2-10* and *Figure 2-11*. The HD Mixer Board contains two compositors and one mixer. The VGEs in slots 4 and 5 are associated with Compositor 1, the VGEs in slots 6 and 7 with Compositor 2. Note that if only one VGE is present in a factory-configured Duet, that VGE is located in slot 3. If five VGEs are present in the system, the fifth is located in slot 3 and routed directly into the mixer, where it appears only as the Background plane.

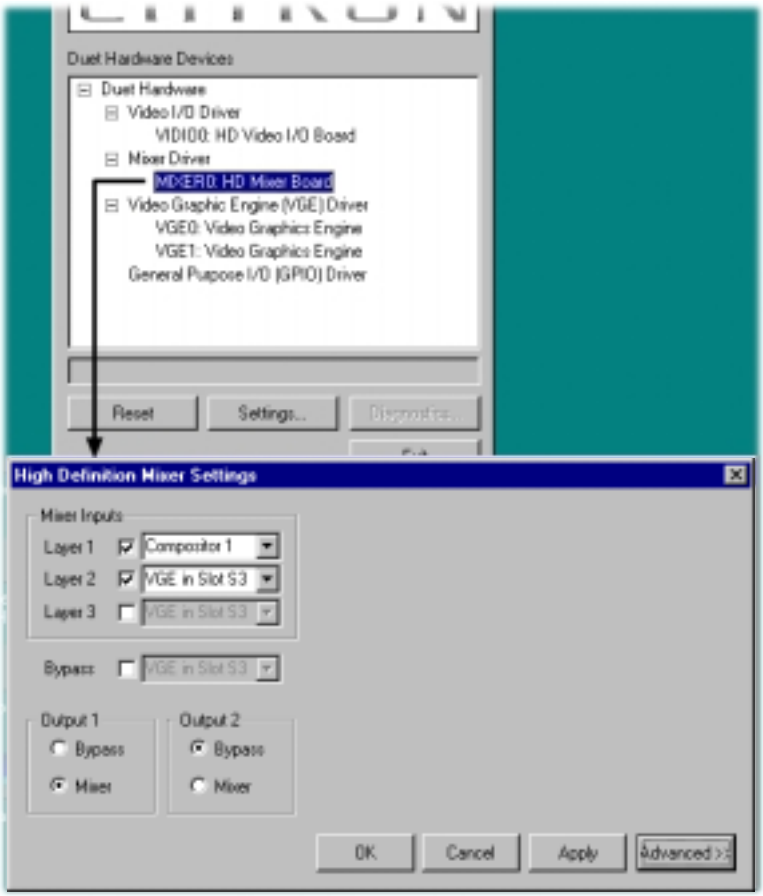


Figure 2-10. HD Mixer Controls, Basic Settings Only

With the release of Lyric 2.0.1, the HD Mixer is used primarily for combining the outputs of VGEs that have been grouped together for enhanced rendering of complex animations (see *§5.17* in the Lyric Handbook).

The mixer board's full capabilities may also be used to create mixes set up by the user, but Lyric provides no dynamic control of the mixer at this time. **Layer 1** is the mixer's foreground, **Layer 2** the middle and **Layer 3** is the background.

The **OUTPUT 1** and **OUTPUT 2** areas determine what is routed to the mixer board's two outputs. For each of the mixer board's outputs, click Mixer to feed the mixer's output to that output. Click Bypass to feed the output of either Compositor or the VGE in slot 3. To configure inputs to the mixer, follow these steps:

[ ] 1. Enable **Layer 1** by clicking its checkbox. Use the drop-down to select Compositor 1, Compositor 2 or the VGE in slot 3 as the input to this layer.

[ ] 2. Enable **Layer 2** by clicking its checkbox. Use the drop-down to select Compositor 1, Compositor 2 or the VGE in slot 3 as the input to this layer.

[ ] 3. Enable **Layer 3** by clicking its checkbox. Use the drop-down to select Compositor 1, Compositor 2 or the VGE in slot 3 as the input to this layer.

[ ] 4. For one of the Compositors or the VGE in slot 3 to bypass the mixer and be routed to the Video I/O board, click the **BYPASS** check box. The routing of the Bypass output is determined in the next step.

It is possible to assign the same VGE or Compositor to more than one path in the mixer, but the same image will simply appear imposed upon itself.

[ ] 5. Click **APPLY** for your selections to take effect.

Additional settings for the HD Mixer may be accessed via the **ADVANCED** button in the lower right corner of the menu. Click the Advanced button, and the High Definition Mixer Settings Menu expands:

Figure 2-11. HD Mixer Controls With Advanced Settings

[ ] 6. In the **COMPOSITOR 1** area, enable the FRONT plane by clicking its checkbox. Select the VGE in slot 4 or 5.

[ ] 7. Enable the BACK plane by clicking its checkbox. Select the VGE in slot 4 or 5.

[ ] 8. Make the same choices for **COMPOSITOR 2,** but note that the available VGEs are the ones in slots 6 and 7.

[ ] 9. In the **Mix Mode** area:

Choose **Composite** to use layers, all layers are visible, in front to back order.

The **Dissolve** function can only be applied to layers 1 & 2.

The **Additive** mode uses both channels full value, ignoring Alpha value.

The **Alpha** mode combines layers, using the alpha data. Set up a static Alpha value; use the slide control to set ratios among the layers seen.

[ ] 10. The **Alignment** control advances or delays video from the VGEs to compensate for a delay in the signal introduced by the HD Mixer. Recommended

settings are **-31** for any 1080 line standard and **-45** for any 720 line standard.

[ ] 11. The **Video Standard** controls are normally not used on this control panel and are unavailable.

2.8.3 VGE Driver Controls

These controls are intended for advanced maintenance use only. Before opening this control panel and making any adjustments, contact Chyron Customer Service at 1-888-4-CHYRON.

2.8.4 GPI/O Board Driver Controls

With the release of Duet Drivers Version 2.72, this control panel is inactive. To operate or make settings to the GPI/O Board, start Lyric and go to:
CONFIG > DUET HARDWARE > GPI.

2.9 Startup and Shutdown

2.9.1 Power On Procedure

Startup for HD and SD systems are slightly different. **On the HD system, the keyer may not initiate correctly if the Front Panel Power Switch is used.**

2.9.1.1 High Definition Systems

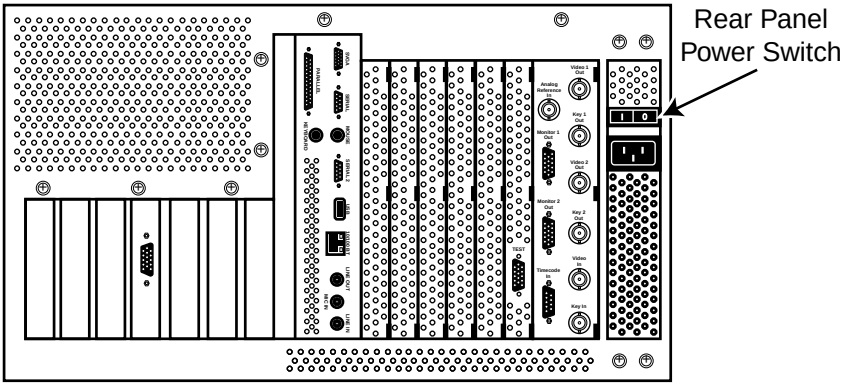


Figure 2-12. Rear Panel Power Switch Location

Turn on the main power switch on the **REAR** Panel. Refer to Figure 2-5. **DO NOT USE THE FRONT PANEL POWER SWITCH!** Normal Windows NT startup commences.

NOTE

If normal startup fails, follow steps 1 through 9:

[ ] 1. Open the front panel's access door and locate the Power Control Button. Refer to Figure 2-7.

[ ] 2. Turn the SVGA PC monitor on.

[ ] 3. Press **F2** to enter Setup.

[ ] 4. Right arrow over to view the Boot Menu. Refer to Figure 2-6.

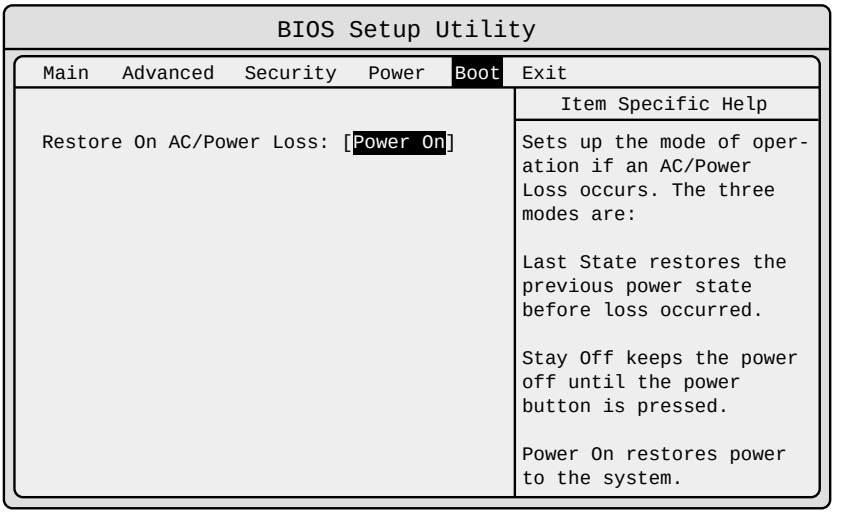


Figure 2-13. BIOS Setup Utility Window

[ ] 5. Ensure that "Power On" is selected for "Restore On AC/Power Loss". This is the factory setting. However, if the entry reads "Stay Off", the power remains off until the Power Control Button (on the front of the unit) is pressed. Using the spacebar, change the entry to "Power On".

[ ] 6. Exit and Save all changes.

[ ] 7. Power-off unit by following procedures in section 2.7.2.

[ ] 8. Restart system referring to Step 1.

NOTE

Once these steps are implemented, it is not required to repeat this procedure on successive start-ups.

2.9.1.2 Standard Definition Systems

[ ] 1. Turn on the main power switch on the rear panel (see Figure 2-5). The fans may briefly start and then stop depending on factory BIOS settings; THIS IS NORMAL!

WAIT at least 10 seconds for standby power to come on-line before turning on the front panel power switch (Step 4).

[ ] 2. Turn on the SVGA PC monitor; then, turn on program and preview monitors and other equipment as necessary.

[ ] 3. Open the front panel's access door. Refer to *Figure 2-14* to locate the power button.

[ ] 4. Press the front panel power button. Normal Windows NT startup commences.

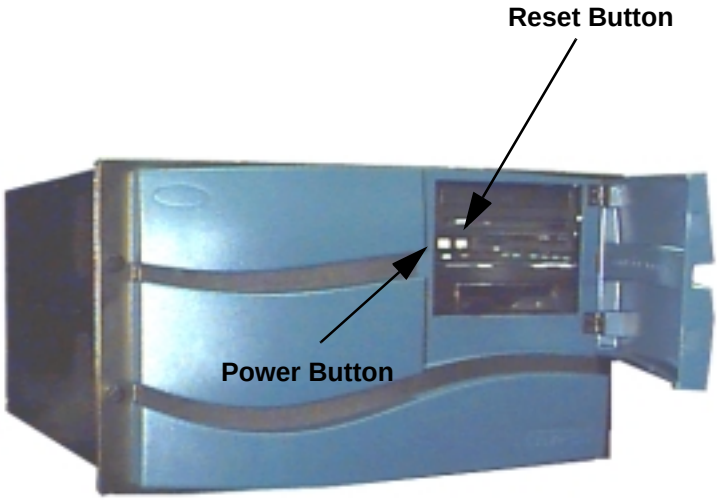


Figure 2-14. Front Panel Power Switch Location

2.9.2 Power Off Procedure

[ ] 1. Select the "Start" icon; then choose "Shutdown System".

[ ] 2. **HIGH DEFINITION SYSTEMS:** When you are prompted "It Is Now Safe To Turn Off Your Computer", turn off the main power switch on the rear panel.

STANDARD DEFINITION SYSTEMS: Confirm that you wish to shut down, and Duet's power supply will switch off automatically.

2.10 Windows NT 4.0 Network Setup

Duet is shipped with the Windows NT 4.0 operating system installed. Network setup will differ at every facility; Chyron suggests having your Network Administrator do the network setup. The following is a sample procedure for connecting to a network. *Before beginning network software configuration, Duet must be physically connected to the network.*

[ ] 1. From the **Start** menu on Duet**,** select **Settings**, then **Control Panel**; or click on the **My Computer** icon, then the **Control Panel** icon. The **Control Panel** window (Figure 2-8) is displayed

Figure 2-15. Control Panel

[ ] 2. Double click on the **Network** icon. The **Network** window is displayed, with the **Identification** tab in front. Click on the **Adapters** tab (*Figure 2-16*). The following Adapter list is displayed.

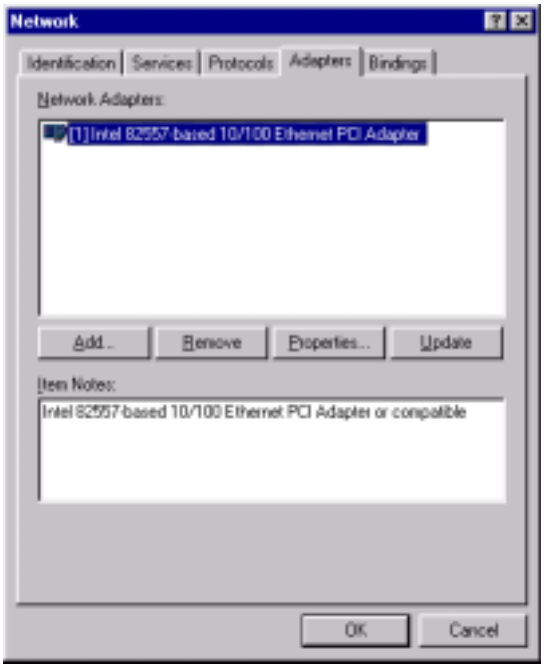


Figure 2-16. Network Window - Adapters

[ ] 3. If the adapter that is installed in the PC is not on the list, click **Add**. The **Select Network Adapter** window (*Figure 2-17*) is then displayed.

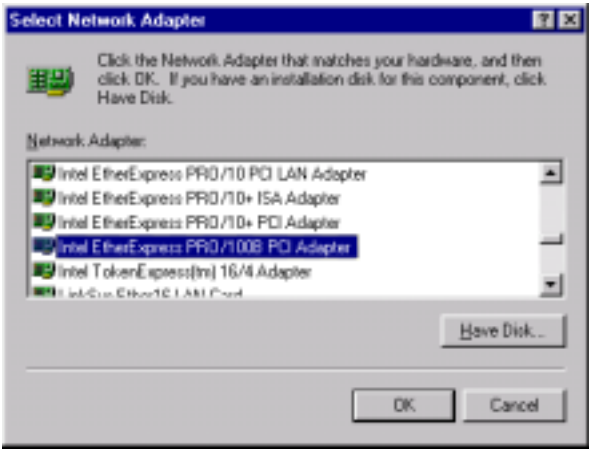


Figure 2-17. Select Network Adapter Window

[ ] 4. Select the proper adapter as shown, then click **OK**. The **Select Adapter** window closes.

[ ] 5. Click on the **Protocols** tab (*Figure 2-18*). The following Protocols list is then displayed:

Figure 2-18. Network Window - Protocols

[ ] 6. Highlight **TCP/IP Protocol**. Click **Add**. The **Select Network Protocol** window (*Figure 2-19*) appears.

NOTE

If it is not possible to access Add (or other items) in the Network window, Administrative privileges on the network are required. Contact the Network Administrator.

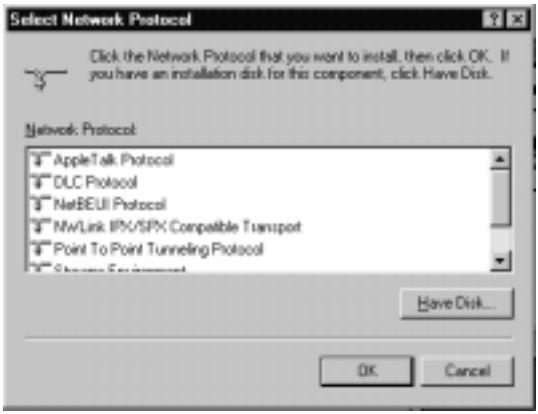


Figure 2-19. Select Network Protocol Window

[ ] 7. If **TCP/IP** appears on the list, it is already in the system. Click **Cancel**, then return to the **Network** window (Figure 2-9).

If **TCP/IP** does not appear in the list, click **Have Disk**. Follow the on-screen installation directions. Return to the **Network** window (Figure 2-9).

[ ] 8. Highlight **TCP/IP** in the **Protocols** list, then click **Properties**. The **Microsoft TCP/IP Properties** window (Figure 2-12 - shown with addresses already entered) is displayed.

[ ] 9. Enter the **IP Address**, the **Subnet Mask**, and the **Default Gateway** in their respective fields. After entering the addresses, click **OK**.

Once the addresses are entered, clicking on **TCP/IP** then **Properties** in the **Network** window brings up the following display:

Figure 2-20. Microsoft TCP/IP Properties Window - Addresses Displayed

[ ] 10. After clicking **OK** in the **Microsoft TCP/IP** window, the **Network** window (Figure 2-9) is displayed. Click **OK**.

[ ] 11. Close the **Network** window and the **Control Panel** window, then shut down and restart Duet.

3 - Duet Hardware Overview

3.1 General

This section provides a block-level description of Duet hardware.

3.2 System Overview

The overall system architecture for Duet is illustrated in the block diagrams for the complete and basic systems, shown in Figure 3-1.

The system architecture of Duet reflects the following design goals:

- Meet/exceed performance and quality expectations of the video professional
- Use of industry standard components, where possible
- Expandable
- Cost-effective power & performance

Duet is a true 'best of both worlds' hybrid architecture that integrates industry standard PCI, CompactPCI and 'Wintel' technology with a re-routable, high performance digital video interconnect capable of handling SDTV as well as HDTV video streams.

The Duet backplane supports the following hardware housed in a standard '6RU' (10.5") high, 19" wide rackmount chassis:

- CPU board (Intel NLX with Pentium II processor or BX with Pentium III processor)
- (8) industry standard PCI card slots, split up into two bus segments of (4) slots per PCI bus segment. These standard PCI bus slots are intended to support 'off the shelf' system I/O and PC peripheral solutions.
- Up to seven (7) proprietary Chyron designed video-processing slots using CompactPCI as the system bus interface to the host NLX or BX computer board.

The remainder of the Chyron video/graphics board bus connectors support high speed, point-to-point, digital video links, capable of handling SDTV and HDTV bandwidths. The seven proprietary Chyron video board slots are assigned as the following on the backplane:

Slot	Function
S1	Syncgen & Video I/O board (w/ double wide I/O panel)
S2	Multi-Channel Mix & Effects/Crosspoint video source router - or - One Video Graphics Engine processing board
S3	Video Graphics Engine or Chyron expansion hardware
S4	Video Graphics Engine or Chyron expansion hardware
S5	Video Graphics Engine or Chyron expansion hardware
S6	Video Graphics Engine or Chyron expansion hardware
S7	Video Graphics Engine or Chyron expansion hardware

A custom modular plug-in power supply subsystem plugs straight down into the Duet backplane, greatly improving in-field serviceability. The power supply module is auto AC ranging and complies with all North American and international safety & EMC/RFI emissions requirements.

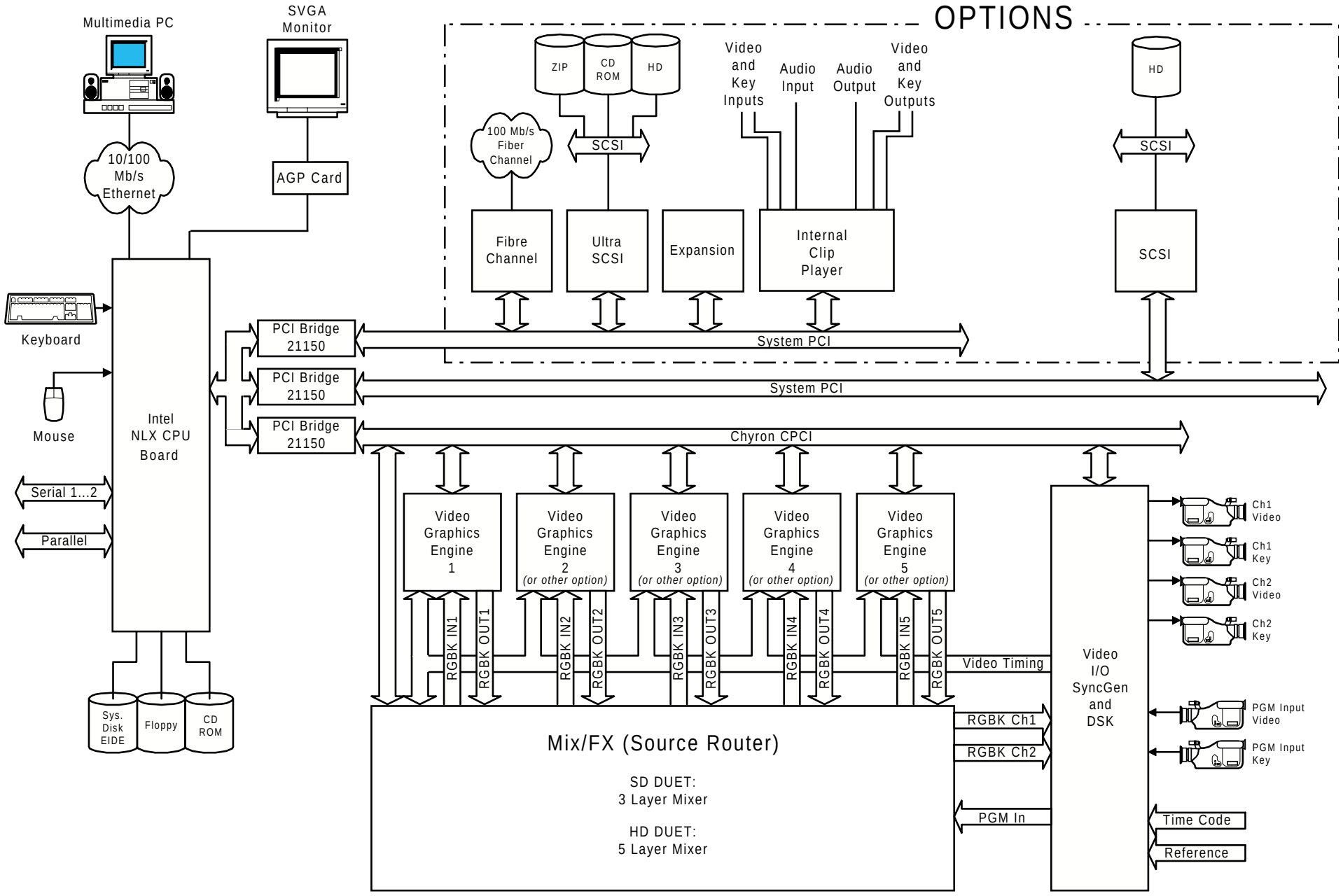


Figure 3-1. Duet Block Diagram (Complete Configuration)

3.3 Duet Components

3.3.1 Duet Backplane

Duet uses a custom backplane, which includes three PCI-PCI bridges to accommodate PCI expansion cards. Two of the bridges are dedicated to standard PCI form factor cards and one bridge is dedicated for Chyron proprietary form factor cards. The standard PCI form factor slots allow the use of industry standard PCI components for networking, audio, and other functions. The proprietary Chyron PCI segment uses a larger form factor, which allows boards to be designed with minimal real-estate constraints. The CPCI connector (2mm hard metric) is used for these slots - this connector provides superior signal integrity, ruggedness, and ample pin count compared to standard PCI edge finger connectors.

Besides a PCI bus, the Duet backplane has a proprietary data bus to provide a data path for streaming video and other media. This data path is implemented with point-to-point Channel Links. Channel Link provides a scaleable and reliable means of streaming high speed data between boards. Along with the data path Channel Links, there are Links to provide video timing and other synchronization signals among boards. Not only can each Channel Link data path be scaled up to HDTV data rates, but each could also provide multiple channels at SDTV resolutions. An advantage of the Channel Links is that they are not tied to any particular data format or image resolution.

Five of the Chyron slots are available for general purpose, Video Graphic Engines or other Chyron expansion hardware. These slots have (4) Channel Links dedicated for input and (4) for output. The Channel Link inputs and outputs of each Video Graphic slot are wired to the Mix/Effects & Crosspoint Router slot. The Mix/Effects slot is wired to a Video I/O-Syncgen slot. For a fully configured standard-definition system, the Mix/Effects board also provides a crosspoint switch matrix to allow media streams to be reconfigured on the fly between the video graphic engines or Video I/O or MJPEG/ DDR boards. For entry-level systems, the Mix/Effects slot is populated with a video graphic engine, which directly drives the Video I/O-Syncgen slot.

3.3.2 Power Supply

Duet uses a modular plug-in power supply subsystem capable of supplying 840W of DC power to the Duet infrastructure.

The power supply module plugs straight down into the Duet backplane just as any PCB would, greatly improving in-field serviceability and 'mean time to repair' (MTTR) issues.

The supply module is approximately 1.4"W x 9"H x 18"L, is self cooled by internal blowers, has a universal IEC AC input connector as well as a main AC cutoff switch on a rear accessible I/O & vent panel.

The power sub-system module is auto AC ranging and complies with all North American and international safety and EMC/RFI filtering & emissions requirements.

The unit supplies +5v, +3.3v, +12v, -12v, +12v fan & +5v 'Stand-By' power in addition to various TTL level control and alarm signals via three high capacity connectors interfacing directly to the Duet backplane. As part of a normal power on/off sequence, the main supply outputs are controlled via a low level TTL control signal from a switch on the front panel of the Duet chassis.

3.3.3 CPU Board

Duet is built around an Intel NX440LX or an Intel JN440BX micro-processor board; both conform to the NLX edge-card form factor. The Intel NX440LX board supports the Pentium® II family of microprocessors, and provides three 168-pin DIMM sockets with support for up to 384 MB of synchronous DRAM (SDRAM). The NX440LX board also provides support for 66 MHz SDRAM, and for either ECC or non-ECC memory.

The JN440BX supports Pentium®III processor. Like the NLX, the BX board also provides three 168-pin DIMM sockets for up to 384 MB of synchronous DRAM (SDRAM). The JN440BX supports **100** MHz SDRAM and ECC or non-ECC memory.

See Intel’s web site for a list of approved vendors.

Please note that all Duets are shipped with 256 MB of CPU RAM as standard equipment.

Other on-board resources include 10/100Mbit/s LAN hardware, floppy drive interface, one multi-mode parallel port, two serial ports, and keyboard/mouse controllers.

The Windows NT operating system controls systems infrastructure, such as resource management and networking. Furthermore, this “Wintel” approach allows various, third party applications to be used with/bundled with Duet.

On Duet systems equipped with the NLX motherboard, the preferred SVGA output is located on the SVGA adapter card located in the PCI area on the machine’s rear panel. However, the CPU board’s SVGA output may be enabled by changing jumpers on the CPU. Refer to §4.6.3 for the complete procedure.

Duets using the BX motherboard are capable of driving an SVGA monitor directly from the BX’s on-board ATI RAGE-PRO Turbo video card. You may, however, wish to use a different video card for higher performance; check with Chyron Customer Service for more information on the card recommended for this type of upgrade.

SD Duets are shipped with an AGP graphics board connected to the CPU. For HD Duets, a high-performance video card is available.

3.3.4 Video Graphics Engine (VGE)

The Video Graphics Engine is composed of a RISC processor (i960), dedicated graphics chipset (GMX2000), custom DSP hardware (display controller, video mixers, image resizers), video DMA controllers and memory (local memory, local buffers, framebuffers)

The Intelligent Input Output architecture (I²O) used in Duet is ideal for critical, real-time functions. Using I20 architecture, the i960RP runs with a multi-threaded, real-time operating system (RTOS). I²O is a hardware-independent architecture that features a split driver programming model. An I²O driver consists of an operating specific module (OSM) and a hardware device module (HDM). For Duet, the OSM runs under Windows NT on the NLX440 and the HDM runs on the i960RP under the RTOS. The OSM deals with high level

details like file systems, network protocol, and other NT resources. The HDM deals with control registers, port addresses, interrupt handling and other low level details. The OSM and HDM modules communicate by passing messages through a communications layer implemented on the PCI bus. I²O also allows peer-to-peer communication between HDM's without intervention by the Wintel host.

The i960 RISC processor implements the HDM portion of the I²O device driver. The i960 has its own memory, 32 MB of RAM and 1 MB of EPROM for running IxWorks. The i960 receives I²O messages via the CPCI interface and PCI-PCI Bridge to the CPU board. The local bus of the i960 provides access to the DSP hardware, DMA controllers and local memory. The i960 has a number of DMA channels to allow image data and command buffers to be efficiently moved from system memory on the Wintel platform to the local i960 system memory. The i960 provides the real-time control and execution of display lists.

Each on-board rasterizer has its own dedicated frame buffer, scaleable from SDTV resolution (0.5 Mpixels) up to HDTV resolutions (2.0 Mpixels). Each frame buffer has a 32 bit RGBK plane and an 8 bit Wipe plane for dynamic switch and mixing effects between channels. Two SDTV channels can be output (using 2 channel link channels) or a single HDTV channel can be output (using 4 channel link channels).

3.3.5 Standard Definition (SD) Video I/O Board

The SD Video I/O board provides video processing services for Duet - providing SDI (Serial Digital Interface) inputs and outputs, plus various sync gen timing services including a genlock input and time code inputs. ***This board provides no analog video outputs.***

The channel 1 video path includes a 10 bit 4:2:2 keyer for compositing the RGB1 input over the program video input using Key1. When the keyer mix is enabled, the resulting key output is 100% opaque. When the keyer mix is disabled the video output can be either shaped by key or unshaped under user control.

The Input Processor has 10 bit resolution. RGB1 is optionally unshaped via an integer divider, and Key1 is decimated, then RGB1 is converted into YCrCb 4:2:2. Y1 and Key1 are fed to a luminance mixer along with program Y. CrCb1 and decimated Key1 are fed to the chrominance mixer along with program CrCb.

The Keyer Luminance Mixer has 10 bit resolution. A two channel mixer, uses shaped Y1 input for mix with program video, shaped or unshaped otherwise. The Y1 mixer coefficient is 100%; the program Y mixer coefficient is equal to (1 - Key1).

The Keyer Chrominance Mixer also has 10 bit resolution. CrCb1 and program CrCb are multiplexed, and use shaped CrCb1 input for mix with PGM video (shaped or unshaped otherwise). The CrCb1 mixer coefficient is 100%; the program CrCb mixer coefficient is equal to (1 - Decimated Key1)

Output Processor, 10 bit resolution:

YCrCb and Key are range limited, filtered, and have sync added. Ancillary data, delayed from the program video input, is optionally added prior to conversion to SDI.

Channel [2] Output (w/o Keyer):

The Channel [2] Input/Output Processor has 10 bit resolution. RGB2 is optionally unshaped via an integer divider. RGB2 and Key2 are converted to YCrCbK 4:2:2:4, then are range limited, filtered, and have sync added. Ancillary data, delayed from PGM video input, is optionally added as well, before conversion to SDI.

Program Video Inputs:

For the Program Video inputs, SDI Video and Key are deserialized, then Y and CrCb are demultiplexed for the keyer input. YCrCbK is then converted to RGBK for the program video output.

This board subsection includes a programmable delay for horizontal positioning. A separate delay path is provided for ancillary data pass through to the SDI video outputs.

Sync-Gen:

In the Sync Gen section of the Video I/O board, Genlock is selectable from either the SDI video input or from the analog reference input. Scanline timing (525/625 timing) is software selectable. Separate video timing channels are provided for each backplane slot, with individually programmed (software controllable) delays.

3.3.6 High Definition (HD) Video I/O Board

Standard Definition Duet (SD-Duet) and High Definition Duet (HD-Duet) versions differ in system firmware and software, as well as in the hardware of the Video I/O Board.

In conformance to SMPTE 292M specifications, the HD Video I/O board provides 1.485 Gb/sec serial digital 1080i and 720P display formats. Prior to Lyric Version 1.2 and Duet Driver Version 2.5, the video standard was determined by the DIP switches on the board; refer to Section 5.

For Lyric Version 1.2 and Duet Driver Version 2.5 and later, the video standard is set by the drivers that are loaded when the system starts. Consult the Lyric Handbook, §3.3.1.2.

A single reference input is provided for analog trilevel sync. With the time code input, the entire system can be referenced to an external source.

The design of the HD Video I/O hardware is essentially standards independent among the various HD formats. Different oscillators are available on board for the different required standards.

RGB TO SMPTE292M CONVERSION:

Inputs for Channel 1 are received on four channel links, giving an input bandwidth of 4 components (RGBK) at 74M pixels/sec. The parallel streams from the channel links are converted and synchronised to the internal clock, and re-multiplexed to RGBK streams of 8 bits at 74MHz. The RGBK streams are then passed to filters in order to reduce fast (0-1) edges, so that these edges do not ring later analog or digital filters. The RGB signals are then passed through a color space convertor to get to YUV 10 bit, and then the U & V signals are passed through a down sampler. This down sampler implements a 29 point

symmetric filter for half bandwidth reduction and decimation, and both the U & V channels can pass through a single LF3320. Delay compensation for the luminance signal and key signals are made. The key signal is level shifted to SMPTE292M levels for output, and to a 0-512 level for key processing.

PROGRAM VIDEO IN:

Parallel Y & C data from the program input has its timing information extracted and passed to the genlock area. The Y & C data are passed through a short synchroniser to synchronise to board clock phase. The C data is demultiplexed, and up-sampled through a 5-7 point filter. Color space conversion to RGB is accomplished, after which the data is demultiplexed and passed to channel link transmitters to go to the VGE board. Timing information can also be put on the channel links.

GENLOCK:

The **reference input BNC connector** is intended for a tri-level sync source that will synchronize HD Duet with your facility's master timing. The oscillators are VCXOs, and 4 positions are provided for different standards. Automatic detection of frame rate is incorporated (including differentiation of 59.94Hz & 60Hz). Only one oscillator will be active at any one time in normal mode to prevent cross-talk. The timing generator provides clocks and timing signals both for on board use, and for the channel links to drive the rest of Duet.

PCI:

Control will be via the PCI bus. Registers that require updating during field blanking (i.e. mix level) are double buffered, so that the new value can be written any time during the previous field, and the control is updated at field interval.

MIXER & OUTPUT MATRIX:

The HD Mixer board will enable routing and mixing of up to five VGE boards in a single Duet chassis. Support is provided for two separate graphic "layers", with each layer consisting of two VGE boards. The mixer can also perform dissolves and simple cuts between layers.

Available choices for Output 1 or Output 2 include: Layer 1, Layer 2 or Layers 1 and 2. If a fifth Frame Buffer board is installed in Duet, it may be used as a background for the output channel assigned to Layers 1 and 2.

Note that during the vertical and horizontal blanking periods, both Program and Preview pass through the Background signal, thereby producing the bypass path for ancilliary data.

DIP SWITCH CONTROL:

A row of colored DIP switches control a number of setup functions for the HD-Video I/O board. These functions are described in Figure 3-2:

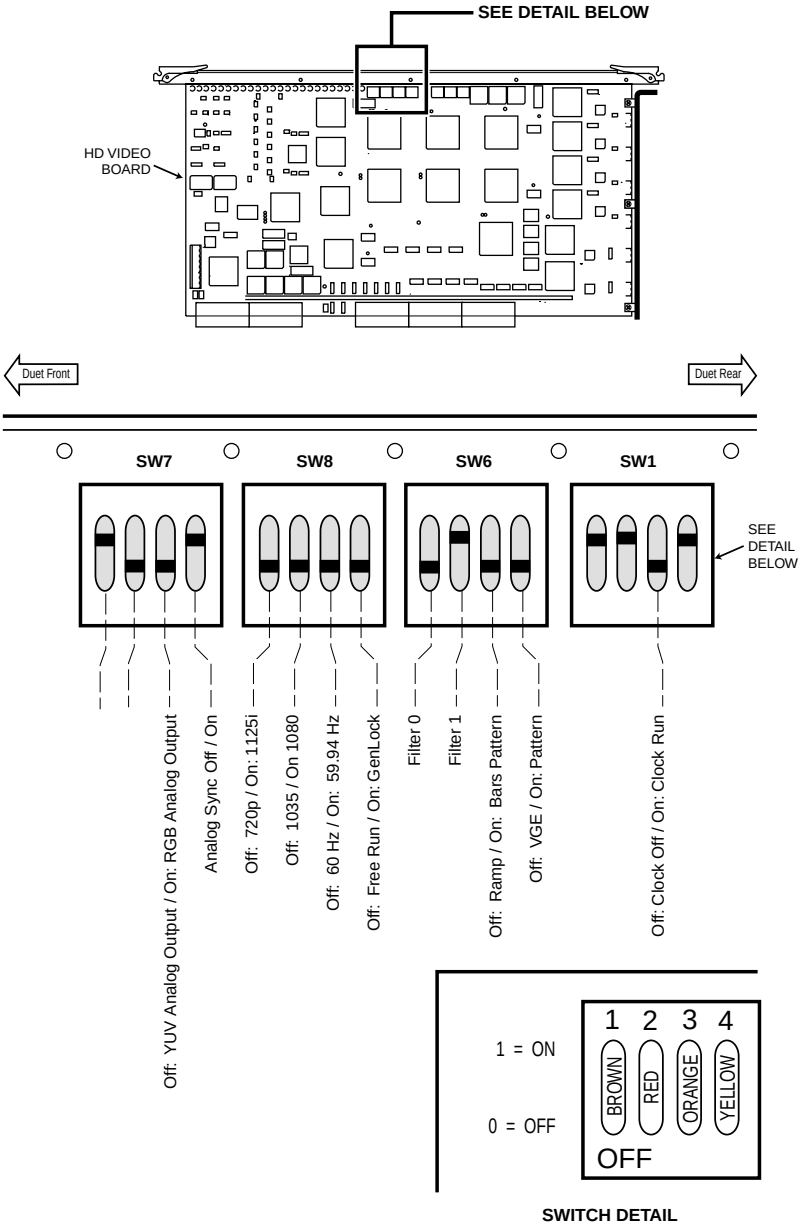


Figure 3-2. HD Video I/O DIP Switch Controls

Prior to Lyric V1.2 and Driver V2.5, operation of the **HD Video I/O Board** was controlled by the DIP switches pictured in Figure 3-2. Different versions of the video I/O board used the DIP switches in differing ways. The switch settings in Figure 3-2 for reference only. With Lyric V1.3/Driver V2.5 and later, all functions are now software-controlled.

For diagnostic purposes, **SW5** still controls Channel 2's input. Setting **Pole 4** (yellow) of SW5 to 'ON' will replace the channel input with a **color bars** signal. The switch must be set to **OFF** for normal Duet operation.

4 - Board Removal/Replacement

This section provides chassis mechanical disassembly/ reassembly information, including general instructions for the removal and replacement of circuit boards.

WARNINGS

POWER MUST BE DISCONNECTED FROM THE UNIT BEFORE ANY MODIFICATIONS. FAILURE TO DO SO MAY RESULT IN EQUIPMENT DAMAGE AND/OR SEVERE PERSONAL INJURY!

A STATIC-FREE WORK ENVIRONMENT IS NECESSARY WHEN WORKING ON ANY COMPONENT OF THE SYSTEM. USE A PROPERLY GROUNDED WRIST STRAP, AND TAKE ALL APPROPRIATE ANTI-STATIC PRECAUTIONS TO PREVENT SYSTEM DAMAGE!

4.1 Chassis Disassembly

To begin Chassis disassembly:

[ ] 1. Ensure that power is **OFF** to the Duet chassis and remove the power cord.

[ ] 2. Label all rear panel cables and connectors with their location, before removing them.

[ ] 3. Remove rack mounting hardware (if necessary), and carefully move the chassis to the work area.

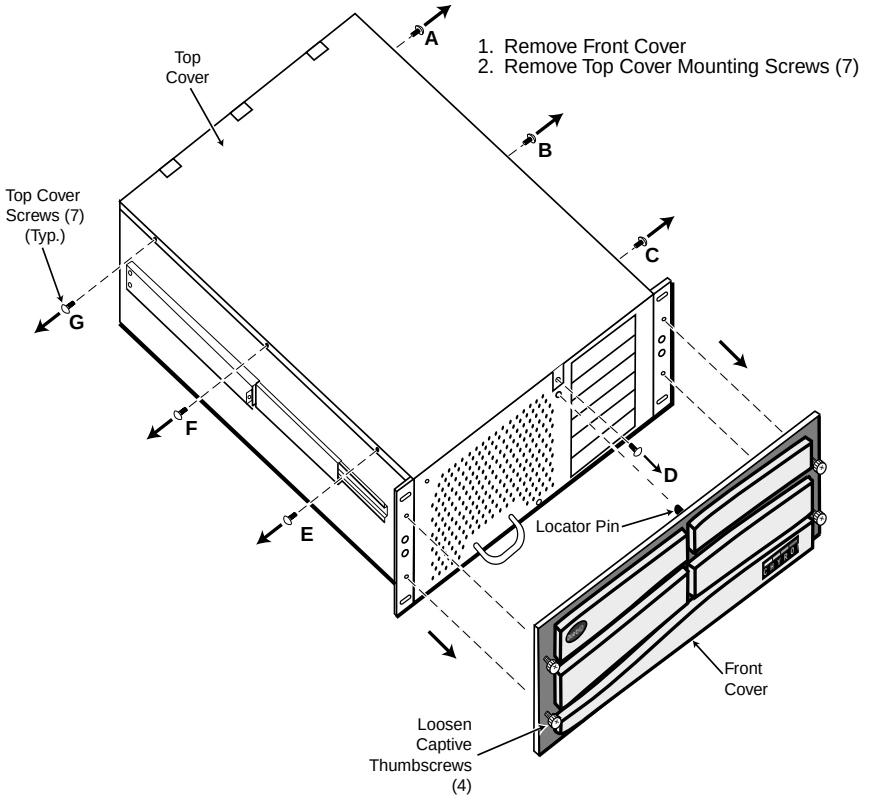


Figure 4-1. Removing Securing Screws

[ ] 4. Refer to Figure 4-1. Loosen the four (4) captive thumbscrews that secure the Front Cover to the chassis, as shown.

[ ] 5. Carefully disengage the center locator pin and remove the Front Cover. Set the cover aside.

[ ] 6. Remove the seven (7) screws that secure the chassis Top Cover (one in front, three on each side). Retain the hardware for reinstallation.

3. Slide Top Cover *Forward*, then lift *Up*.

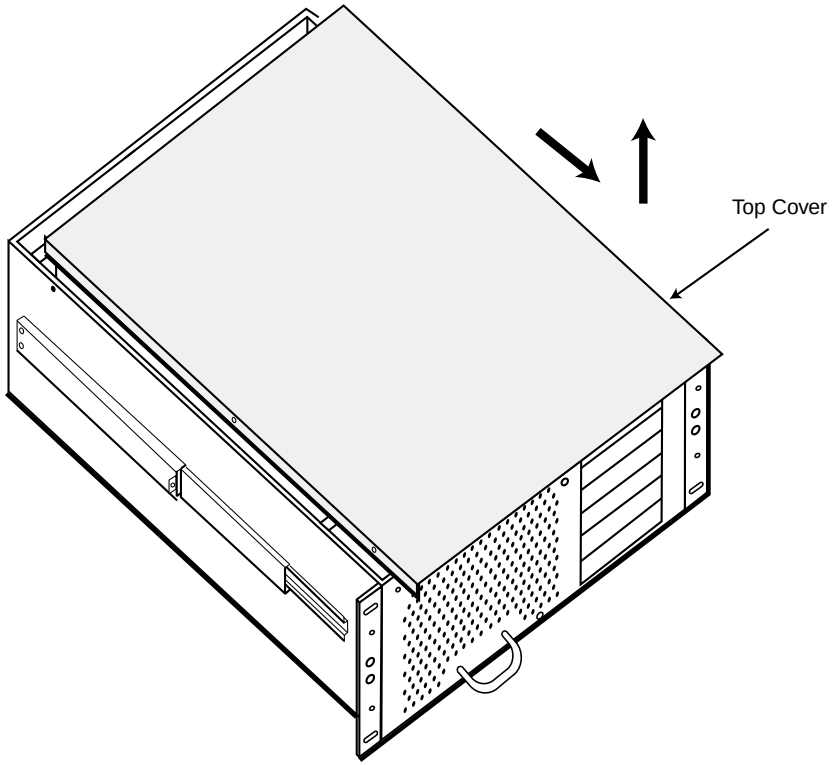


Figure 4-2. Top Cover Removal

[ ] 7. Refer to Figure 4-2. Carefully slide the Top Cover towards the front of the chassis to disengage the rear securing tabs, then lift the top cover.

NOTE

You must take all necessary ESD precautions when working on any open chassis, or when handling any circuit boards outside of the chassis! Be sure to use an anti-static wrist strap whenever working on an open chassis!

[ ] 8. To reinstall the Top Cover, place the top cover on the chassis, slid approximately 1.5 inches (40mm) towards the front of the chassis. Then, press down

while you slide the Top Cover back into position. Secure the top cover with the seven (7) screws removed previously.

[ ] 9. To reinstall the Front Cover, align the locator pin and press the cover into place. Then, secure the Front Cover using the four thumbscrews.

4.2 Chassis Interior

Refer to the following diagram (Figure 4-3) to familiarize yourself with the Duet chassis interior:

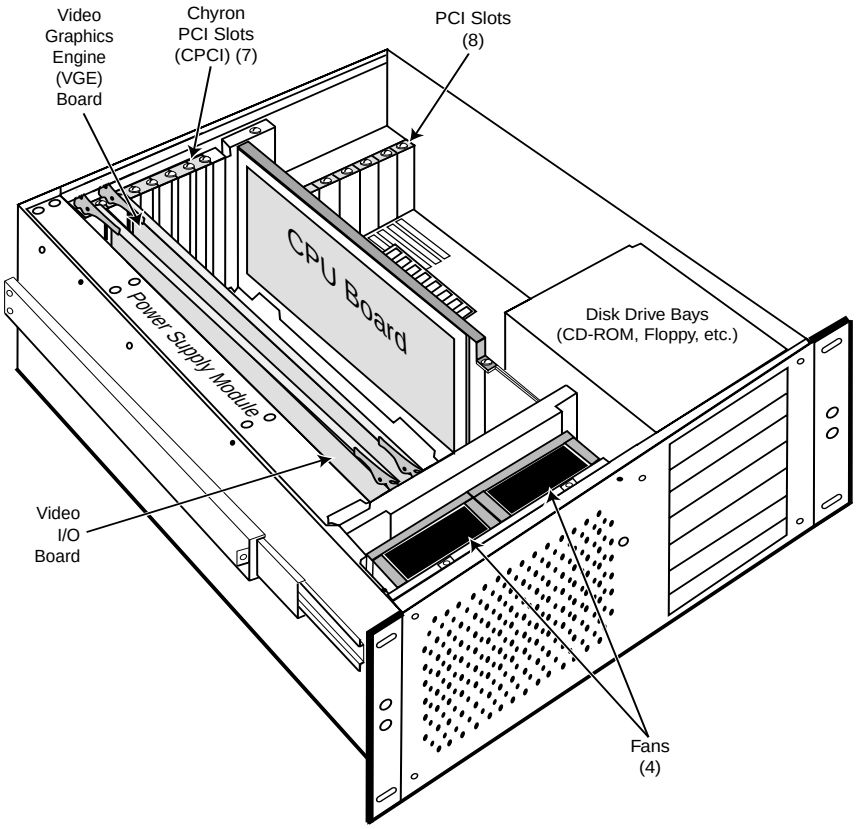


Figure 4-3. Duet Chassis Interior

4.3 Handling PCI Boards

CAUTION

Take all necessary ESD precautions when working on the chassis, or when handling circuit boards!

The PCI area is located at the rear of the Duet chassis, behind the disk drive bay; this area supports industry-standard PCI Boards. Any PCI card may be installed in any available PCI slot. Before installing any PCI Boards, remove the Duet top cover (as previously described) if not already removed. Refer to Figure 4-4 to locate the PCI section of the Duet chassis.

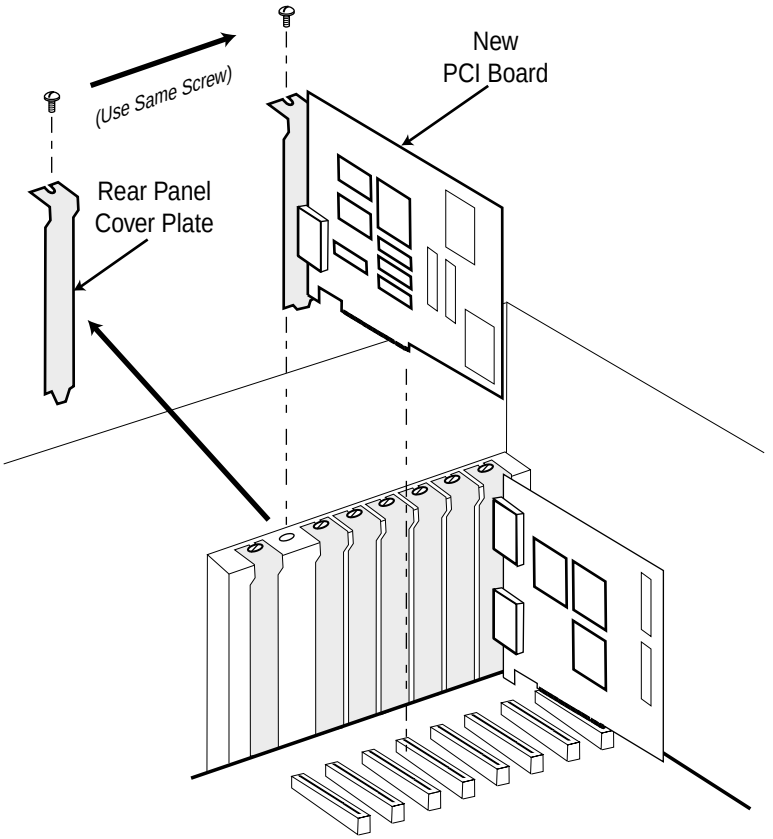


Figure 4-4. Duet Chassis/PCI Board Installation

4.3.1 PCI Board Installation

[ ] 1. Refer to Figure 4-4. Using an appropriate screwdriver, remove the Rear Panel Cover Plate for the PCI slot the new board will be installed in. *When viewed from the rear panel, each cover plate is slightly to the left of its matching board slot.* Retain the screw for installation of new PCI Board, and retain the cover plate for possible future use!

[ ] 2. Remove the PCI Board from its anti-static packing material. Insert the board into the board slot. Carefully press down on the board's upper edge using firm pressure, until the board is seated securely into the slot.

[ ] 3. Secure the PCI Board's rear panel to the chassis by aligning the metal retaining bracket with the screw hole in the top edge of the Duet chassis. Then, secure the bracket to the chassis using the original screw that secured the Rear Panel Cover Plate.

4.3.2 PCI Board Removal

[ ] 1. Refer to Figure 4-4. Using an appropriate screwdriver, remove the retaining screw from the rear panel bracket of the PCI Board you are removing. Retain the screw for cover plate installation!

[ ] 2. Place the PCI board into anti-static packaging material to prevent ESD damage.

[ ] 3. Install a Rear Panel Cover Plate to the chassis by aligning its metal retaining bracket with the screw hole in the top edge of the PCI slot area. Then, secure the bracket to the chassis using the screw that secured the PCI Board. ***For proper chassis cooling, rear panel cover plates must be installed on all unoccupied PCI slots!***

4.4 Handling CPCI Boards

CAUTION

You must take all necessary ESD precautions when working on any open chassis, or when handling any circuit boards outside of the chassis! Be sure to use an anti-static wrist strap whenever working on an open chassis!

The CPCI area is located in the left portion of the chassis, next to the Power Supply Module. *Refer to Figure 4-3 on page 4-5 to familiarize yourself with chassis layout.* The CPCI area houses proprietary Chyron hardware which uses a larger form factor. The CPCI connector (2mm hard metric) is used for these slots - this connector provides superior signal integrity and ruggedness compared to standard PCI edge finger connectors.

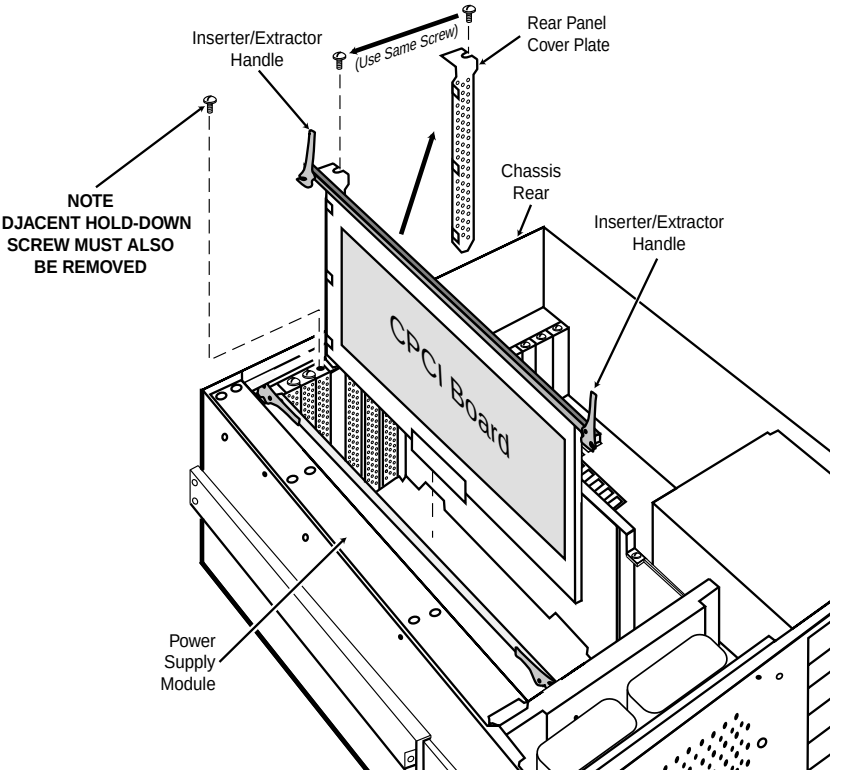


Figure 4-5. CPCI Board Removal/Replacement

4.4.1 CPCI Board Installation

[ ] 1. Refer to Figure 4-5. Using an appropriate screwdriver, remove the hold down screw securing the Rear Panel Cover Plate where the new CPCI board will be installed. In addition, you must also remove the hold-down screw securing the adjacent Rear Panel Cover Plate. The hold-down screws overlap each Rear Panel Cover Plate. Retain both screws for CPCI Board installation, and retain the unused cover plate for possible future use.

[ ] 2. Remove the CPCI Board from its anti-static packing material, and open its Inserter/Extractor Handles (handles face away from board; refer to Figure 4-6.)

[ ] 3. Insert the CPCI Board into the appropriate board slot, being careful to engage both slotted card guides located on the front and rear of the chassis. The board is now partially seated in the slot.

[ ] 4. Refer to Figure 4-6. With firm pressure, rotate the Inserter/Extractor Handles inwards (towards the center of the board) to engage the front and rear chassis hold-down flanges.

[ ] 5. Ensure the board is fully seated into its slot and, that the Inserter/Extractor Handles are flush with the top edge of the board.

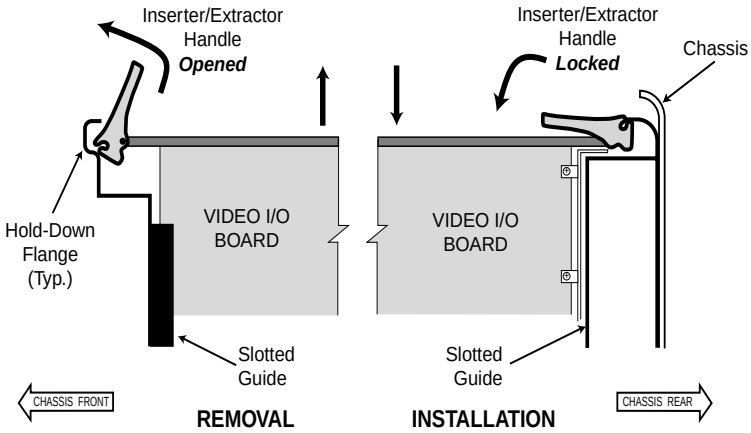


Figure 4-6. CPCI Board Inserter/Extractor Handles

[ ] 6. Secure the CPCI Board's rear panel to the chassis by aligning its metal retaining bracket with the screw hole in the top edge of the Duet chassis. Then, secure the bracket to the chassis using the screw that secured the Rear Panel Cover Plate.

4.4.2 CPCI Board Removal

CAUTION

You must take all necessary ESD precautions when working on any open chassis, or when handling any circuit boards outside of the chassis! Be sure to use an anti-static wrist strap whenever working on an open chassis!

[ ] 1. Refer to Figure 4-5. Using an appropriate screwdriver, remove the hold-down screw securing the CPCI Board into its slot as well as the adjacent hold-down screw. The hold-down screws overlap each Rear Panel Cover Plate. Retain both screws for Rear Panel Cover Plate installation.

[ ] 2. Remove the CPCI Board from the chassis by opening its Inserter/Extractor Handles (rotate handles away from board; refer to Figure 4-6.)

[ ] 3. Lift the board straight up and out of the chassis.

CAUTION

IMMEDIATELY wrap the CPCI Board in anti-static packaging to prevent ESD damage!

[ ] 4. Install a Rear Panel Cover Plate by inserting its foot tab into the bottom rear of the chassis, and then aligning its metal retaining bracket with the screw hole in the top edge of the Duet chassis. Then, secure the cover plate using the screw that secured the CPCI board. ***For chassis integrity, rear panel cover plates must be installed on all unoccupied CPCI slots!***

4.5 Handling Power Supply Unit

The Duet Power Supply is a modular unit, which includes auto-ranging AC input (90-264 VAC, 47-63 Hz), an integrated Power Entry input module, an on/off switch, and two internal cooling fans.

The modular Power Supply unit is secured to the chassis with three screws, and no wiring harness is used - power output is routed to the backplane via three high current connectors, which enable easy alignment with the backplane and low insertion force. Once installed and secured with the screws, the power supply connectors cannot disengage through thermal transitions, vibration, shipping impacts, or handling--- thus providing the highest possible reliability.

4.5.1 Power Supply Unit Removal

[ ] 1. Power down the Duet chassis using the rear panel switch, and disconnect the AC power cord. Then, remove the Duet chassis top cover (See “Chassis Disassembly” on page 4-1.)

[ ] 2. Refer to Figure 4-7. Remove the two screws securing the Power Supply Module to the chassis side wall.

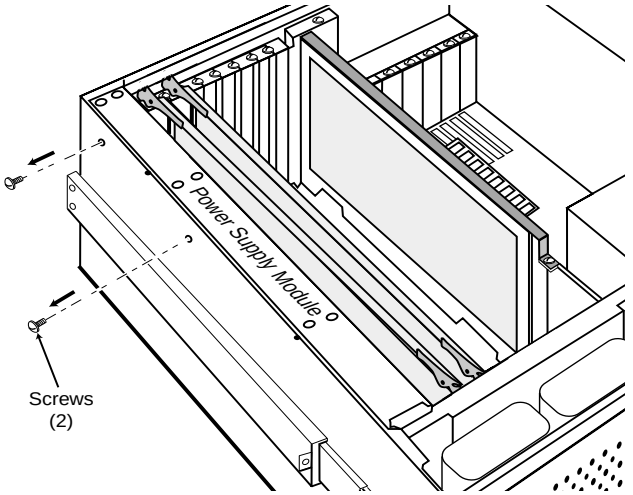


Figure 4-7. Removing Power Supply Screws

[ ] 3. Refer to Figure 4-8. Firmly grasp the lifting handle as shown, and lift the Power Supply straight up.

Gently rock the unit side to side to help disengage the backplane connectors.

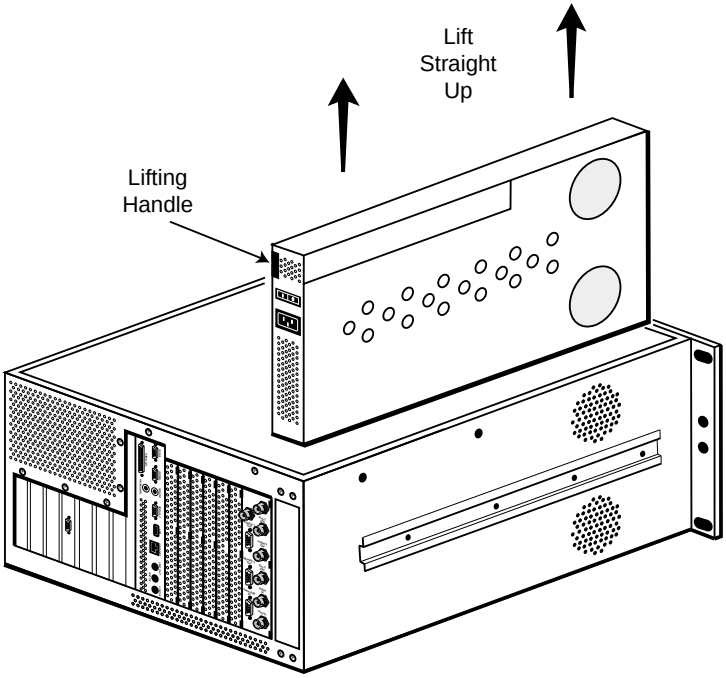


Figure 4-8. Power Supply Unit Lifting Handles

[ ] 4. Remove the mesh Air Filter from the inside of the chassis wall near the Power Supply fans. Clean this filter, and retain it for reinstallation.

4.5.2 Power Supply Unit Installation

[ ] 1. Refer to Figure 4-8. Grasp the Power Supply unit using its lifting handle, and orient the Power Supply unit as shown.

[ ] 2. Lower the unit carefully into its shroud, until it is resting on the backplane power connectors.

[ ] 3. Refer to Figure 4-9. Insert the mesh Air Filter and slide it down until its top edge is flush with the top of the chassis wall.

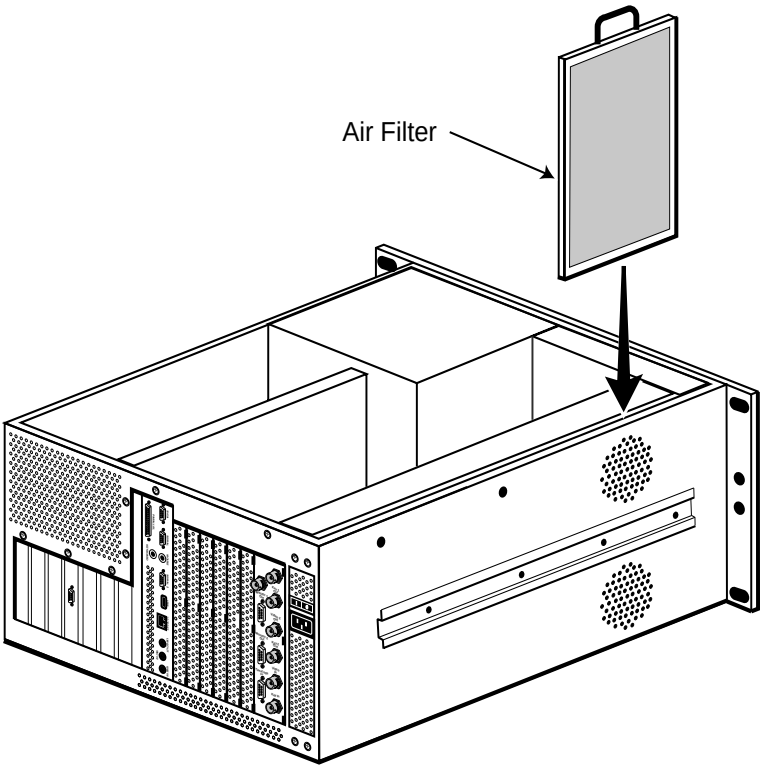


Figure 4-9. Installing Chassis Air Filter

[ ] 4. Using gentle pressure, seat the Power Supply unit into the backplane connectors.

[ ] 5. While maintaining pressure on the top edge of the Power Supply unit, insert and secure the two screws/lockwashers removed earlier.

4.6 Handling CPU Board

Duet is designed with an Intel CPU Board adhering to the "NLX" form factor, in which all signals to/from the rest of the system are carried by an edge-card connector.

CAUTION

Take all necessary ESD precautions when working on the chassis, or when handling circuit boards!

4.6.1 CPU Board Removal

Before removing the CPU Board, remove the system's front panel and top cover.

To remove the CPU Board:

[ ] 1. Refer to Figure 4-10 to locate the CPU Board. Note the board is secured to the chassis with a stiffener and two hold-down screws; one screw at the rear upper corner of the board and the other screw securing the stiffener to the front of the chassis.

[ ] 2. Using an appropriate screwdriver, remove the rear screw.

[ ] 3. Remove the front screw and stiffener. Retain the hardware for reinstallation.

[ ] 4. Gently grasp the card's stiffener bar, and lift the board free from the Duet backplane. Then, IMMEDIATELY place the CPU Board into anti-static packaging!

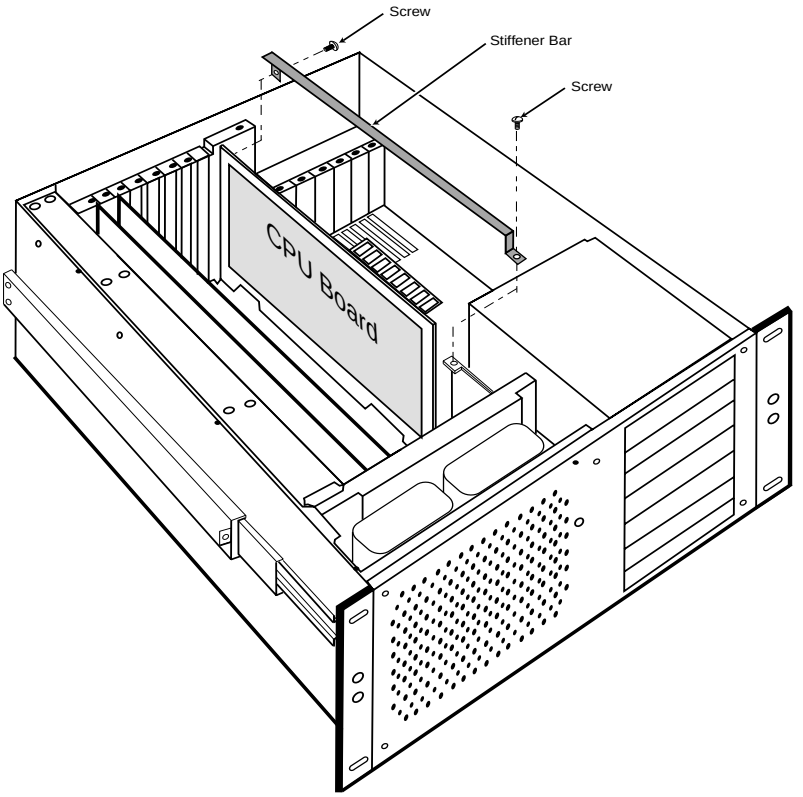


Figure 4-10. CPU Board Installation Diagram

4.6.2 CPU Board Installation

[ ] 1. Refer to Figure 4-10 to locate the CPU Board within the chassis.

[ ] 2. Carefully mate the CPU Board's front edge to the vertical slide near the front of the chassis.

[ ] 3. Insert the CPU Board and mate the board's edge card connector to the backplane. *Firmly press the board into position.*

[ ] 4. Place the stiffener on top of the CPU Board attaching it to the card at the rear with one screw, and secure the other end of the stiffener to the chassis with a second screw.

4.6.3 Switching SVGA Outputs

Duet's **BX** CPU board automatically detects the presence of an AGP or PCI-type video card. When one of these cards is detected, the CPU's SVGA output on is disabled.

4.7 PCI Bridge Removal/Replacement

The PCI Bridge Board communicates with the Backplane using five connectors, and is secured to the Backplane using two screws.

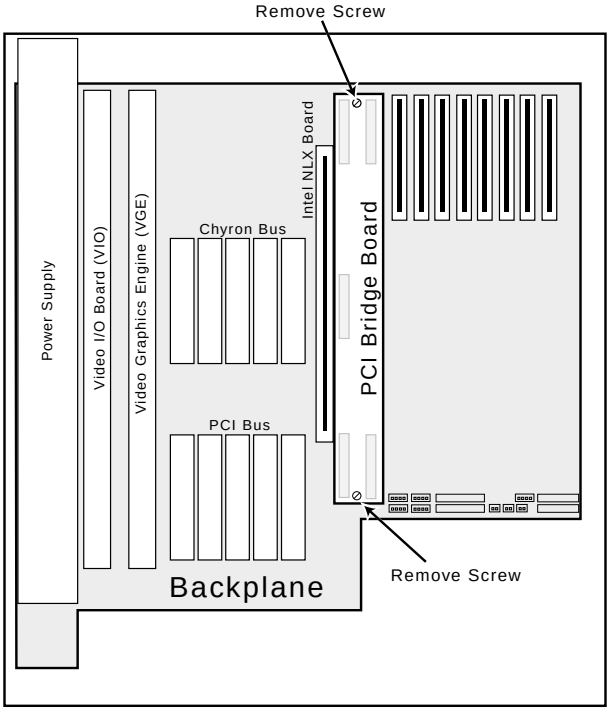


Figure 4-11. PCI Bridge Board Diagram

CAUTION

You must take all necessary ESD precautions when working on any open chassis, or when handling any circuit boards outside of the chassis! Be sure to use an anti-static wrist strap whenever working on an open chassis!

[ ] 1. Turn off the power.

[ ] 2. Remove Duet's top panel.

[ ] 3. Refer to Figure 4-12. Using an appropriate screwdriver, loosen and remove the screws/washers as shown. Retain the hardware for reinstallation.

[ ] 4. Grasp the board at the long ends, and carefully lift the board to unseat the connectors. Rocking the board gently will help to release the connectors.

[ ] 5. IMMEDIATELY place the PCI Bridge Board into anti-static packaging.

To reinstall the PCI Bridge Board, reverse this procedure.

5 - Upgrade/Maintenance

5.1 Introduction

This section describes a variety of common customer maintenance and upgrade procedures, including: adding, replacing, and configuring disk drives; CPU RAM upgrade; and installing the recommended SCSI Adapter card for use with optional SCSI disk hardware.

5.2 Adding/Replacing Disk Drives

Duet is configured with a CD ROM Drive in Bay 1 (top), a Floppy Disk Drive in Bay 2, and a System Hard Drive in Bay 4. Bay 3 is for an optional Zip Drive, and Bays 5 and 6 are for additional (optional) disk drives.

A Zip drive is standard equipment; an optional Jaz drive may be purchased in lieu of the Zip drive. One SCSI hard drive is standard equipment.

Refer to Figure 5-1 (showing Bay 3 as an example) for adding and replacing disk drives.

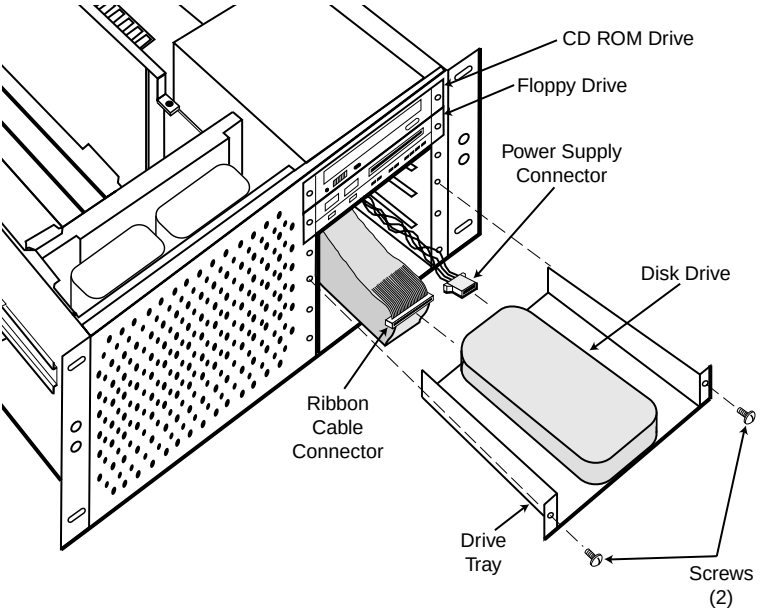


Figure 5-1. Disk Drive Installation/Removal

5.2.1 Disk Drive Removal

Refer to Figure 5-1 and Figure 5-2 for Disk Drive removal.

[ ] 1. Refer to Figure 5-1. Remove the two (2) screws securing the Disk Drive Tray to the chassis.

[ ] 2. Carefully slide the tray containing the Disk Drive partially out of the chassis.

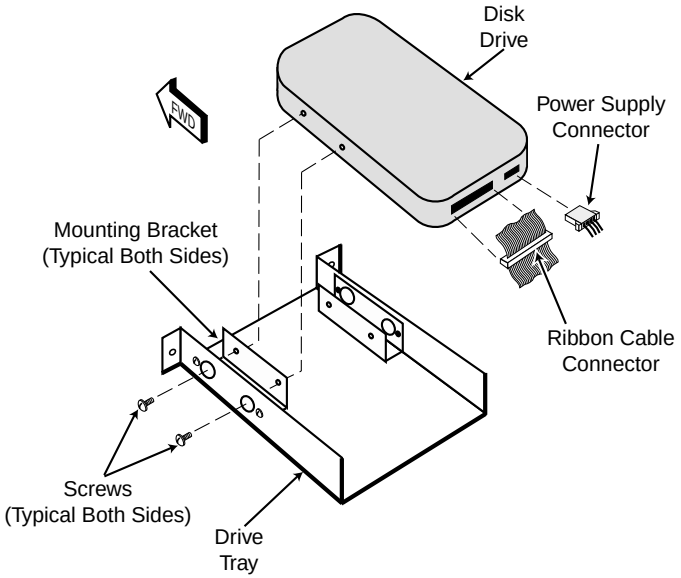


Figure 5-2. Disk Drive Tray Assembly

[ ] 3. Refer to Figure 5-2. Disconnect Power Supply connector.

[ ] 4. Disconnect Ribbon Cable connector.

[ ] 5. While referring to Figure 5-2, remove the two (2) screws from each side of Disk Drive (four screws total) that secure it to the tray.

[ ] 6. Lift Disk Drive out from tray and immediately place it into anti-static packaging.

5.2.2 Disk Drive Installation

Refer to Figure 5-1 and Figure 5-2 for Disk Drive installation.

[ ] 1. Place Disk Drive into Drive Tray.

[ ] 2. Referring to Figure 5-2, secure Disk Drive to tray with four (4) screws (2 on each side).

[ ] 3. Attach Ribbon Cable connector.

[ ] 4. Attach Power Supply connector. **See** Table 5-1 after Step 7 for the appropriate header connections.

[ ] 5. Carefully slide tray containing Disk Drive into chassis.

[ ] 6. Secure Drive Tray to chassis with two (2) screws. (See Figure 5-1).

Table 5-1: Duet Drive Header Assignments

JD 1	IDE B
JD 2	IDE A
JD 3	Floppy drive tray
JD 4 & 5	Power supply connectors for IDE A
JD 6 & 7	Power supply connectors for IDE B
JD 8	Power supply connector for floppy drive tray

In the case of **SCSI** drives, the SCSI adapter board cable must be connected to the drive.See §5.4 for more information on the Adaptec SCSI card.

5.2.3 Disk Drive Configuration

After installing an additional, or replacement, disk drive, follow the subsequent procedures for configuring the drive with the system. For a replacement System Hard Drive, you must re-install Windows NT 4.0. Refer to §5.13 on for instructions.

5.3 CPU RAM Upgrade

Duet is configured with one 128 MB DIMM (Dual Inline Memory Module) installed in the top-most socket. Two additional expansion sockets are located underneath. Minimum memory size is 16MB, and the maximum memory size is 384 MB. The CPU BIOS (Basic Input/ Output System) automatically detects the memory size, type and speed, and supports the following memory features:

- 168-pin DIMMs
- 66 MHz unbuffered SDRAM only for NX440LX CPU board

  OR...

  100 MHz unbuffered SDRAM only for JX440BX CPU board
- Non-ECC (64-bit) and ECC (72-bit) memory
- 3.3 V memory only
- DIMMs in the following sizes:

Table 5-2: Main Memory

DIMM Size	Non-ECC Configuration	ECC Configuration
16 MB	2 Mbit x 64	2Mbit x 72
32 MB	4 Mbit x 64	4 Mbit x 72
64 MB	8 Mbit x 64	8 Mbit x 72
128 MB	16 Mbit x 64	16 Mbit x 72

Should the factory-installed DIMM need to be replaced, or you wish to add additional memory to the unit, follow the steps as outlined below.

CAUTION

Chyron strongly recommends safety measures such as grounding bracelet, before performing any tasks involving DIMM removal and installation.

5.3.1 Removal of Memory Module

[ ] 1. Refer to Figure 5-3. Carefully disengage the retainers securing the Memory Module by moving them away from the module simultaneously. This action will release the DIMM from its socket.

[ ] 2. Remove the module from the socket and place in anti-static packaging for storage, or discard if defective.

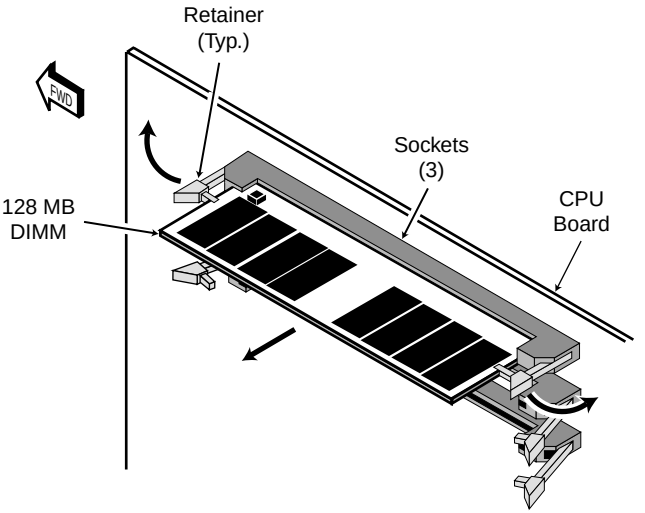


Figure 5-3. DIMM Removal

5.3.2 Installation of Memory Module

[ ] 1. Refer to Figure 5-4. Carefully remove your new, or additional, DIMM from its anti-static packing.

[ ] 2. Handling by the edges, place the DIMM into the socket. Be sure to line up the keyways in the card with the keys in the socket.

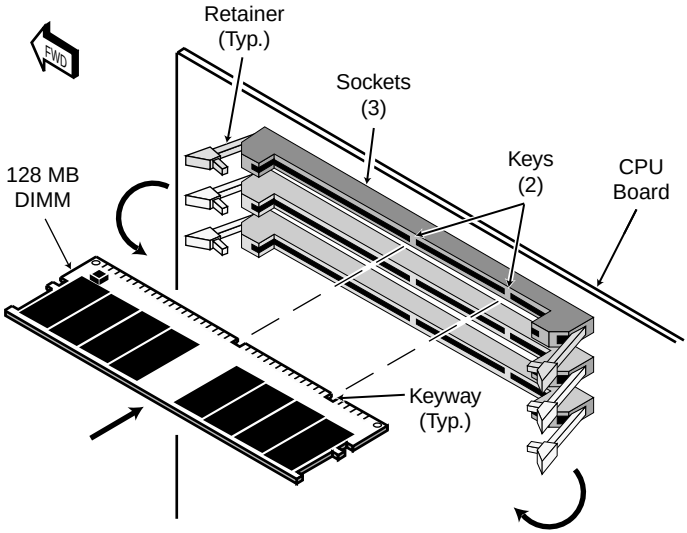


Figure 5-4. DIMM Installation

[ ] 3. Gently push the new DIMM into the socket until it engages. As you push, the retainers will close automatically on the DIMM for a secure installation.

[ ] 4. Once seated, ensure that the retainers are properly engaged by gently pushing them in towards the module.

5.4 Installation of Adaptec SCSI Card (Option)

Adaptec's SCSI Card 29160 is the Chyron-recommended optional SCSI card for use with Duet. The 29160 is a 160 MB PCI-to-Ultra LVD board.

Remember that any PCI card may be installed in any available PCI slot.

NOTE

See "Handling PCI Boards" on page 4-6 for basic PCI card installation procedures. Additional procedures unique to installing the SCSI card are as follows.

NOTE

For maximum performance, connect only Ultra2 devices to the Ultra2 segment of the card. Connection of non-Ultra2 devices will degrade the Ultra2 segment's performance to Ultra SCSI performance levels. Only use cables certified for Ultra2 with the external Ultra2 connector. Refer to Figure 5-5.

[ ] 1. Connect all Wide Ultra and Wide Fast devices to the 68-pin Wide Ultra SCSI Connector.

[ ] 2. Connect all Ultra SCSI, FAST SCSI, and SCSI-1 devices to the 50-pin Ultra SCSI segment.

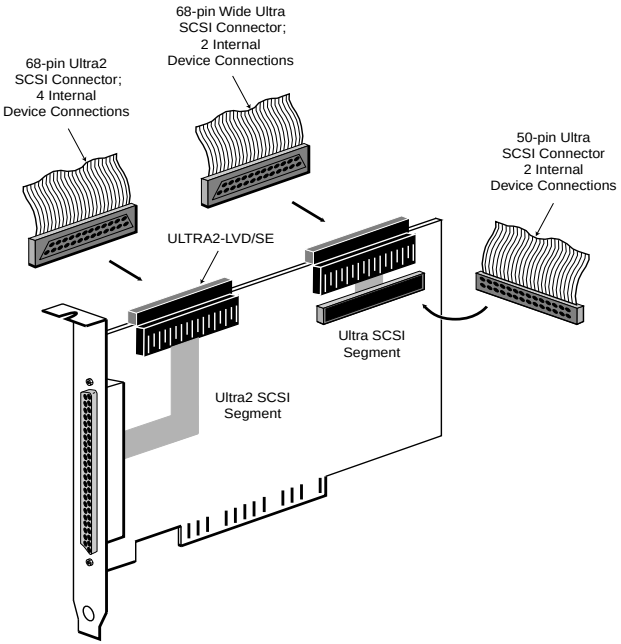


Figure 5-5. SCSI Card Configuration

NOTE

When using the optional internal-to-external Ultra SCSI adapter, the 50-pin external connector MUST be terminated when no device is connected. Failure to terminate the external connector will result in erratic performance over the entire Ultra SCSI segment. See Figure 5-6.

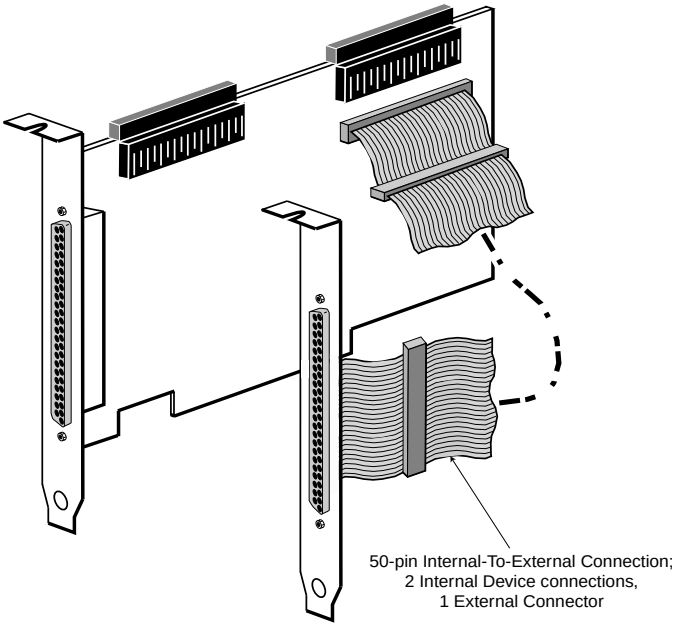


Figure 5-6. Ultra SCSI External Connections

5.4.1 Installation of SCSI Drive

[ ] 1. Connect one end of a 68-pin Ultra2 SCSI Ribbon Cable to the Ultra2-LVD/SE connector on the SCSI Card. See Figure 5-5.

[ ] 2. Connect the other end of the Ribbon Cable to the SCSI Drive in the Drive Housing. Leave enough slack in the Ribbon Cable for installation.

[ ] 3. Slide tray containing the SCSI Drive into the Drive Housing.

[ ] 4. Secure tray with screws (2). See Figure 5-7.

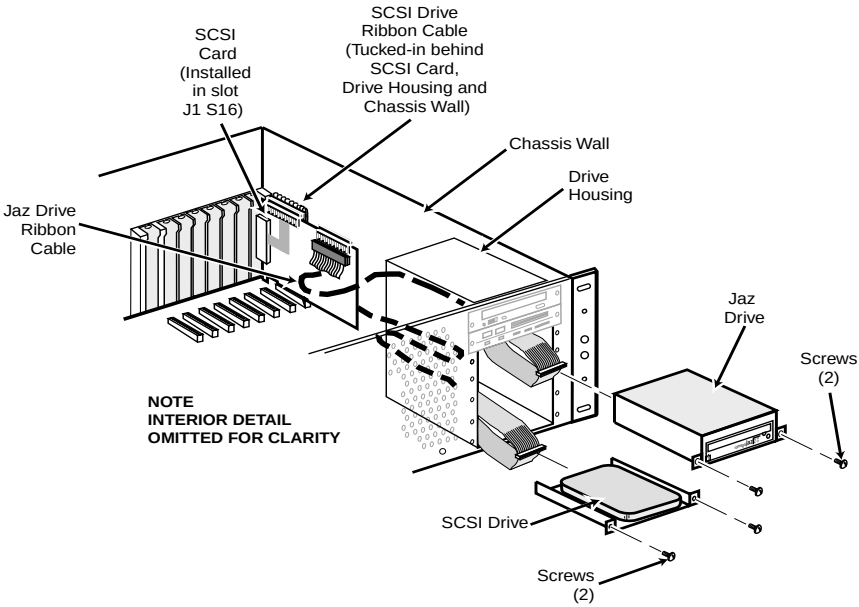


Figure 5-7. SCSI Drive and Jaz Drive Installation

5.4.2 Installation of Jaz Drive

[ ] 1. Connect one end of a 50-pin Ultra SCSI Ribbon Cable to the Ultra SCSI Segment connector on the SCSI Card. See Figure 5-5.

[ ] 2. Connect the other end of the Ribbon Cable to the Jaz Drive in the Drive Housing. Leave enough slack in the Ribbon Cable for installation. See Figure 5-7.

[ ] 3. Slide tray containing the SCSI Drive into the Drive Housing.

[ ] 4. Secure tray with screws (2). See Figure 5-7.

Note: The ribbon cable must be terminated with a termination connector at the end nearest the last device, in this case, the Jaz drive.

5.5 SVGA Board

3D Labs' Oxygen VX-1 is the Chyron-recommended graphics accelerator for use with the Duet HD and SD.

CAUTION

Take all necessary ESD precautions when working on the chassis, or when handling SVGA boards!

The area that supports the industry-standard SVGA board is located at the rear of the Duet chassis, behind the disk drive bay. Before installing the SVGA board, remove the Duet top cover (as previously described) if not already removed. Then, refer to Figure 5-8 to locate a PCI slot in the Duet chassis if you are installing a PCI graphics board. Remember that any PCI card may be installed in any available PCI slot. The 3D Labs VX-1 card is an AGP-type graphics board, and plugs directly into the CPU board.

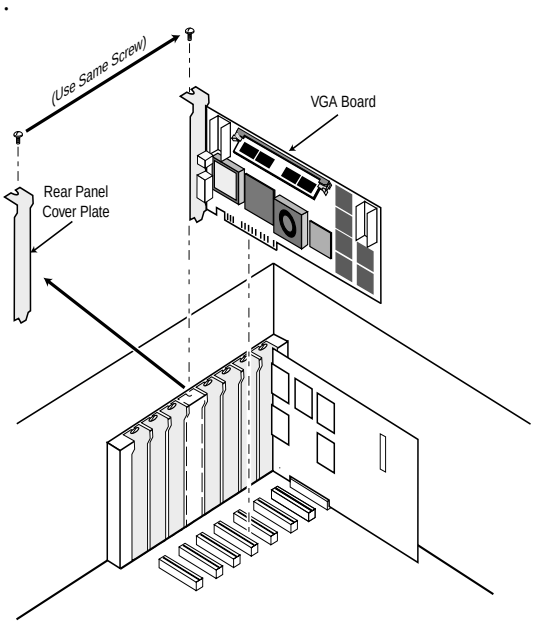


Figure 5-8. SVGA Board Installation

5.5.1 Installation of SVGA Board

[ ] 1. Refer to Figure 5-8. Using an appropriate screwdriver, remove the Rear Panel Cover Plate for the PCI slot the SVGA board will be installed in. *When viewed from the rear panel, each cover plate is slightly to the left of its matching board slot.* Retain the screw for installation of the SVGA board, and retain the cover plate for possible future use!

[ ] 2. Remove the SVGA board from its anti-static packing material. Insert the board into the board slot. Carefully press down on the board's upper edge using firm pressure, until the board is seated securely into the slot.

[ ] 3. Secure the SVGA board's rear panel to the chassis by aligning the metal retaining bracket with the screw hole in the top edge of the Duet chassis. Then, secure the bracket to the chassis using the original screw that secured the Rear Panel Cover Plate.

[ ] 4. Refer to §5.5.3 if you have been using the CPU board's video output and are now switching to use of one of the recommended SVGA boards. A change to the jumpers on the CPU board is necessary in this situation.

5.5.2 Removal of SVGA Board

[ ] 1. Refer to Figure 5-8. Using an appropriate screwdriver, remove the retaining screw from the rear panel bracket of the SVGA board. Retain the screw for cover plate installation!

[ ] 2. Place the SVGA board into anti-static packaging material to prevent ESD damage.

[ ] 3. Install a Rear Panel Cover Plate to the chassis by aligning its metal retaining bracket with the screw hole in the top edge of the SVGA slot area. Then, secure the bracket to the chassis using the screw that secured the SVGA board. ***For proper chassis cooling, rear panel cover plates must be installed on all unoccupied PCI slots!***

5.6 Fax Modem Board

The Zoom Fax Modem 56K PCI Dualmode (2925) V.90, is the Chyron-recommended fax modem for use with Duet.

5.6.1 Installation of Modem Driver

NOTE

Windows NT users: You MUST install the modem driver software from the Zoom Link CD BEFORE installing the fax modem in your PC.

To install, perform the following steps:

[ ] 1. From the Task Bar on the desktop of your Windows NT, click on **START** and select **RUN**.

[ ] 2. Select the **Modems** icon. When the **Zoom 56K PCI Modem Installation** window appears, click **NEXT**.

[ ] 3. In the **Select Components** window, select **Install New** and click **NEXT**. A message reading "Installing Comm Port and Modem" appears.

[ ] 4. In the **Setup Complete** window a restart message will appear. Click **FINISH**.

Your Zoom 56K PCI Dualmode Fax Modem setup is now completed.

5.6.2 Installation of Fax Modem Board

CAUTION

Take all necessary ESD precautions when working on the chassis, or when handling the fax modem board!

The area that supports the fax modem board is located at the rear of the Duet chassis, behind the disk drive bay. Before installing the fax modem board, remove the Duet top cover (as previously described) if not already removed. Then, refer to Figure 5-10 to locate a PCI slot in the Duet chassis.

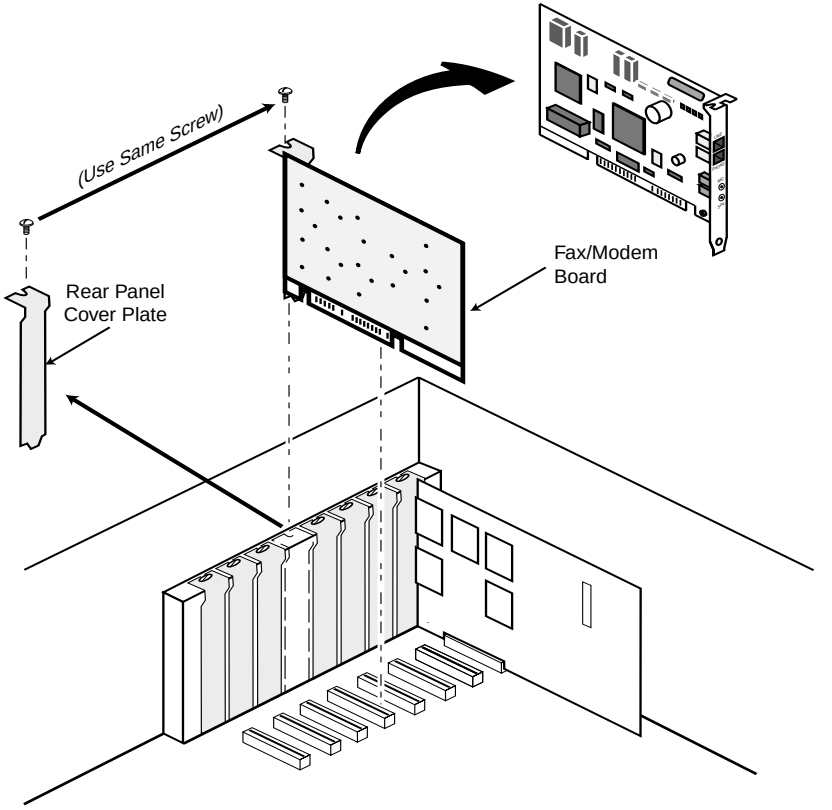


Figure 5-9. Fax Modem Board Installation

[ ] 1. Refer to Figure 5-10. Using an appropriate screwdriver, remove the Rear Panel Cover Plate for the PCI slot the fax modem board will be installed in. *When viewed from the rear panel, each cover plate is slightly to the left of its matching board slot.* Retain the screw for installation of the fax modem board, and retain the cover plate for possible future use!

[ ] 2. Remove the fax modem board from its anti-static packing material. Insert the board into the board slot. Carefully press down on the board's upper edge using firm pressure, until the board is seated securely into the slot.

[ ] 3. Secure the fax modem board's rear panel to the chassis by aligning the metal retaining bracket with the screw hole in the top edge of the Duet chassis. Then, secure the bracket to the chassis using the original screw that secured the Rear Panel Cover Plate.

5.6.3 Removal of Fax Modem Board

[ ] 1. Refer to Figure 5-10. Using an appropriate screwdriver, remove the retaining screw from the rear panel bracket of the fax modem board. Retain the screw for cover plate installation!

[ ] 2. Place the fax modem board into anti-static packaging material to prevent ESD damage.

[ ] 3. Install a Rear Panel Cover Plate to the chassis by aligning its metal retaining bracket with the screw hole in the top edge of the PCI slot area. Then, secure the bracket to the chassis using the screw that secured the fax modem board. ***For proper chassis cooling, rear panel cover plates must be installed on all unoccupied PCI slots!***

5.7 Enabling SD Or HD Via VGE Board Jumper Settings

CAUTION

You must take all necessary ESD precautions when working on any open chassis, or when handling any circuit boards outside of the chassis! Be sure to use an anti-static wrist strap whenever working on an open chassis!

The Video Graphics Generator (VGE) Board is located in the area of the Duet chassis for CPCI Boards. See Figure 4-3.

5.7.1 Standard Definition

Remove the VGE Board from the Duet Chassis. For removal procedure, refer to Section **§4.4.2** "CPCI Board Removal". Place VGE Board on a static free surface.

For Standard Definition, refer to Figure 5-11. The configuration of the jumpers on the VGE Board must be set as follows:

- On JP13, set the jumper to Pins 2 and 3.
- On JP16, set the jumper to Pins 2 and 3.
- On JP17, set the jumper to Pins 2 and 3.
- On JP19, set the jumper to Pins 2 and 3.
- On JP20, set the jumper to Pins 1 and 2.

After jumpers are set, reinstall the VGE Board into the Duet chassis. For installation procedure, refer to Section **§4.4.1** "CPCI Board Installation". Be sure you are operating the Duet with a Standard Definition Video I/O Board.

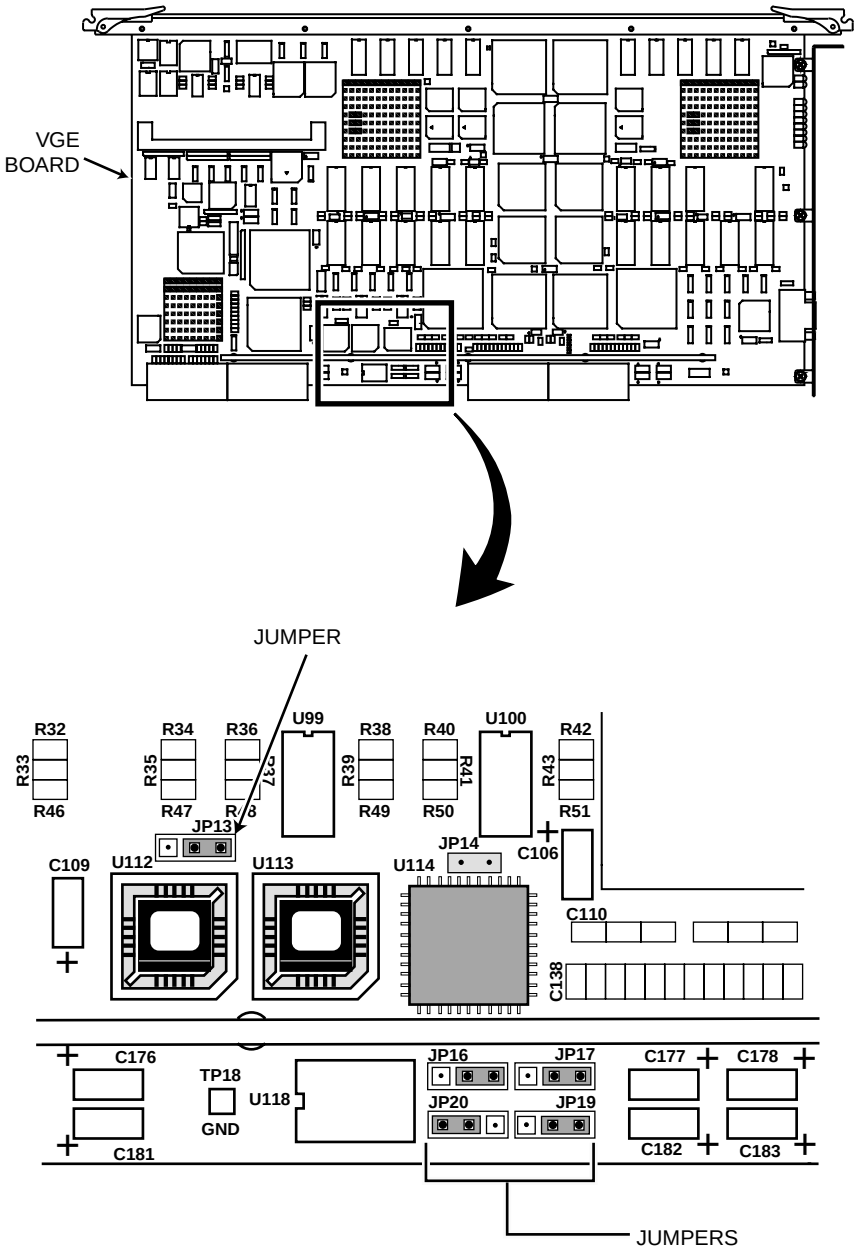


Figure 5-10. Jumper Settings for Standard Definition

5.7.2 High Definition

Remove the VGE Board from the Duet Chassis. For removal procedure, refer to Section **§4.4.2** “CPCI Board Removal”. Place VGE Board on a static free surface.

For High Definition, refer to Figure 5-12. The configuration of the jumpers on the VGE Board must be set as follows:

- On JP13, set the jumper to Pins 1 and 2.
- On JP16, set the jumper to Pins 2 and 3.
- On JP17, set the jumper to Pins 2 and 3.
- On JP19, set the jumper to Pins 2 and 3.
- On JP20, set the jumper to Pins 2 and 3.

After jumpers are set, reinstall the VGE Board into the Duet chassis. For installation procedure, refer to Section **§4.4.1** “CPCI Board Installation”. Be sure you are operating the Duet with a High Definition Video I/O Board.

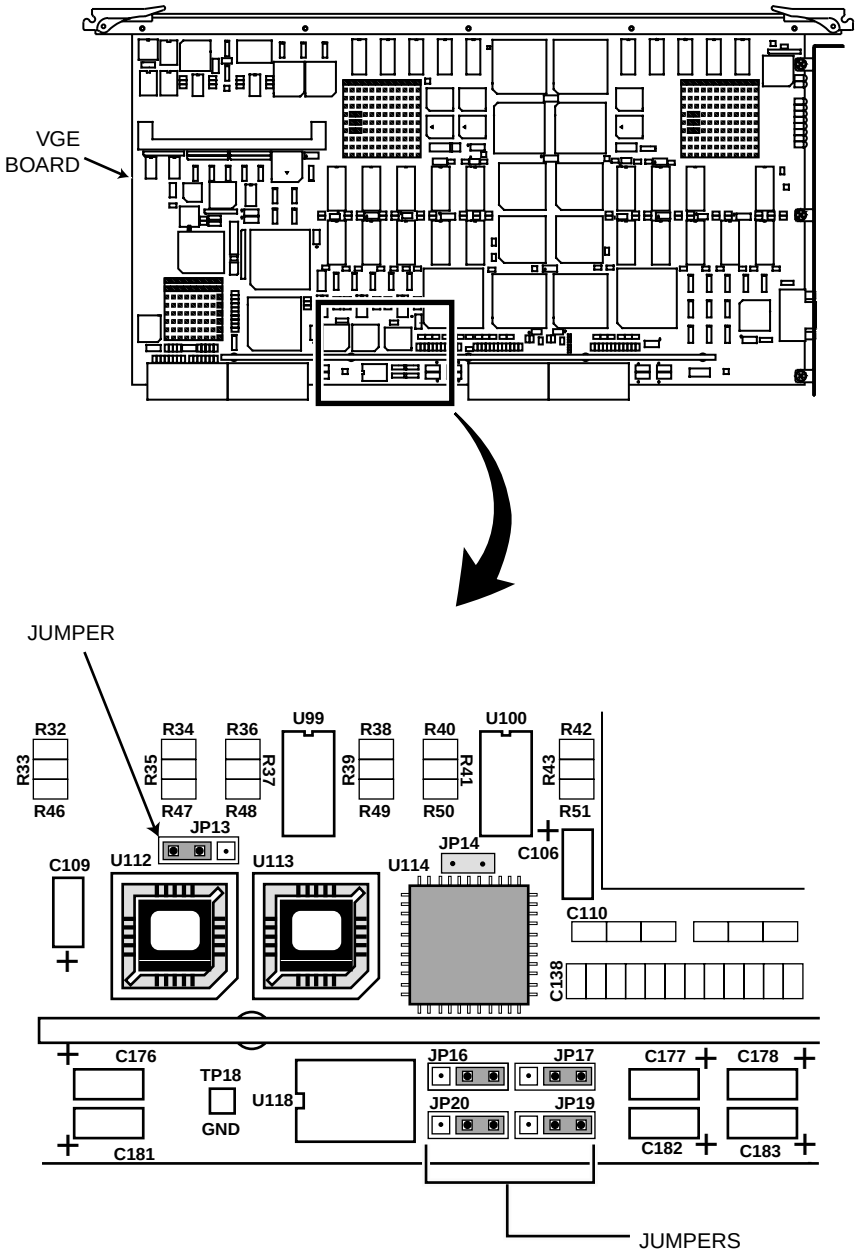


Figure 5-11. Jumper Settings for High Definition

5.8 HD Video I/O DIP Switches

5.8.1 HD Video I/O Board Rev. A

For bench testing, a row of colored DIP switches controls a number of setup functions for early versions of the HD-Video I/O board, as seen in Figure 5-13:

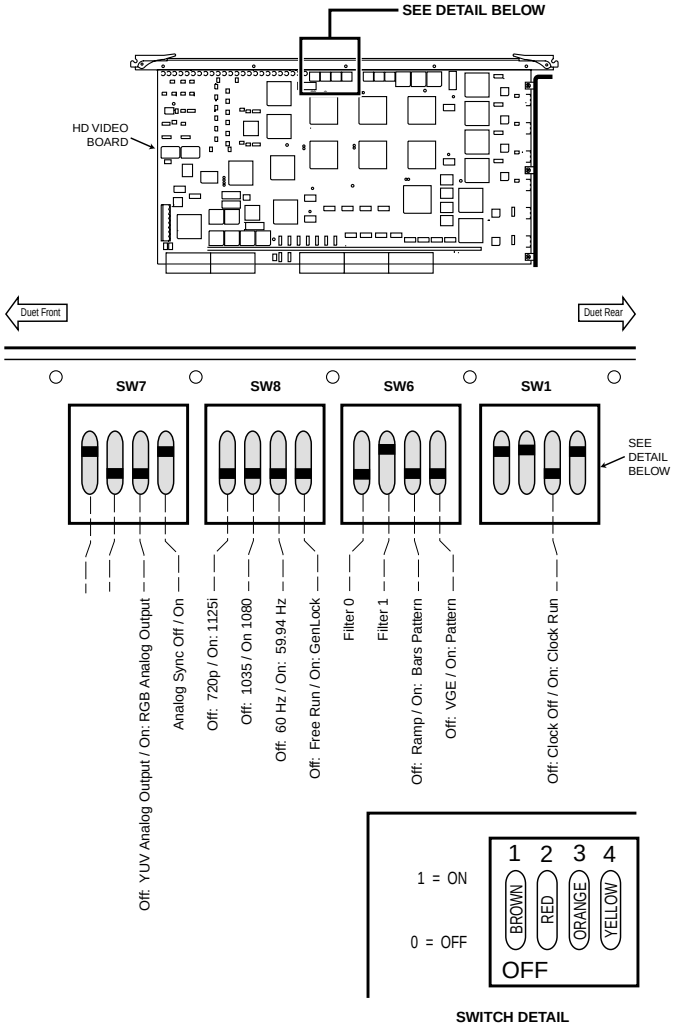


Figure 5-12. HD Video I/O DIP Switch Controls

Remember that Switch #5 controls the Channel 2 input. For diagnostic work, setting Pole #4 (yellow) to 'ON' will replace the channel input with a color bars signal.

5.8.2 HDI/O Board Rev. M And Later

Revised Duet HDI/O boards were released in early 2000, to coincide with Lyric Version 1.2 and later. Numerous HD formats and setup options are now available. The DIP switches whose settings are pictured below are used **only for bench testing!** In normal operation with Lyric Version 1.2 or later, all operations are software-controlled. Control of setup options and formats is illustrated in the following two tables.

Table 5-3: Video Setup Options for HDI/O Board Rev. M and Later

S7			S6		S1
Pole 2 Red	Pole 3 Orange	Pole 4 Yellow	Pole 3 Orange	Pole 4 Yellow	Pole 3 Orange
On	**On**	**On**	**On**	**On**	**On**
Gen-lock	Analog Out = RGB	No sync on Analog Out	Color Bar Pattern	Pattern Output	Clock Run
Off	**Off**	**Off**	**Off**	**Off**	**Off**
Free Run	Analog Out = YUV	Tri-Level Sync on Analog Out	Ramp Pattern	VGE Output	Clock Off

On Duet's HDI/O board, **dip switch number 5's pole 4** may be set to ON to generate a test pattern. This action temporarily disables the "B" input to the HDI/O board.

S8				S7	DESCRIPTION							
Pole 1 Brown	Pole 2 Red	Pole 3 Orange	Pole 4 Yellow	Pole 1 Brown	System Nomenclature	Active Samples/line	Active lines/ frame	Frame rate (Hz)	Scanning Format	Sampling Frequency (MHz)	Total samples per line	Total lines per frame
ON	ON	ON	ON	OFF	1920x1080/60/2:1	1920	1080	30	2:1 Interlace	74.25	2200	1125
ON	ON	ON	ON	ON	1920x1080x 59.94/2:1	1920	1080	30 1.001	2:1 Interlace	74.25 1.001	2200	1125
ON	ON	OFF	ON	OFF	1920x1035/60/2:1 (Sony Special)	1920	1035	30	2:1 Interlace	74.25	2200	1125
ON	ON	OFF	ON	ON	1920x1035/59.94/ 2:1 (Sony Special)	1920	1035	30 1.001	2:1 Interlace	74.25 1.001	2200	1125
ON	OFF	ON	ON	OFF	1920x1080/50/2.1	1920	1080	25	2:1 Interlace	74.25	2640	1125
ON	ON	ON	OFF	OFF	1920X1080/30/1:1	1920	1080	30	Progressive	74.25	2200	1125
ON	ON	ON	OFF	ON	1920x1080/29.97/ 1:1	1920	1080	30 1.001	Progressive	74.25 1.001	2200	1125
ON	OFF	ON	OFF	OFF	1920x1080/25/1:1	1920	1080	25	Progressive	74.25	2640	1125
ON	OFF	OFF	OFF	OFF	1920x1080/24/1:1	1920	1080	24	Progressive	74.25	2750	1125
ON	OFF	OFF	OFF	ON	1920x1080/23.98/ 1:1	1920	1080	24 1.001	Progressive	74.25	2750	1125
ON	OFF	OFF	ON	OFF	1920x1080/24(sF)	1920	1080	24	Progressive (sF)	74.25	2750	1125
ON	OFF	OFF	ON	ON	1920x1080/ 23.98(sF)	1920	1080	24 1.001	Progressive (sF)	74.25	2750	1125
OFF	ON	ON	OFF	OFF	1280x720/60/1:1	1280	720	60	Progressive	74.25	1650	750
OFF	ON	ON	OFF	ON	1280x720/59.94/1:1	1280	720	60 1.001	Progressive	74.25 1.001	1650	750
OFF	OFF	ON	ON	OFF	1920x1080/50/2:1	1920	1080	25	2:1 Interlace	74.25	2376	1250

Table 5-4: HD Duet DIP Switch Settings

Lyric V1.2 and the Duet Dual Channel configuration currently support these High Definition video standards:

1080i/59.94 Hz	SMPTE 274M Standard 5
1080sf/23.98 Hz	SMPTE 274M Standard 13
720p/59.94 Hz	SMPTE 296M

Table 5-5: Supported HD Standards For Lyric V2.0

Remember that the video standard output by Duet is determined by the **drivers** that are loaded when the system is started.

Duet drivers released concurrently with Lyric Versions 1.3 and later allow the system's output video standard to be changed via familiar Windows Control Panels. See §2.8.1.

5.9 Dual Channel Upgrade

The Dual Channel HD-Duet upgrade option (Chyron Part No. 5A01331) allows an additional VGE board to be added to the system to support a second channel output. Refer to Chyron Field Update Number 2A02134 for more information.

5.9.1 Installation And Setup

Note: You must install the new Lyric software AFTER this hardware upgrade and the installation of new Duet drivers.

It is recommended that you remove Duet to a static-free work area for this procedure. Remove the unit's top cover and all rear cables. Follow the procedure outlined below. (Note: boards and their slots in the backplane are numbered from the HD Video I/O board closest to the CPU board. The HD Video I/O board's slot is number **1**.)

When installing boards into the backplane, check the backplane connector to ensure that no debris has fallen into the connector during the procedure. Also, be sure that the board edge connectors are aligned with the backplane connectors before locking down the ejectors.

[ ] 1. Remove the current VGE board from the Slot 2 position and install it in the Slot 3 position.

[ ] 2. Install the new VGE board in the Slot 4 position.

[ ] 3. Install the crosspoint board into the Slot 2 position.

Note: If your original HDI/O board is not **Revision "I**" or later, you will need to install the updated board included in the update package. Most Duets produced after December 1999 include the Revision I HDI/O board.

Contact Chyron Customer Service if you need help in verifying the type of your system's HDI/O board.

[ ] 4. Remove the HD Video I/O board from the Slot 1 position. **If you are installing a new HDI/O board from a field update kit that included an MRA #, put aside the original board to be returned to Chyron! The new board and the return of the original board are part of your purchase agreement!**

[ ] 5. Install the new HD Video I/O board into the Slot 1 position.

[ ] 6. Reconnect power and turn on the system.

[ ] 7. Log on to Windows NT.

[ ] 8. Uninstall the current Duet drivers. Use Windows NT's **ADD/REMOVE** control panel to remove **"Duet SYSTEM FILES**".

[ ] 9. Load the **current Lyric CD-ROM** and install the driver for the high definition video standard you will be using.

[ ] 10. Install the Lyric application.

[ ] 11. Start Lyric and pull down the **CONFIG** menu. Click on the **Duet HARDWARE** tab. Confirm that Lyric is detecting **both** VGE boards; you should be able to click in the **LOCKED** check boxes or **IN USE** radio buttons. Refer to §5.9.2 for more information on this menu.

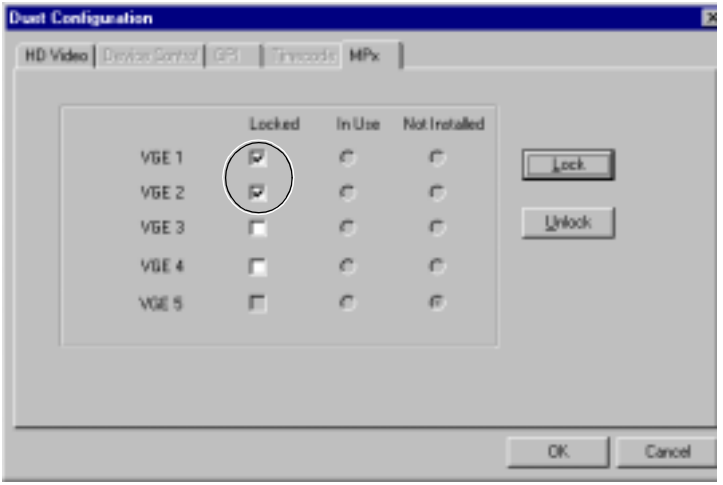


Figure 5-13. Duet MPx Control Panel In Lyric Application

The **NOT INSTALLED** column indicates the status of the remaining slot positions.

[ ] 12. Next, click the **HD VIDEO** tab. Set these controls as described in §2.8.1.1.

5.9.2 Dual Channel Operation

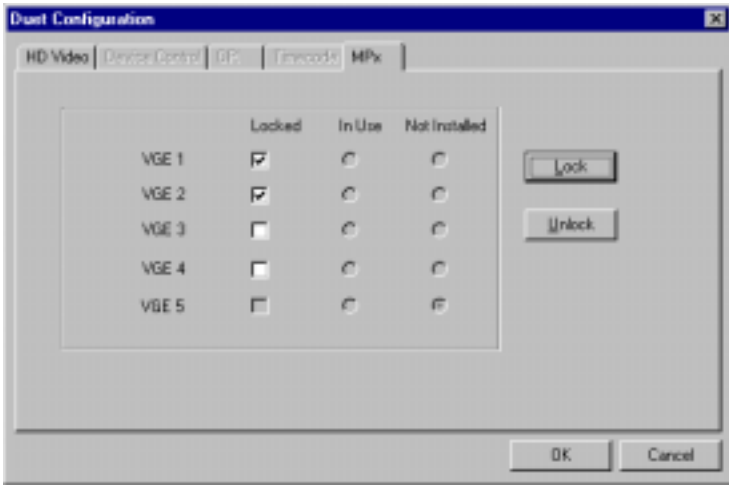


Figure 5-14. Duet MPx Control Panel In Lyric Application

If a VGE board is **Locked**, Lyric has use of the frame buffers on that board, excluding other applications such as CAL. An error will be generated by the CAL server if the client application tries to connect to that channel. If a VGE board is **In Use**, another application (e.g. CAL client) has connected to that board and has locked it for exclusive use. The Frame Buffer's settings are written to the registry on exit from Lyric.

The **Duet Toolbar** on the Lyric interface selects the Frame Buffer whose Canvas is active for composition and editing. Note that buttons for Frame Buffers 1 & 2 appear with the standard configuration of a single Video Graphic Engine in SD Duet. In HD Duet, a single VGE board provides only one Frame Buffer. An additional Frame Buffer button is added to the HD Duet Toolbar with each installation of an additional VGE. In routine operation, the Frame Buffer must be locked by the application you are using.

On start-up, FB 1 will be selected as the active channel. If FB 2 is clicked, channel 2 will become the active channel. From the keyboard, the * key can be used to switch between channels.

The Playlist will support specification of a channel for a particular event. Effects between channels are not available, therefore, dissolve and wipe effects in the Playlist will be disabled for HD systems.

5.10 Multi-VGE Rendering (Lyric Version 1.3 Or Later)

The steadiness and smoothness of complex High Definition animations can be optimized by dedicating multiple Video Graphics Engines to rendering the animation. It may be helpful to visualize dividing the work among these multiple VGEs. When grouped together for one task, the VGEs take turns rendering successive frames of the animation.

However, it is important to remember that each VGE has its own output, and that all must be equally visible to the Duet's output(s). Therefore, Duet's **HD Mixer** must be used to combine the VGEs together into one output. Refer to §5.17 in the Lyric Handbook for more information on this operation.

The Multi-VGE rendering option supports up to four VGE boards. The upgrade package is Chyron Part No. 5A01334.

Multi-VGE Rendering is not to be confused with the Duet Dual Channel option (discussed in the previous section, §5.9) and the two features are not compatible. Any of the VGEs installed as part of either upgrade may be used in the other, but the two features will not operate at the same time. Note, however, that the Multi-VGE option can perform the same function as the Dual Channel option; see §5.10.2.

Figure 5-15 is a block diagram of the VGEs and HD Mix/Effects board in a Multi-VGE rendering setup using 2 VGEs. Figure 5-15 assumes that Slots 1 and 2 are populated by the HDI/O board and the HD Mix/Effects board, as will be the case in a Duet containing this feature or with this feature installed as an upgrade.

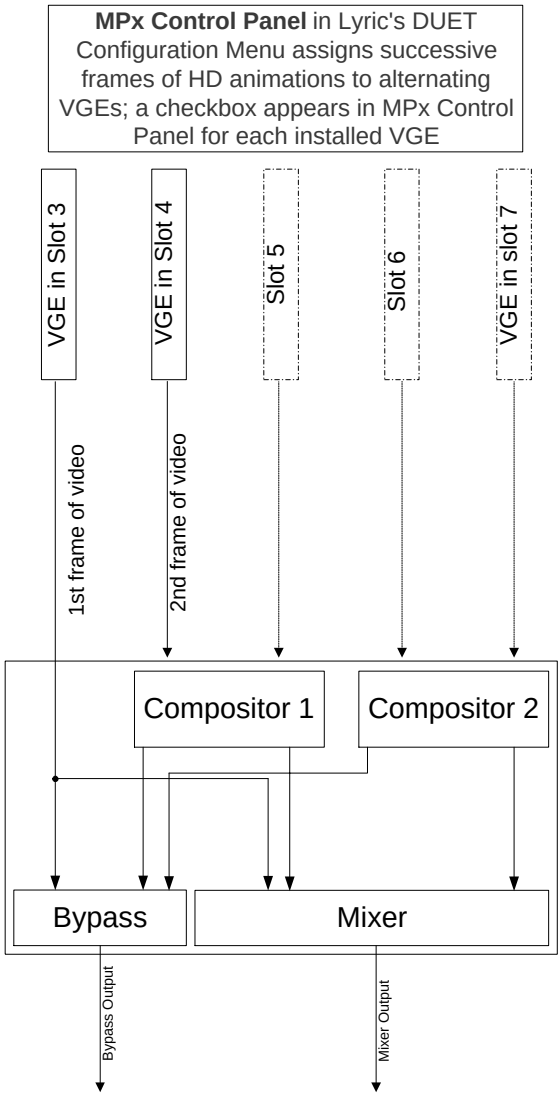


Figure 5-15. Signal Paths For Multi-VGE Rendering

Figure 5-15 represents factory defaults, wherein the VGE in Slot 3 is connected to the Mix/Effect Board's input for Layer 1. Each of the remaining two VGEs is connected to a different Compositor, allowing individual control of all VGEs.

See Figure 5-16 for appropriate settings on the MPx tab under Lyric's Duet Configuration menu, and on the controls for the HD Mix/Effects board.

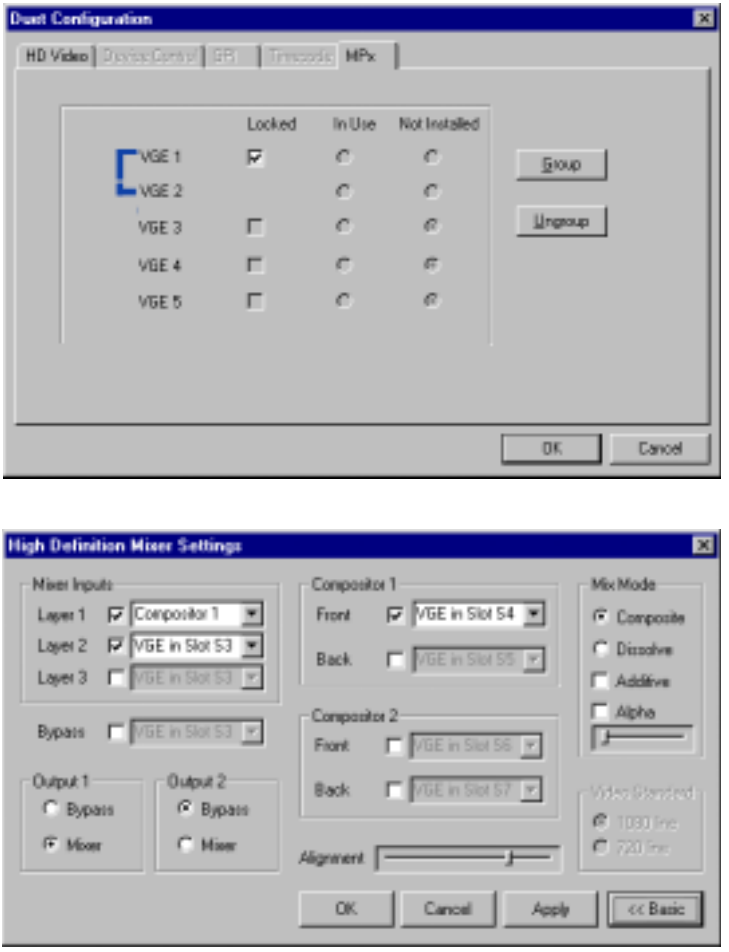


Figure 5-16. MPx And HD Mixer Settings For Multi-VGE Rendering

5.10.1 Installation

Note: You must install the new Lyric software AFTER this hardware upgrade and the installation of new Duet drivers.

- **Your HD Video I/O board will need to be at least revision level 'V' to support this option.**
- **If you were supplied with an updated HD Video I/O board, you will be removing the HD Video I/O board from 'Slot 1' in the backplane. The documentation for the return of this board to Chyron has been included with your option. If you were not supplied with an updated board and the revision level of your existing board is below revision level 'V', you must contact Chyron Customer Service at 800-4-CHYRON.**
- **Your VGE boards must be at revision level 'R' or later. If your existing board is not at revision level 'R' or later, you should have been supplied with a new board and an MRA number for the return of your existing board. The documentation for the return of this board to Chyron has been included with your option.**
- **If your system has the Dual Channel HD-Duet option installed, you will have the crosspoint board in slot 2 and VGE boards in Slot 3 and 4. Remove the crosspoint board and the two VGE boards. Examine the revision level of the VGE boards. If either of them is revision level 'R' or later, you may use it with this option. If not, call Chyron Customer Support for an MRA number to return the additional VGE board for an upgrade.**

It is recommended that you remove Duet to a static-free work area for this procedure. Remove the unit's top cover and all rear cables. Follow the procedure outlined below. (Note: boards and their slots in the backplane are numbered from the HD Video I/O board closest to the CPU board. The HD Video I/O board's slot is number **1**.)

When installing boards into the backplane, check the backplane connector to ensure that no debris has fallen into the connector during the procedure. Also, be sure that the board edge connectors are aligned with the backplane connectors before locking down the ejectors.

[ ] 1. Remove the top cover of the unit.

[ ] 2. Install the new (or existing) HD Video I/O board into the Slot 1 position.

[ ] 3. Remove the VGE board from the 'Slot 2' position.

[ ] 4. Install one of the VGE boards supplied with this option in the Slot 2 position.

[ ] 5. Reconnect the keyboard, mouse, monitor and line cord. Apply power to the system and wait for the login screen. Log on.

[ ] 6. Uninstall the current Duet drivers. Use Windows NT's ADD/REMOVE control panel to remove "Duet System Files".

[ ] 7. Insert the CD-ROM containing Lyric Version 1.3 or later and install Version 2.6 or later of the drivers; select the driver for the HD video standard you will be using. At this time, the installation script will ask which of the optional drivers you wish to install; do not select any of them.

[ ] 8. Install the Lyric application. After completion of the installation, reboot Duet.

Watch the rebooting process! If Duet gives a warning that 'some services failed to start', it may mean that the system was unable to properly detect the HD Video I/O board. If this occurs, check Duet's **event log** to determine if the **HD Video I/O service** failed to start. For help checking the event log, contact Chyron Customer Support. This type of service failure must be corrected before continuing this process.

[ ] 9. Next, confirm that your HD Video I/O board is working properly in the system. Log on to Duet and start Lyric. Pull down the **CONFIG** menu and select **Duet HARDWARE**; click the **HD VIDEO** tab. Here, you will see that the video standard you selected is enabled. The **Analog Output** and **Reference** selections should also function. Output 1 and Output 2 will not be operational until more VGE boards are installed.

[ ] 10. Next, shut down the system and remove the line cord.

[ ] 11. Move the VGE that was in Slot 2 to Slot 3.

[ ] 12. Install the HD Mixer board in Slot 2.

[ ] 13. Install the second VGE board into Slot 4.

If you purchased an additional VGE board or are adding this option to an existing Dual Channel system, install the next VGE into Slot 6. A fourth board would be installed in Slot 5, and a fifth in Slot 7.

Remember that any VGE boards installed for this option must be at **revision 'R' or later**. If you were sent an additional VGE board with an **MRA#** for the return of an older revision board, set the old board aside for later return to Chyron.

[ ] 14. Put the cover on the unit; reattach the line cord and again power on the unit. After the system boots to the log-on screen, log on to the system.

[ ] 15. Uninstall the current **Duet drivers**. Use Windows NT's ADD/REMOVE control panel to remove **Duet SYSTEM FILES**.

[ ] 16. If the Lyric Version 1.3 or later CD-ROM is not still in your CD-ROM drive, reload it. Install the **v2.6x drivers** for the high definition video standard you will be using. During this step, the install script asks if you wish to install optional drivers. You must click on the box for the **HD Mixer driver**. If GPI/O boards are installed in your system, also click 'yes' for the appropriate driver.

[ ] 17. Reboot the system for the new settings to take effect.

5.10.2 Using Multi-VGE For Dual-Channel Functionality

Assign one VGE to one of the channel outputs. The second channel will have one VGE board assigned with the remaining VGE boards used for Multi-VGE rendering on the main channel. More than two VGE boards are required to support Multi-VGE rendering on the main channel. Customers with the Dual Channel HD-Duet option will already have two VGE boards in their system and will be able to add one of them with this option.

5.11 Air Filter Maintenance

Duet uses two cleanable air filters, one filter in the front of the chassis (Main Chassis Filter), and one on the left (power supply) side of the chassis (Power Supply Air Filter). These filters MUST be maintained in good condition or thermal failure may result!

Follow these procedures for removal, cleaning, and reinstallation of the air filters. *If an air filter can no longer be adequately cleaned, replace it with a new one; the part numbers are included in the procedures that follow.*

NOTE

Both types of filter should be inspected every 30 days, or more frequently if Duet is used in dusty conditions.

CAUTION

Power must be OFF and the use of a grounding bracelet is recommended before proceeding with removal and installation of the air filter.

5.11.1 Duets With Plated Chassis

5.11.1.1 Main Air Filter

These procedures assumes that Duet's blue front cover has been removed.

[ ] 1. Refer to Figure 5-17, and note the five clips holding the filter to the Duet chassis at top, lower right and bottom. The filter should move easily, but if you wish, you may loosen the clips slightly.

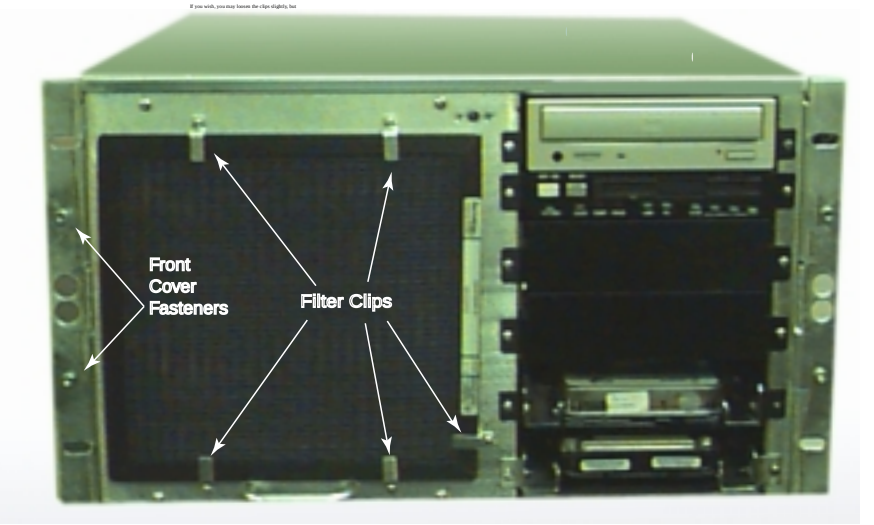


Figure 5-17. Duet With Main Filter In Place

[ ] 2. Reach behind the left side of the filter and pull it toward you slightly.

[ ] 3. Slide the filter to your left, continuing to pull gently toward you, so the filter clears the front panel fasteners as it separates from the chassis.

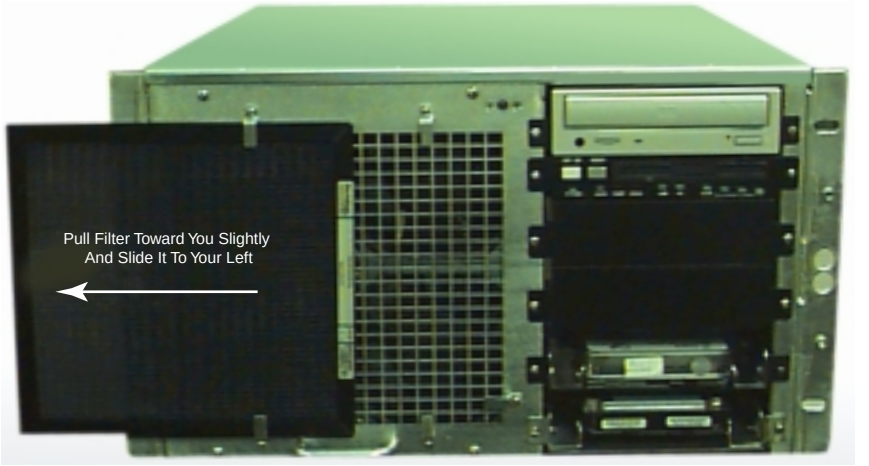


Figure 5-18. Removing Duet's Main Filter

[ ] 4. Clean Air Filter with *compressed air only*, and reinstall, or replace if necessary.

If you are putting in a new filter, make sure the label faces you, and is oriented to the right, as in Figure 5-18. Use only the proper replacement filter, Chyron part no. 4A02943.

5.11.1.2 Power Supply Air Filter

The Power Supply Air Filter is located on the left front side of the Duet. This procedure may be performed with Duet's blue front cover on the machine, but the machine's top cover must be removed.

[ ] 1. Refer to Figure 5-19. On the chassis' left side, note the pull ring protruding above the power supply.

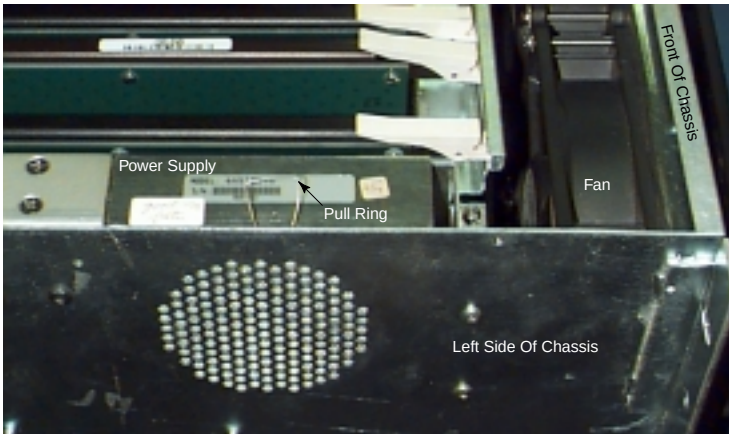


Figure 5-19. Power Supply Air Filter Pull Ring

[ ] 2. Pull gently up on the ring and the filter slides out of the chassis, as seen in Figure 5-20.

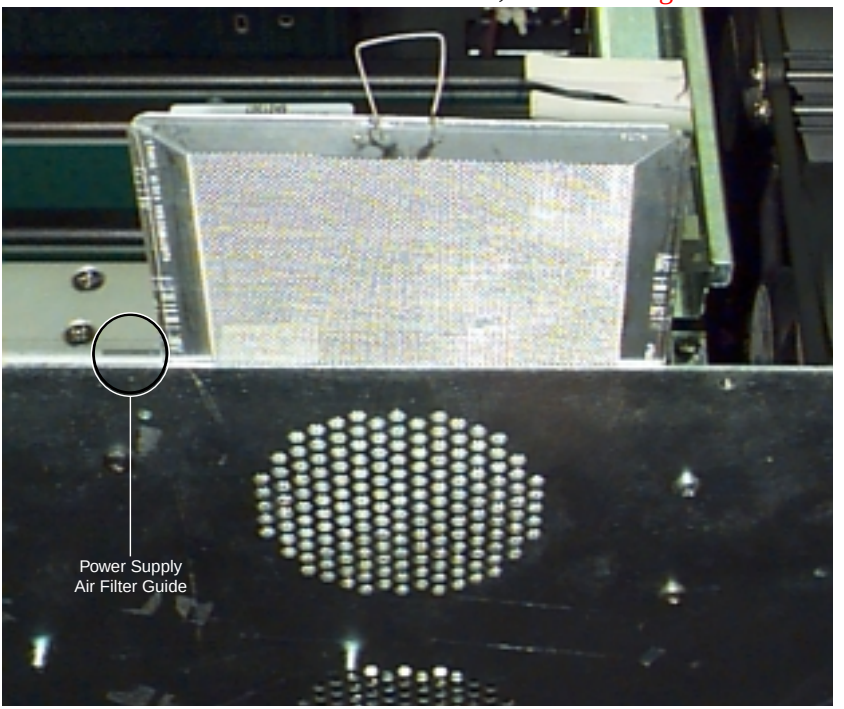


Figure 5-20. Power Supply Air Filter Partly Removed

[ ] 3. To replace the filter, position the new one alongside the guide shown in Figure 5-20, and push down gently.

If you are putting in a new filter, make sure the pull ring curves away from you, as in Figure 5-19 and Figure 5-20. Use only the proper replacement filter, Chyron part no. 23D0016.

5.11.2 Duets With Black Chassis

5.11.2.1 Removal Of Main Air Filter

[ ] 1. Refer to Figure 5-21. Remove the two (2) bottom screws securing the fan assembly to the front of the Duet chassis.

[ ] 2. Remove the two (2) top screws from the top mounting brackets.

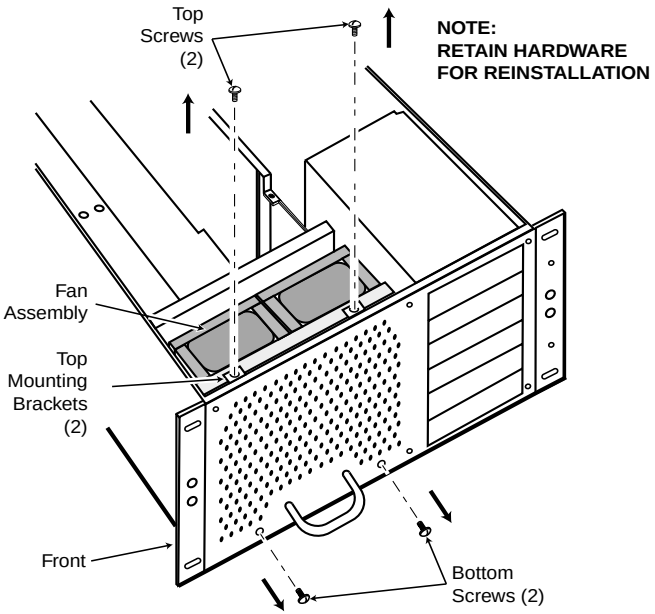


Figure 5-21. Removal of Securing Hardware

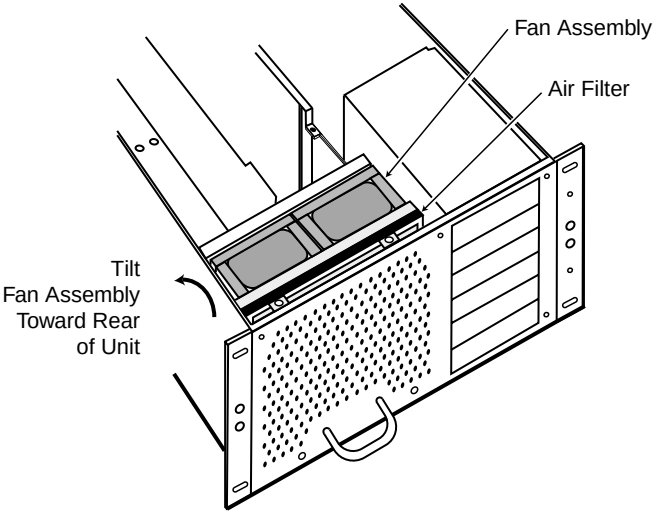


Figure 5-22. Access to Air Filter

[ ] 3. Refer to Figure 5-22. Tilt the fan assembly toward the rear of the chassis, exposing the air filter. It is not necessary to remove the fan assembly from the chassis.

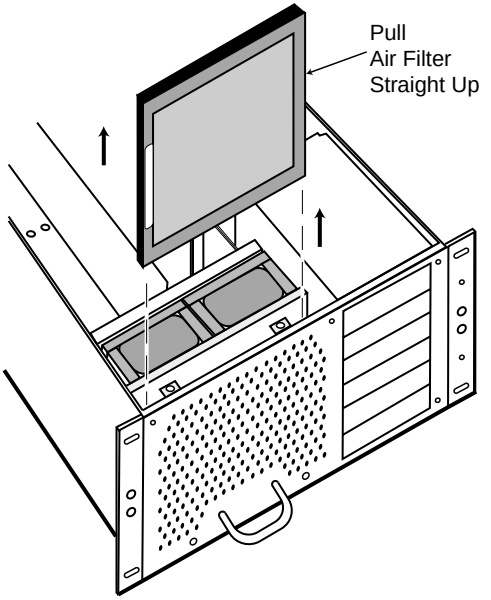


Figure 5-23. Air Filter Removal

[ ] 4. Refer to Figure 5-23. Grab the edge of the air filter and lift it straight up and out.

[ ] 5. Clean the air filter, *with compressed air only*, and reinstall it (see below).

5.11.2.2 Installation of Main Air Filter

Follow the steps described below to reinstall an air filter that you have cleaned, or to install a replacement. Use only the proper replacement filter, Chyron part no. 23D0017.

NOTE

The Main Air Filter measures 9.00 x 9.30 inches and can only be installed with the 9.30 inch edge held vertically. Dimensions are shown on the white label on the front left side of Air Filter.

[ ] 1. Refer to Figure 5-24. Slide the air filter into the fan assembly bracket with the white label facing you and to your left. Make sure the bottom edge of the air filter rests between the guides on the bottom edge of the fan assembly bracket. The sides of the air filter slide against the side spacers on either side of the fan assembly bracket.

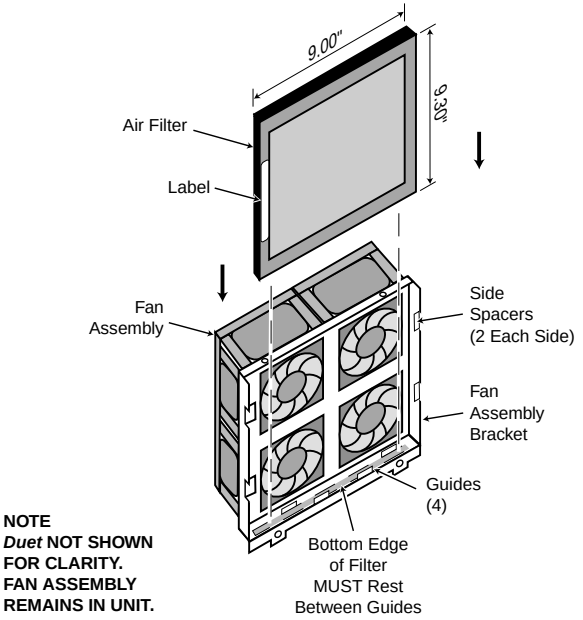


Figure 5-24. Air Filter Installation

[ ] 2. Return Fan Assembly with Air Filter to upright position towards front of unit.

[ ] 3. Install the two (2) top screws into the top mounting brackets to secure and align the Fan Assembly for the next step.

[ ] 4. Install the two (2) bottom screws through the front of the unit into the Fan Assembly bracket.

5.11.2.3 Power Supply Air Filter Removal

[ ] 1. Refer to Figure 5-25. Gently pull the side wall of the chassis out approximately 1/8" to relieve pressure on the air filter to facilitate removal.

NOTE

The Pull Ring will be lying flat along the top of the Power Supply Unit. Simply pull the ring to the vertical position before removal of air filter.

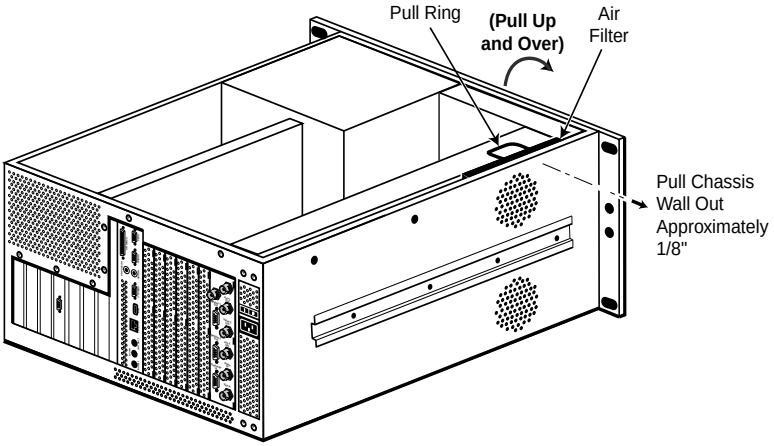


Figure 5-25. Pull Ring Access

Refer to Figure 5-26. Pull the air filter straight up and out of the unit using the Pull Ring located on top of the air filter frame.

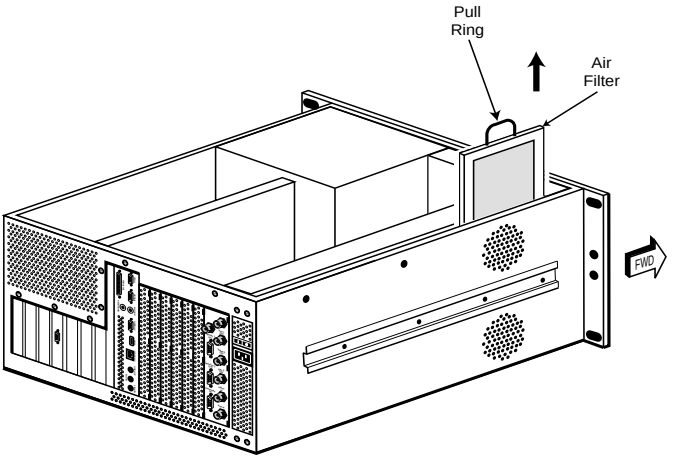


Figure 5-26. Air Filter Removal

5.11.2.4 Power Supply Air Filter Installation

Use only the proper replacement filter, Chyron part no. 23D0017.

[ ] 1. Refer to Figure 5-27. Place the lower left edge of the Air Filter against the guide.

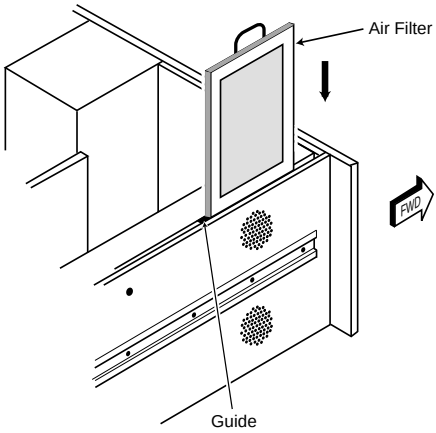
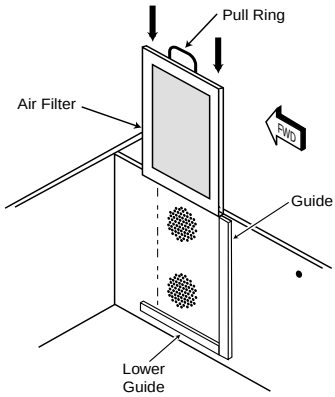


Figure 5-27. Air Filter Installation

[ ] 2. Using firm pressure along the top edge of the Air Filter frame, push the Air Filter down into the unit until contact is made with the lower guide. Refer to Figure 5-27.



VIEW FROM INSIDE LOOKING OUT
(POWER SUPPLY NOT SHOWN FOR CLARITY)

Figure 5-28. Air Filter Installation Detail

[ ] 3. After the air filter is firmly seated in the unit, gently push the Pull Ring over so that it is flush with the top of the Power Supply Unit. See Figure 5-28.

5.12 Duet Keyboard

The Duet Keyboard is a custom keyboard for use with both Standard Definition and High Definition Duets operating with Lyric software. The Duet Keyboard provides for the use of hotkeys to simplify common messages, compose functions, and reduce, but not eliminate, the need for using the mouse.

5.12.1 Duet Keyboard Layout

The design of the Duet Keyboard is very similar to the established locations and functions of an iNFiNiT! keyboard. Callouts that are in italics in Figure 5-19 indicates those similarities.

Some hotkey positions replace commonly used Windows keys, and creates the availability of standard functions. These keys have their standard function printed on the front of the key. For example, keys that generate the same scan code have their standard function printed in GREEN on the front of the key. Keys that generate different scan codes have their standard function printed in BLUE on the front of the key. These keys can be overridden by pressing the Chyron **Fn** key. The Chyron **Fn** key has its function printed in BLUE on the front of the key.

A typical Duet Keyboard layout is shown in Figure 5-19. For further explanation of the functions of each key, refer to the Duet Keyboard Reference Card, Pub No. 2A02122.

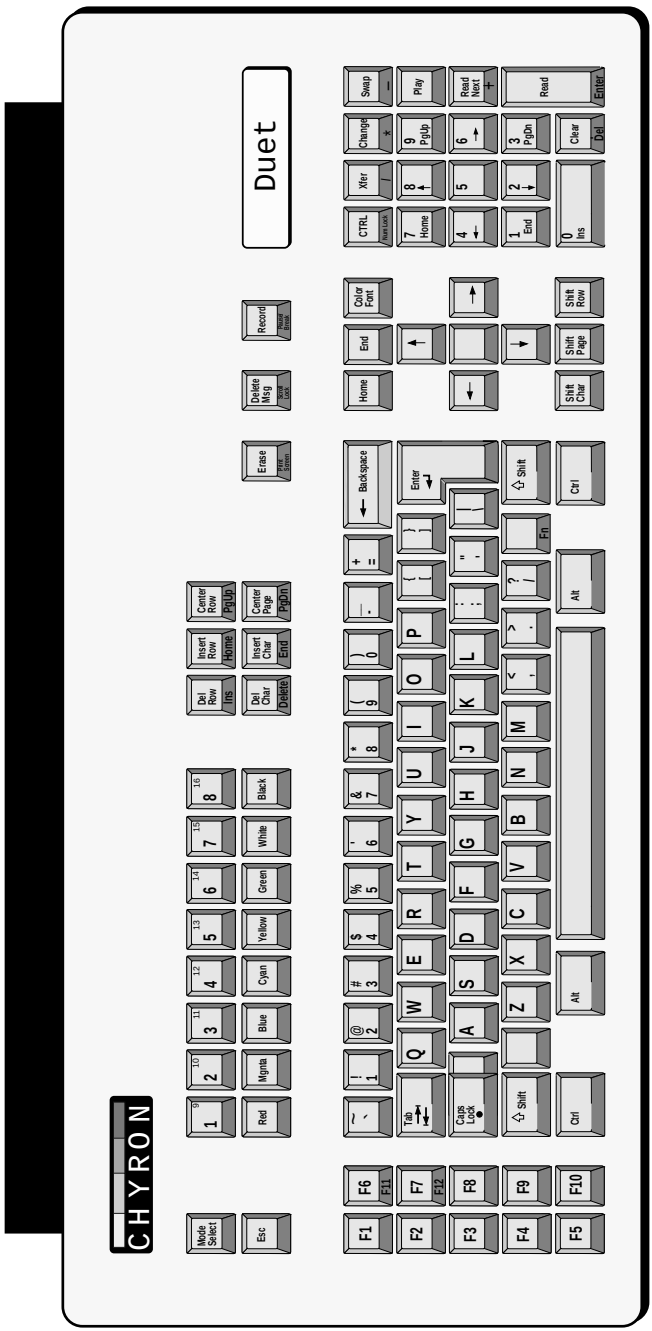


Figure 5-29. Duet Keyboard Layout

5.12.2 Keyboard Installation

Proper connection of the Chyron Duet Keyboard to either a Duet SD or Duet HD system, requires one external 5-pin PC Cable, and one PS/2 5-pin to 6-pin adapter cable. The PS/2 adapter cable is necessary due to the 6-pin connector on the rear panel of the CPU Board. See Figure 5-30 for components.

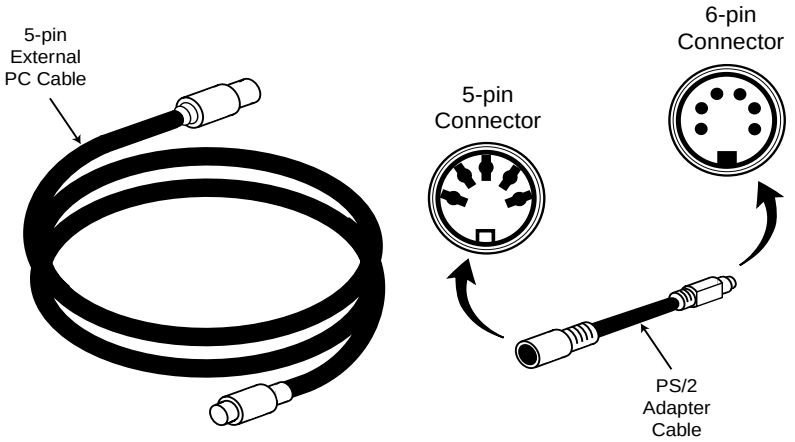


Figure 5-30. PC and Adapter Cable

Follow the steps listed below and refer to Figure 5-31 for proper installation.

[ ] 1. Attach one end of the external PC Cable to the connector on the rear of the Duet Keyboard.

[ ] 2. Connect the other end of the external PC Cable to the end of the PS/2 Adapter Cable with the 5-pin connector.

[ ] 3. Attach the PS/2 Adapter Cable to the 6-pin connector labeled **Keyboard** on the rear panel of the CPU Board.

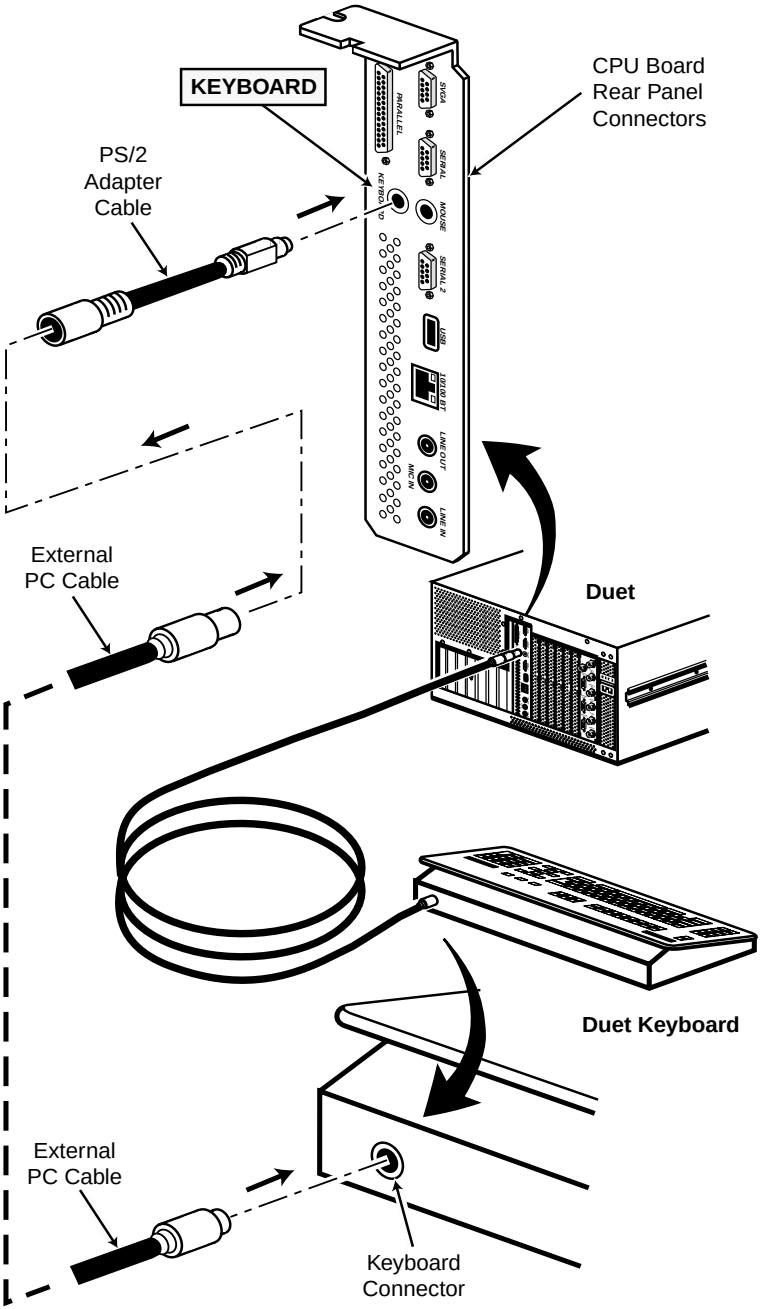


Figure 5-31. Keyboard to Duet Installation

5.13 Windows NT Reinstallation

Your Duet comes equipped with the Windows NT operating system and all drivers necessary for initial operation, as dictated by the options your facility has purchased.

If, at a later time, it becomes necessary to re-install the Windows NT operating system and basic drivers, use the following procedures.

5.13.1 Connections and Power

[ ] 1. Connect:

- RJ-45 network cable to hub
- Monitor
- Keyboard and mouse

[ ] 2. Turn on the power.

5.13.2 Windows NT Basics

[ ] 1. Load the Windows NT CD (supplied).

[ ] 2. Turn system power off via **front panel** power switch (SD systems) or **rear panel** power switch (HD systems).

[ ] 3. Turn system power back on. Duet looks through drives, devices, etc. again.

[ ] 4. A series of prompts follows, regarding your empty hard drive. Click **NEXT** until...

[ ] 5. The License Agreement appears. Read the License Agreement, then scroll down to the bottom and press **F8** to agree to it.

[ ] 6. The next screen gives the BIOS's summary of your system's hardware:

- Standard PC
- SVGA display
- Keyboard and its layout
- Mouse

Press **ENTER** on this screen to agree to 'No Changes'.

[ ] 7. A screen appears stating that you have an unformatted hard drive. The hard drive's total capacity appears as a bar graph, across which divisions will appear as you proceed.

[ ] 8. Choosing the "FAT" file format, create two partitions at this time, as follows. Press **"C"** to create the first partition.

- Another screen appears, with the total capacity of the hard drive highlighted.
- **Backspace** through this figure to delete the numbers. Enter **2000 MB** to create a **2 gigabyte** partition for the System software. Press < . By default, this partition will be designated as the "C" drive (and will actually be 996 MB).
- The previous screen reappears. Press **"C"** to create another partition. It is recommended that this partition be given all of the remaining space on the hard drive. Press < . By default, this partition will be designated as the "D" drive.
- Press < to accept the default figure for remaining memory capacity on the hard drive, which will likely be 2094 MB.

Remember that partitions D, E and F must later be formatted with the NTFS file system. Chyron recommends returning to that procedure after Windows NT installation is complete.

[ ] 9. On the next screen, the setup utility suggests a destination folder for the Windows NT operating system. Press < to confirm.

[ ] 10. On the next screen, press < to agree to the suggested brief examination of your hard drive for corrupted files. As the prompt indicates, this may take several minutes.

[ ] 11. The next screen will announce that the installation thus far has been successful. You will be prompted to remove floppy disks and CDs from Duet's drives, and to **Restart.**

5.13.3 Windows NT Install - Part 2

Press the **Restart** button on the machine's front panel. Duet restarts and you are prompted to reinsert the CD. Do so.

[ ] 1. The **Files Needed** window appears; click **OK** to accept the indicated default file path.

[ ] 2. A **Copying Files** display appears. When the indicated file copying concludes, a large setup window appears.

[ ] 3. This window prompts you to accept that Setup is *gathering information* on your system. Click **NEXT.**

[ ] 4. An **Options** window prompts you to choose between **Typical** and custom installations. Choose **Typical** and click **NEXT.**

[ ] 5. On the next screen, enter the name of the individual and organization to which this copy of Windows NT will be registered. Click **NEXT.**

[ ] 6. On the next screen, enter the **CD key** from the sticker on the back of the Windows NT CD sleeve. Click **NEXT.**

[ ] 7. On the next screen, enter the name by which your machine will be known on its network. (If you do not know this name, contact your Network Administrator.) Click **NEXT.**

[ ] 8. The next screen will prompt you to enter a password and confirm the password by entering it a second time. This step can be skipped by clicking **NEXT** without filling in these fields**.**The next screen will ask if you wish to create an **Emergency Repair Disk** on a floppy disk. It is recommended that you do so. Insert a floppy disk, formatted or unformatted and click **OK.**

When you are prompted, remove the disk, label it, and set it aside for booting Duet in case of future hard drive problems.

This step can also be skipped by clicking the appropriate radio button and clicking **NEXT.**

[ ] 9. The next screen will ask if you wish to install the most common components of Windows NT. Click **NEXT.** On the next screen, click the appropriate button to indicate whether you are currently connected to a Local Area Network, and will wish to participate in that network. Click **NEXT.**

[ ] 10. On the next screen, click **HAVE DISK.**

[ ] 11. Insert the network driver floppy disk that was included with your Duet software and documentation package. Select the "**a**" drive of your PC, and scroll through its contents to find the driver labeled **Intel Ethernet Express Pro100B PCI Adapter.** Click **NEXT. Note**: At this point, the system may change the displayed name of your adapter to "**Intel 82557-based 10/100 Ethernet Adapter**". This is normal, and you will still be installing the right adapter.

[ ] 12. The next screen will offer to have the system search for another adapter. If your Duet was purchased with standard equipment, click **NEXT** to skip this step.

[ ] 13. The next screen offers a choice of Network Protocols. Select **TCP/IP** and click **NEXT**.

[ ] 14. The next screen offers a choice between giving your unit a fixed IP address or assigning the IP address through your facility's DHCP server. (If you are uncertain, contact your Network Administrator.) **Fixed IP Address** is the most common choice**.**

[ ] 15. The next screen offers default Network Services options. Click **NEXT** to select these defaults.

[ ] 16. The next screen gives you the opportunity to confirm network settings before installing networking-related files. Click **NEXT.**

[ ] 17. On the next screen, click **NEXT** to accept the default **NETWORK BINDING** settings (which have been determined by the default Network Services settings in Step 18).The next screen will ask for your computer's name and your facility's domain name. Obtain these from your network administrator. Enter the names and click **NEXT**.

[ ] 18. You may be asked to fill in further information on the next screen regarding the name of your workgroup. Enter this information and click **NEXT.**

[ ] 19. If further dialog boxes appear asking to confirm details on your unit's adapter and the services and protocols you have chosen, accept the defaults and click **NEXT.**

[ ] 20. Click **NEXT** on the **Finishing Setup** screen**.** The **Date and Time Utility** screen appears.

- Click the Time Zone tab and scroll through the list that appears to select your time zone.
- Click the Date and Time tab. Pull down the month menu and select the appropriate month.
- Pull down and select the appropriate year in the same way. With month and year selected, the days of the week line up correctly with the dates.
- Single-click the current date on the calendar form.
- Note that the clock does not start until you click the **APPLY** button.

[ ] 21. Next, the Display utility appears. Click **OK**. Later, you will install the monitor driver that is required for Duet's 3D Rage Pro video card.

[ ] 22. Windows NT setup is complete. You will be prompted to remove disks from the floppy drive. Remove all disks and click the **RESTART** icon.

5.13.4 Modifying The Boot.ini File

If you've needed to reinstall Windows NT, Chyron strongly recommends making the following modification to the **boot.ini** file.

[ ] 1. On Duet's C drive, locate the **boot.ini** file; if the file is not visible, go to View and select **List**.

[ ] 2. Right-click the mouse button on the boot.ini file and click on **Properties**.

[ ] 3. Uncheck the **Read-only** box, press **Apply** and close the window.

[ ] 4. Double-click on the **boot.ini** file; a notepad will open; this is where the boot.ini file will be edited.

Locate the row containing:

scsi(0)disk(0)rdisk(0)partition(1)\WINNT=
"Windows NT Workstation Version 4.00"

Be careful to distinguish this from a similar row containing the phrase **[VGA mode]**.

[ ] 5. After "Windows NT Workstation Version 4.00" in the appropriate row, type

/PCILOCK.

[ ] 6. Click on **File** and **Save**. The row should look like this:

scsi(0)disk(0)rdisk(0)partition(1)\WINNT=
"Windows NT Workstation Version 4.00"/PCILOCK

[ ] 7. Close the Notepad

[ ] 8. Right-click the mouse button on the boot.ini file and click on Properties.

[ ] 9. Check the Read-only box again, and press Apply; close the window. Editing is complete.

5.14 Driver Installation/Reinstallation

5.14.1 Video Drivers

NOTE

Only one video card can be installed in Duet at any given time!

LX CPU Board users only: Using the on-board video facility of your CPU board (instead of a PCI or AGP video card) requires a change in the jumpers on the CPU board! Refer to §4.6.3 and §5.5.3 for more information.

The type of video cards installed in your Duet will vary with the system's manufacture date. This section includes driver installation/re-installation procedures for the various video cards that have been included in Duet since manufacture of the earliest systems. Check the following sections for instructions on reinstalling the driver for your card. If your system is equipped with a video card not covered here, contact Chyron Customer Service for help in obtaining and installing the appropriate driver.

5.14.1.1 Adding Driver for 3D Rage Pro Video Card

[ ] 1. Load the CD-ROM that contains Duet's drivers and the Lyric application.

[ ] 2. From the Start menu, click on the Settings menu item.

[ ] 3. Click on Control Panel. Once in the Control Panel menu, double-click the Display icon.

[ ] 4. In the Display screen, click the **Settings** tab.

[ ] 5. Next, click the **Display Type** button.

[ ] 6. On the **DISPLAY TYPE** page, click the **CHANGE** button.

[ ] 7. On the **CHANGE DISPLAY** page, click **HAVE DISK.**

[ ] 8. On the **INSTALL FROM DISK** screen, **DO NOT** click **OK.** Click **BROWSE.**

[ ] 9. In the **LOCATE FILE** screen, double-click the **MY COMPUTER** icon.

[ ] 10. Find your system's CD-ROM drive, which is probably designated as the "G" drive. Double-click the CD icon to open the Duet drivers/ Lyric CD-ROM.

[ ] 11. Double-click the **DRIVERS** folder.

[ ] 12. Double-click the **SVGA ADAPTER DRIVERS** folder.

[ ] 13. Double-click the **RAGE PRO** folder.

[ ] 14. In the **LOCATE FILE** screen,

Ati.inf

appears. Double-click this file name or use the **OPEN** button.

[ ] 15. The **INSTALL FROM DISK** screen returns, showing this file path:

G:\Drivers\SVGA\Adapter Drivers\Rage Pro

[ ] 16. Click **OK.**

[ ] 17. In the **CHANGE DISPLAY** screen that next appears, scroll down to "**ATI Technologies Inc. 3D Rage Pro**". Click **OK.**

[ ] 18. The **Third Party Drivers Warning** screen appears. Click **YES** to accept this warning and proceed. A display appears indicating that the appropriate files are being copied from the CD-ROM to the target system folder.

[ ] 19. Next, a screen appears indicating that the driver has been installed successfully. This screen also advises you to close the windows that have opened during this installation, and to restart your computer. Click **OK.**

[ ] 20. Close all open windows. The **SYSTEM SETTINGS CHANGE** screen appears. Restart the system as prompted.

[ ] 21. After your system has restarted, an **INVALID DISPLAY SETTINGS** screen appears. Change your display settings as desired.

5.14.1.2 Adding Driver for Diamond Fire GL 4000 Video Card

This driver's installer is an .exe file, so the recommended installation procedure will differ from those using .ini files.

[ ] 1. Load the CD-ROM that contains Duet's drivers and the Lyric application.

[ ] 2. From the **Start** menu, click on the **RUN** menu item.

[ ] 3. Click on the **BROWSE** button.

[ ] 4. Select your system's CD-ROM drive, usually designated as the "G" drive.

[ ] 5. Select and open the **DRIVES** folder.

[ ] 6. Select and open the **SVGA ADAPTER DRIVERS** folder.

[ ] 7. Select and open the **DIAMOND FIRE 4000 GL** folder.

[ ] 8. Select and open the red-and-white icon designated **nt4gl49m.exe**

[ ] 9. The **RUN** screen appears, displaying the file path you have established. Click **OK.**

[ ] 10. In the next screen, click **OK** to continue installation.

[ ] 11. In subsequent screens, select English as the language for installation instructions, and agree to the product's license. Click OK or Next as prompted.

[ ] 12. Choose the **STANDARD INSTALLATION** option. The driver will then self-extract and install the program, and will automatically reboot the system.

[ ] 13. Within the **DISPLAY ADAPTER** window, setup the **CONFIGURATION PROFILE**. Click **START**, and select **SETTING**. Click **CONTROL PANEL**, and then double-click the **DISPLAY** icon.

[ ] 14. Click on the **DIAMOND CONFIGURATION TAB** (with the red-black diamond).

[ ] 15. The window that appears will identify the driver. If the driver identified is **NOT** Version 4.00.1381.2217, repeat steps 1-3 until successful loading is obtained. Once properly loaded, continue to Step 6.

[ ] 16. In the **CONFIGURATION PROFILES** list, add a Configuration Profile named "Chyron" by clicking on the **ADD** button.

[ ] 17. Select, to turn on, **ALPHA PLANES**, **4-BIT OVERLAY PLANES**, and **TEXEL 32-BIT DEFAULT** choices. Make sure the "Chyron" profile is highlighted as the Default before exiting.

[ ] 18. Exit the **DISPLAY PROPERTIES** menu by clicking **OK**.

Your Diamond Fire-GL 4000 Video Adapter is now set up for optimal performance.

5.14.1.3 Installing The Driver For The Intergraph Intense 3D Pro 2200

[ ] 1. Load the Duet CD-ROM.

[ ] 2. From the **START** menu, click on the **SETTINGS** menu item.

[ ] 3. Click on **CONTROL PANEL**. Once in the Control Panel menu, double-click the **DISPLAY** icon.

[ ] 4. In the Display screen, click the **SETTINGS** tab.

[ ] 5. Next, click the **DISPLAY TYPE** button.

[ ] 6. On the **DISPLAY TYPE** page, click the **CHANGE** button.

[ ] 7. On the **CHANGE DISPLAY** page, disregard the entry in the "Display" box on the right. Click **HAVE DISK.**

[ ] 8. On the **INSTALL FROM DISK** screen, **DO NOT** click **OK.** Click **BROWSE.**

[ ] 9. In the **LOCATE FILE** screen, double-click the **MY COMPUTER** icon.

[ ] 10. Find your system's CD-ROM drive. Double-click the CD icon to open the Duet CD-ROM.

[ ] 11. Double-click the **DRIVERS** folder.

[ ] 12. Double-click the **SVGA CARDS** folder.

[ ] 13. Double-click the **INTERGRAPH INTENSE 3D PRO 22OO** folder.

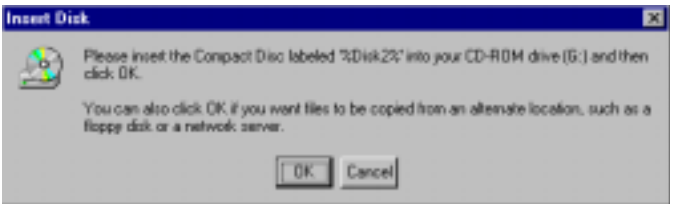
[ ] 14. Double-click the **DISK 1** folder.

[ ] 15. Double-click the item called **oemsetup.inf or** select it and click **OK.**

[ ] 16. In the **CHANGE DISPLAY** screen that next appears, note the "Intense 3D Pro" entry in the

'Display' window at right**.** Click to highlight this entry and then click **YES**. Visual confirmation appears that the appropriate files are being copied from the CD-ROM to the target folder in Duet's hard drive.

[ ] 17. When these files have been copied, the **INSERT DISK** dialog box appears, asking for Disk 2, as seen below. Click **OK**.



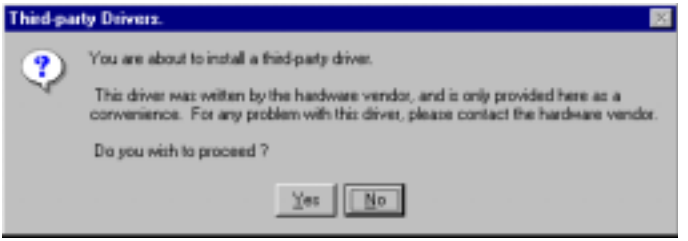
[ ] 18. In the next dialog box, select **BROWSE**.

Duet CD > DRIVERS > SVGA Cards > Intergraph Intense 3D Pro 2200 > Disk 2.

[ ] 19. Open the Disk 2 folder.

[ ] 20. Double-click **glzicd.dl_** or select it and click **OK**.

[ ] 21. The **Third Party Drivers Warning** screen appears.



Click **YES** to accept this warning and proceed. A display appears indicating that the appropriate files are being copied. Next, a screen appears indicating that the driver has been installed successfully.

Click **OK** to reboot the system and complete the installation.

[ ] 22. After your system has restarted, an **INVALID DISPLAY SETTINGS** screen appears. Change your display settings as desired.

5.14.1.4 Adding the Driver for the 3D Labs Oxygen VX1

Before re-installing this driver or upgrading from the driver of an earlier graphics card, it is recommended that you use the Windows NT Add/Remove control panel to remove any previous graphics card driver. You will need to reboot Duet following this change.

[ ] 1. Load the Duet Configuration CD.

[ ] 2. From the **START** menu, click on the **SETTINGS** menu item.

[ ] 3. Click on **CONTROL PANEL**. Once in the Control Panel menu, double-click the **DISPLAY** icon.

[ ] 4. In the Display screen, click the **SETTINGS** tab.

[ ] 5. Next, click the **DISPLAY TYPE** button.

[ ] 6. On the **DISPLAY TYPE** page, click the **CHANGE** button.

[ ] 7. On the **CHANGE DISPLAY** page, disregard the entry in the “Display” box on the right. Click **HAVE DISK.**

[ ] 8. On the **INSTALL FROM DISK** screen, **DO NOT** click **OK.** Click **BROWSE.**

[ ] 9. In the **LOCATE FILE** screen, double-click the **MY COMPUTER** icon.

[ ] 10. Find your system’s CD-ROM drive. Double-click the CD icon to open the Duet CD-ROM.

[ ] 11. Double-click the **DRIVERS** folder.

[ ] 12. Double-click the **SVGA CARDS** folder.

[ ] 13. Double-click the **OXYGEN VX1** folder.

[ ] 14. Double-click **SETUP.EXE** and follow the rest of the instructions displayed by the installer.

5.14.2 Audio Drivers

5.14.2.1 Yamaha Driver

Use the following procedure if need arises to reinstall the Yamaha OPL3-SA audio device driver. If at any time a disclaimer appears warning that you are loading software from a third-party manufacturer, click **OK** to accept and proceed.

[ ] 1. Load the Duet drivers/Lyric application CD-ROM.

[ ] 2. From the Windows NT Taskbar, click **Settings.**

[ ] 3. Open **Control Panels.**

[ ] 4. Double-click the **Multi-Media** icon. Click the tab labeled **Devices.**

[ ] 5. In the **MULTIMEDIA PROPERTIES** screen, double-click the **AUDIO DEVICES** tab to confirm that the driver must be reinstalled. If this is the case, the Audio Devices tab will display the message “No devices of this class are installed in your system”. Click **OK** to close this window.

[ ] 6. In the **MULTIMEDIA DEVICES** screen, click the **ADD** button.

[ ] 7. In the **ADD** screen, highlight the line in the scroll list that reads **UNLISTED OR UPDATED DRIVER**. Click **OK**.

[ ] 8. In the **INSTALL DRIVER** screen, click **BROWSE**. In the **BROWSE** screen, open your system's CD-ROM drive (usually designated the "**G**" drive) with the pull-down located at the bottom of the screen.

[ ] 9. Highlight the line reading:

lx yamaha audio driver

by clicking it once.

[ ] 10. Click **OK**.

[ ] 11. The **ENGUS** icon appears. Click **OK**.

[ ] 12. The **INSTALL DRIVER** screen reappears, with the file path reading:

G:\lx yamaha audio driver

click **OK.**

[ ] 13. The **ADD UNLISTED OR UPDATED DRIVER** screen appears, listing the **OPL3-SA Sound System (English).** Click **OK.**

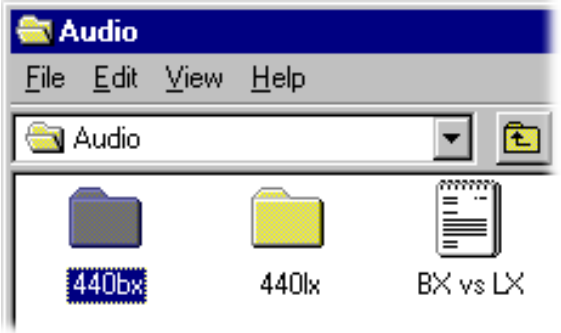
[ ] 14. If prompted to restart your computer, do so.

5.14.2.2 Crystal Audio Driver for Use With BX CPU Board

[ ] 1. Load the Duet drivers CD-ROM.

Before following the rest of this procedure, you may wish to open the CD and look at the "Read Me" file labeled **BX vs LX.txt** (the path is Duet CD > Drivers > Audio).

The information within will help you determine which type of CPU board your Duet is equipped with.



[ ] 2. From the Windows NT Taskbar, click **Settings.**

[ ] 3. Open **Control Panels.**

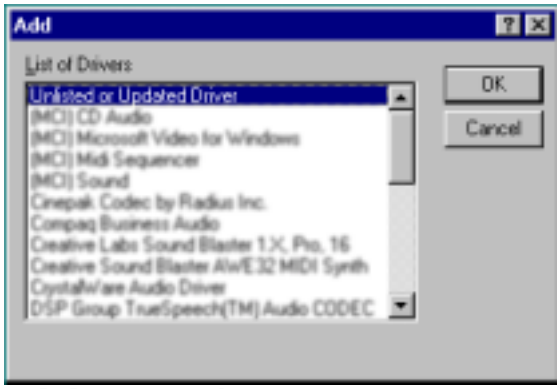
[ ] 4. Double-click the **Multi-Media** icon.

[ ] 5. Click the tab labeled **Devices.**

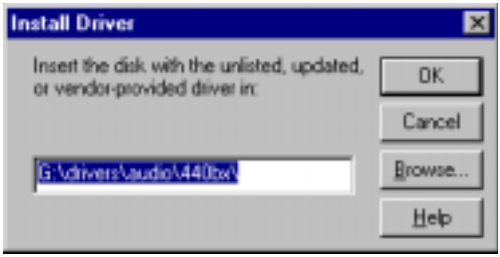
[ ] 6. In the **MULTIMEDIA PROPERTIES** screen, double-click the **DEVICES** tab. If the driver must be reinstalled, the Audio Devices tab will display the message "No devices of this class are installed in your system". Click **OK** to close this window.

[ ] 7. In the **MULTIMEDIA DEVICES** screen, click the **ADD** button.

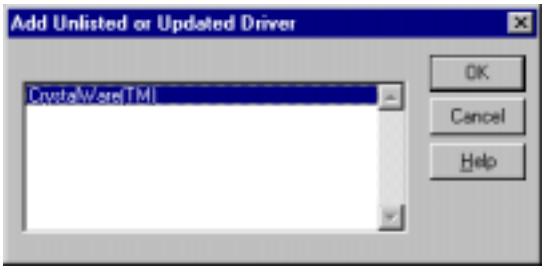
[ ] 8. In the **ADD** screen, highlight the line in the scroll list that reads **UNLISTED OR UPDATED DRIVER**. Click **OK**.



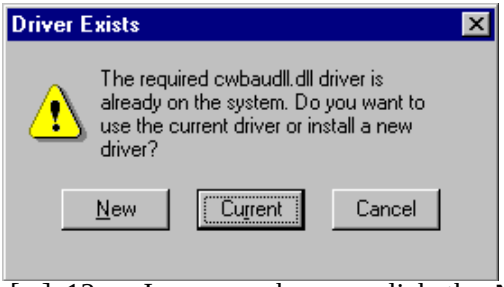
[ ] 9. In the **INSTALL DRIVER** screen, click **BROWSE**. Locate the appropriate file as seen below, where **G** is equivalent to your Duet's CD-ROM drive.



[ ] 10. Duet will confirm your selection by displaying this screen:



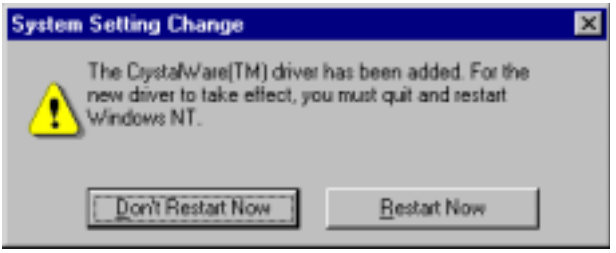
[ ] 11. Click **OK**. If the new installation contains elements already present on your machine, a warning of the type pictured below may appear:



[ ] 12. In any such case, click the **NEW** button to install the newer version of the driver.

[ ] 13. The driver's self-installation begins. Press **OK** to accept the default settings when this screen appears:

[ ] 14. Once you've accepted the defaults, this screen appears. Press **OK**.



[ ] 15. Re-start Duet as prompted.

5.15 Completing Reinstallation

5.15.1 Reformatting Hard Drive Partition D

In §5.11.2, Step 7, Duet's hard drive was divided into 2 partitions. In that operation, all of the partitions were formatted using the FAT file system. (Note that in some Windows NT operations, the partitions will be referred to as 'drives'.) The partition known as "Drive C" will retain the FAT format. Now, it is necessary to re-format the D partition using the NTFS file system. To re-format, follow these steps:

[ ] 1. From the **Start** menu, click **Programs.**

[ ] 2. Click **Administrative Tools (Common).**

[ ] 3. Select **Disk Administrator.**

[ ] 4. A bar graph divided into four sections appears symbolizing each of the four partitions.

[ ] 5. Click the **"D"** segment of the display.

[ ] 6. Pull down the **Tools** menu and click **Format.**

[ ] 7. A dialog box appears, describing the attributes of the selected partition. Do not change the displayed defaults except for the **File System** pulldown.

[ ] 8. Change this setting to **NTFS** and click the **START** button.

[ ] 9. A progress display appears and the system indicates that the process is complete.

5.15.2 Setting the Paging File

As with any PC, it is necessary to establish a paging file and set its initial and maximum size.

[ ] 1. Open the **Control Panels** menu and double-click the **System** icon.

[ ] 2. The **System Properties** screen appears. Click the **PERFORMANCE** tab.

[ ] 3. Click the **CHANGE** button in the Virtual Memory box.

[ ] 4. The **Virtual Memory** screen opens, showing all four of the partitions you established on the hard driver earlier. Click the line for the **"D"** partition.

[ ] 5. Note the figure shown for "Space Available"; enter this figure into the "Max Size" window.

[ ] 6. Enter a figure at least 5 MB smaller than the file's "Max Size" into the "Initial Size" window.

[ ] 7. Click **OK** and close the window.

[ ] 8. Restart your Duet as prompted to effect this change.

Section 6 - Duet GPIO Board

6.1 Introduction

The RS-422 Serial I/O & GPIO Board is a PCI card that enables Duet to control external video devices such as digital disk recorders and tape machines. Conversely, this board allows Duet to be triggered by production switchers, master control systems and other external devices. Incoming and outgoing commands are received and sent via GPI or RS-422 (using the BVW-75 protocol).

The GPIO board also contains a timecode reader that synchronizes outgoing commands with LTC or VITC supplied from an external source. Timecode can be redistributed to other GPI boards installed on the PCI bus.

Duet can accommodate up to four GPIO boards, and each individual board can control four RS-422 serial ports and eight GPI inputs or outputs. GPI ports are DB-25 connectors mounted on an extension connected directly to the GPIO board. The GPIO board and GPI extension bracket are mounted side-by-side in Duet's PCI card area.

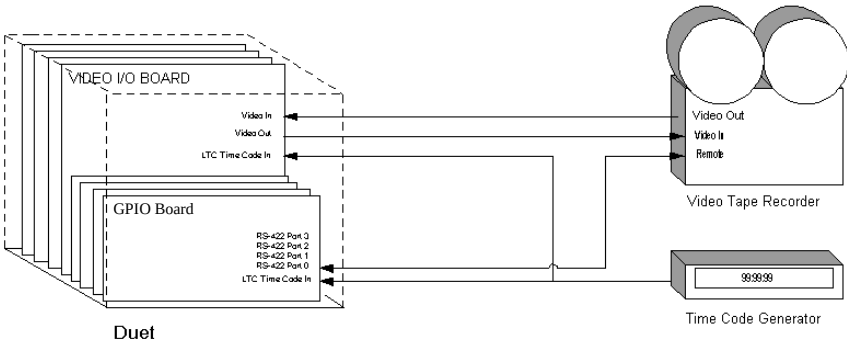


Figure 6-1. Routing Between Duet and External Devices

6.2 Diagrams

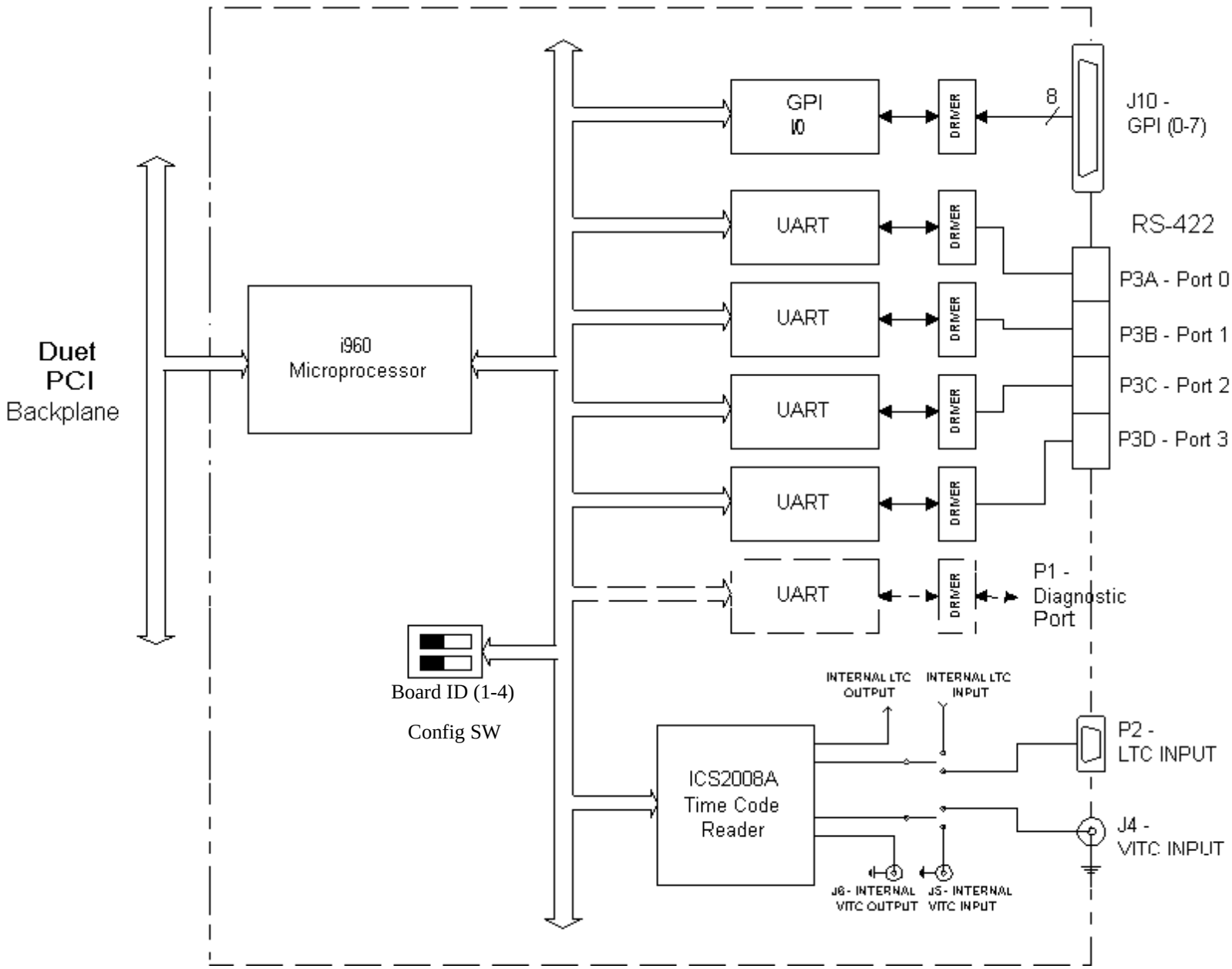
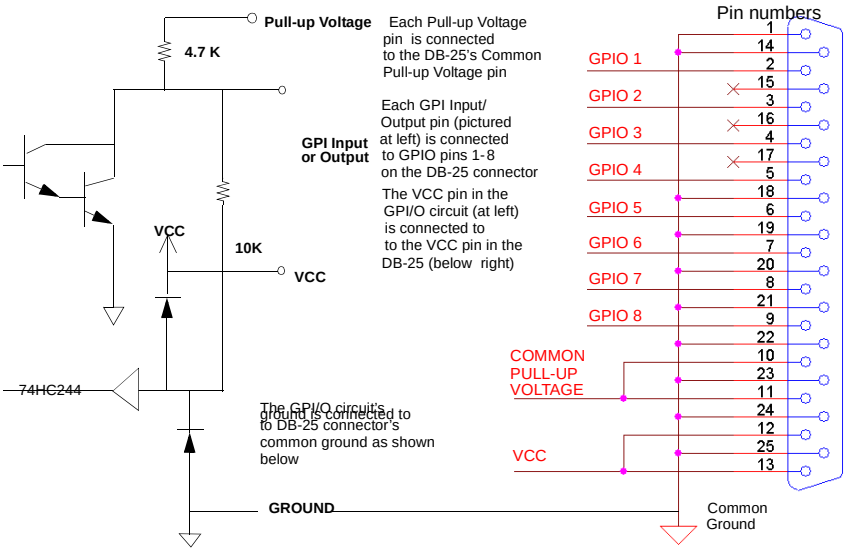
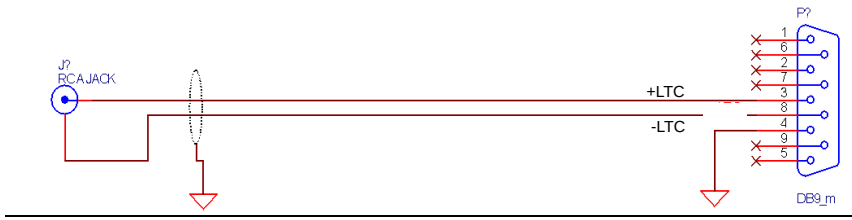


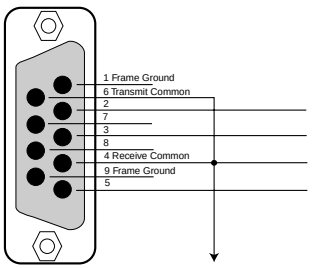
Figure 6-2. GPIO Board Internal Block Diagram



GPI/O Circuit (for each of 8 GPIO ports)

DB-25 Male Connector; front view





Wiring Interface for Sony DDR or VTR

DB-9 Female	RJ-12
6	2
3	3
7	4
8	5
2	6

Figure 6-3. Cabling and Pinouts For GPIO Board and GPI Extension Bracket

The GPI/O inputs are of the **Open Collector** type allowing you to use whatever voltage is appropriate in your facility. You must supply the required voltage to **pin #10** or **pin #11** of the 25-pin cable. The pull-up resistor on the GPI/O board is **4.7k ohms**. If 5 volts is appropriate, this voltage is available on **pins 12** and **13** of the cable.

6.3 Hardware Installation

Each Duet GPIO board is installed in one of Duet's eight PCI slots.The extension bracket bearing the GPI ports and LTC connection should occupy the PCI slot next to the GPIO board to which it is connected.

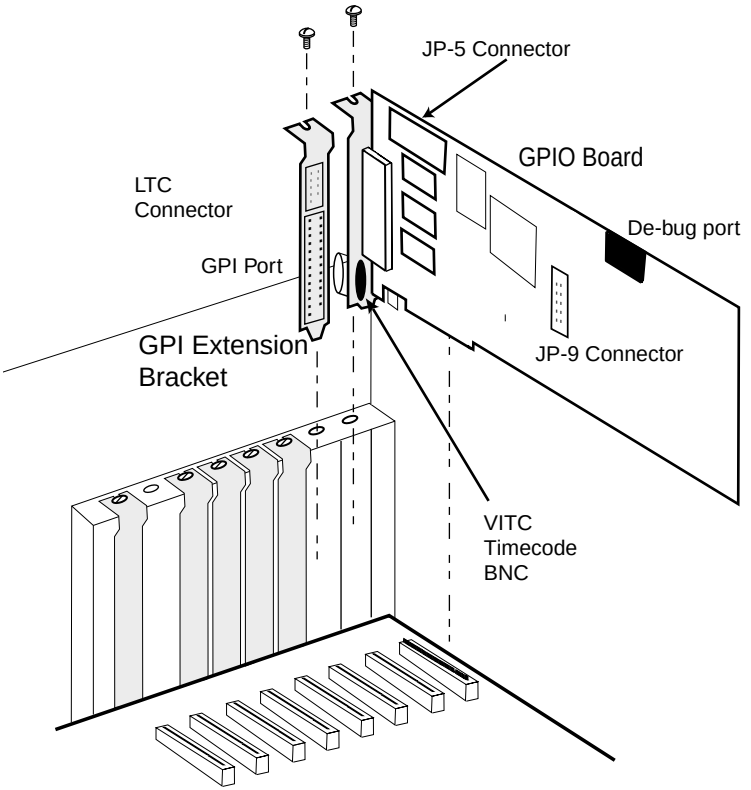


Figure 6-4. Duet PCI Slots With GPIO Board

Follow these steps to install the GPIO board and the optional GPI Extension Bracket. Refer to Figure 6-4.

[ ] 1. Using an appropriate screwdriver, remove the rear panel cover plate for the PCI slot where the new board will be installed. *When viewed from the rear panel, each cover plate is slightly to the left of its matching board slot.* Retain the screw for installation of new PCI boards, and retain the cover plate for possible future use!

[ ] 2. Remove the GPIO board from its anti-static packing material.

Important: It is strongly recommended that measures be taken to dissipate any static electrical charge before touching the GPIO board. When using an antistatic wrist strap, the grounding cord must contain a 1 meg ohm to 10 meg ohm series isolation resistor.

[ ] 3. Remove the nut from the BNC connector that projects from the board's rear panel.

Remember that the first (or only) installed GPIO board **MUST** be installed in PCI slot #8, which is on the extreme right in Figure 6-4 (on the extreme left when looking at the front of Duet).

[ ] 4. Note: The BNC connector projecting from the rear of the GPIO board prohibits pressing the board straight down into the H-connector in the chassis.

Lower the rear of the GPIO board into Duet's PCI area first and then move the board toward the openings at the back of Duet.

[ ] 5. Insert the board into the board slot. Carefully press down on the board's upper edge using firm pressure, until the board is seated securely into the slot.

[ ] 6. Reinstall the nut that you removed from the BNC connector, tightening it against the brackets supporting the GPIO board.

[ ] 7. Secure the GPIO board's rear panel to the chassis by aligning the metal retaining bracket with the screw hole in the top edge of the Duet chassis. Then, secure the bracket to the chassis using the original screw that secured the Rear Panel Cover Plate.

The **GPI Extension Bracket** consists of the LTC connector (DB-9) and the GPI connector (DB-25) mounted on a simple PCI panel. The bracket is shipped with **ribbon cables** for LTC and GPI signals already connected to the DB-9 and DB-25 connectors, respectively. To install the GPI Extension Bracket, follow these steps:

[ ] 1. Remove the **rear panel cover plate** where the GPI Extension Bracket will be installed (preferably the slot next to the GPIO board to which it is connected). Retain the plate and the screw that held it in place. Take note of the way that the lower end of the rear panel cover plate is inserted into the groove that runs across all the PCI slots.

[ ] 2. Connect the large ribbon cable from the extension bracket's GPI connector to the 26-pin connector at JP-5 on the GPIO board.

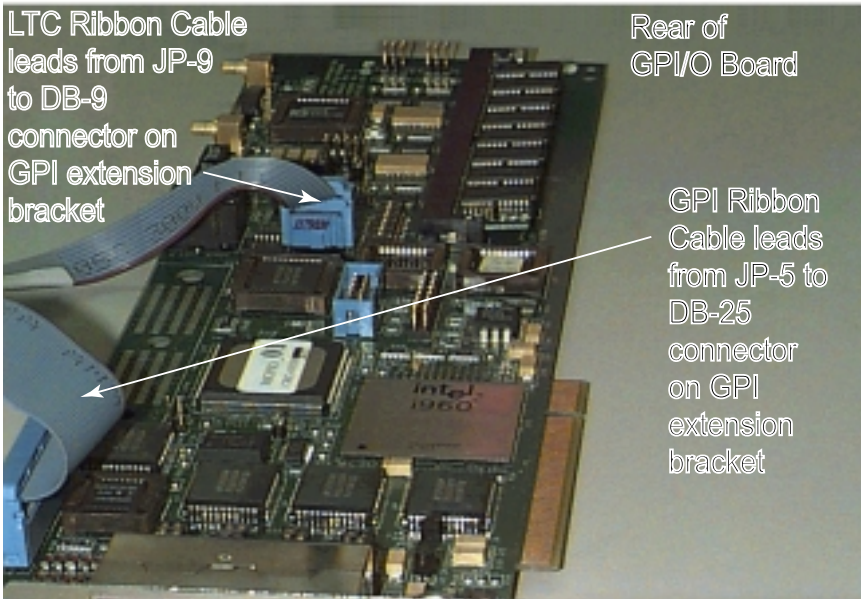


Figure 6-5. Proper LTC Cable Connection

[ ] 3. Connect the smaller cable from the extension bracket's Linear Timecode connector to the 10-pin connector at JP-9 (see Figure 6-5).

NOTE: Be careful to connect the smaller ribbon cable to the connector at JP-9, just below the Debug port. **DO NOT** connect this cable to the shrouded connector at JP-7! (indicated by the strikeout mark in Figure 6-5).

Make sure that **pin 1** (indicated by the red wire in the ribbon cable) is at the **top** of the connector. The red wire in the ribbon should run parallel to the top of the board as it leaves the connector even though you will have to twist both cables to get the GPI Extension Bracket situated properly.

[ ] 4. Note the similarity between the GPI Extension Bracket and the rear panel cover plate that you removed in Step 1. Mount the extension bracket just as the original rear panel cover

plate was mounted, sliding the lower end of the bracket into the groove that runs across the PCI slots.

[ ] 5. Secure the bracket to the chassis by aligning the metal retaining bracket with the screw hole in the top edge of the Duet chassis. Then, secure the bracket to the chassis using the original screw that secured the Rear Panel Cover Plate.

[ ] 6. Replace Duet's top cover before turning on the unit.

6.4 DIP Switch Settings For Multiple GPIO Board Installation

Each GPIO board is shipped with its S1 DIP switches set to identify that board as **GPIO Board #1** in Duet. Each additional GPIO board's DIP switches **MUST** be set to identify the board as #2, #3 or #4 within Duet. See Table 6-1 and Figure 6-6 for the appropriate settings. (Note that only switches S1.1 and S1.2 are used; the others are set to **OFF**. This is the factory default and these switches should be left undisturbed.)

The first (or only) board's GPIs are numbered **1-8** (recall that each can be designated as an input or output). **Each additional GPIO board s GPIs will be designated successively**; a second GPIO board's ports will appear to Duet as 9-16, a third board's GPIs would be 17-24 and a fourth board's GPIs would be 25-32.

S1.1	S1.2	Board I.D. #
Off	Off	1
On	Off	2
Off	On	3
On	On	4

Table 6-1: Board ID DIP Switch Settings

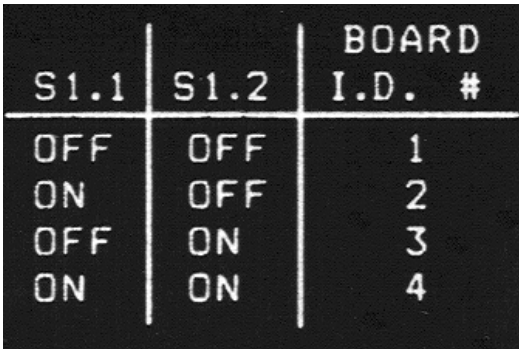


Figure 6-6. DIP Switch Settings As Seen On Board

Table 6-1 and Figure 6-6 both illustrate the possible combinations of DIP switch settings; both are provided because the legend silkscreened on the fully assembled board is obscured by the DRAM modules. For ease of access and electrical safety, each board's DIP switches should be set before the board is installed in Duet.

6.5 Driver Installation

[ ] 1. In Duet's Windows Control Panels, use the **ADD/REMOVE** function to uninstall **Duet System Files**.

[ ] 2. Load the current Duet/Lyric CD.

[ ] 3. In the very first screen that appears, choose **INSTALL DRIVERS**.

[ ] 4. The Welcome screen appears next. Read it and click **OK**.

[ ] 5. Click the checkbox in the next screen if you have installed the GPIO board.

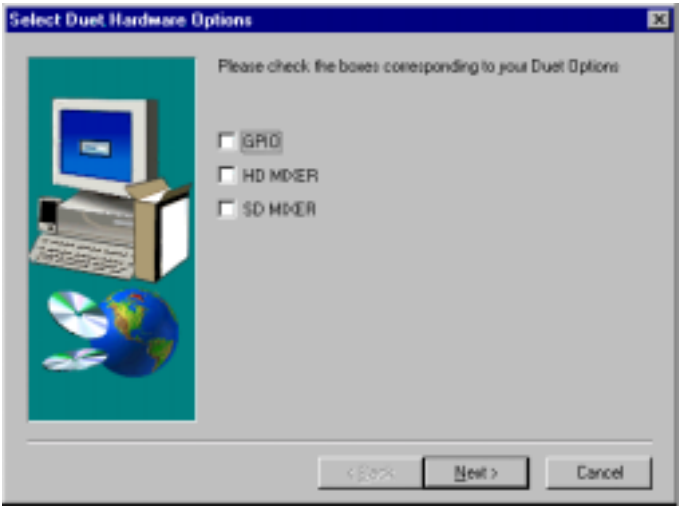


Figure 6-7. Installing the GPIO board Driver

[ ] 6. Complete the rest of the driver installation procedure, following the on-screen prompts.

[ ] 7. Reboot the system before running Lyric.

6.6 Software Setup And Operation

Note: At this time, Lyric supports only timecode from Duet's internal timecode generator, so no timecode source adjustment is necessary on the Timecode tab under **Config** ⇐ **Duet Hardware**.

GPI input to Duet from external sources can start and stop clocks and timers or start an individual step within a Lyric Playlist. GPI output from Duet can be used to trigger external devices such as keyers and tally lights.

Lyric's capability for serial protocol communication with DDRs and VTRs allows complete transport control for playback, recording and cueing. Segments of existing video on external playback devices can be defined as "clips" in the CLIP Control Panel.

In the Device Control tab, you may set parameters for serial control of external devices, and in the GPI tab, you may set parameters for GPI pulses, including port IDs.

[ ] 1. If you plan to use serial control of an external VTR or DDR, be sure that the device is connected to Duet before proceeding. For more information on connecting external devices to Duet, refer to the Duet Hardware Reference Manual.

[ ] 2. Pull down the **CONFIG** menu and select **Duet HARDWARE**.

[ ] 3. Next click on the **DEVICE CONTROL** tab as seen in Figure 6-8.

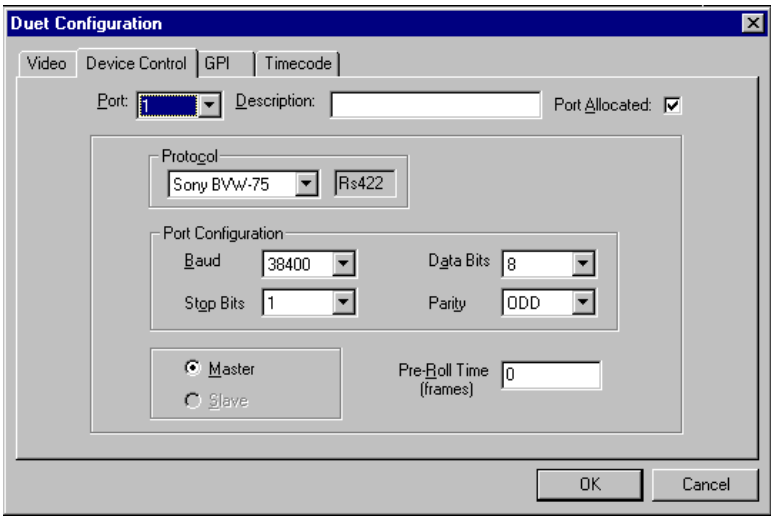


Figure 6-8. External Device Control (Serial) Tab

[ ] 4. With the **PORT** pull-down menu, select the number of the port on Duet's **GPIO board** that you wish to use.

[ ] 5. Click the **PROTOCOL** pull-down menu. Lyric and Duet will detect connected machines that use the recognized protocol. Detection of a connected BVW-75 device automatically sets the **PORT CONFIGURATION** values such as Baud Rate, Data Bits, Stop Bits and Parity.

[ ] 6. Click the **PORT ALLOCATED** check box.

[ ] 7. Set the desired **PRE-ROLL TIME** for the DDR or VTR that is connected. Remember that this adjustment is in **frames**!

[ ] 8. Click **OK**.

[ ] 9. Next, click on the **GPI** tab.

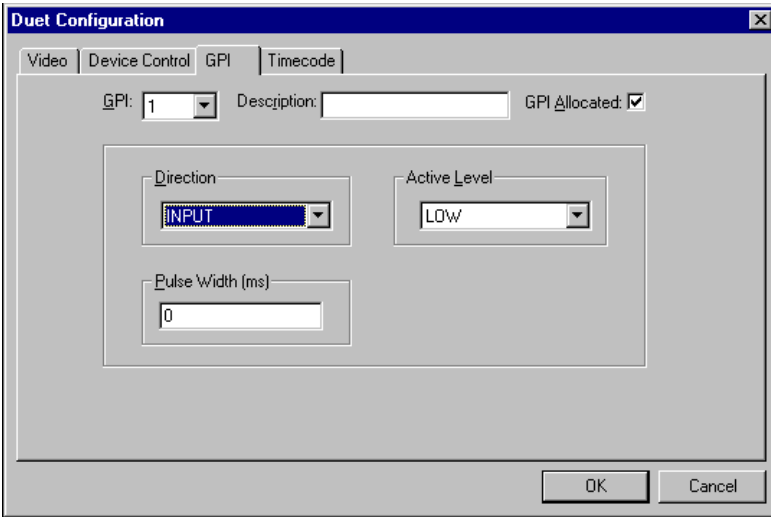


Figure 6-9. GPI Tab

[ ] 10. Select the GPI you wish to configure from the drop-down menu marked **GPI**. The ID number of each available GPI is a function of the dip-switch settings on the GPIO board itself.

(Again, consult the Duet Hardware Reference Manual, Section 5 for more information.)

[ ] 11. Next, fill in the **DESCRIPTION** field. This optional field is strictly a mnemonic device where the operator can label the event in Lyric that will cause a GPI pulse to be sent or that will be triggered by an incoming GPI pulse.

[ ] 12. Use the **DIRECTION** drop-down menu to determine whether Duet will be sending an outgoing GPI pulse or receiving an incoming GPI pulse.

[ ] 13. Use the **ACTIVE LEVEL** drop-down menu to determine whether a low-to-high (the **HIGH** setting) or a high-to-low (the **LOW** setting) voltage change in the signal will be the trigger.

[ ] 14. Fill in the **PULSE WIDTH** edit box to define the duration of the GPI pulse in milliseconds.

[ ] 15. Press **OK**.

6.7 Establishing And Testing Connections

For information on the pinouts and cabling associated with the GPIO Board and the GPI Extension Bracket see Figure 6-3.

6.7.1 Serial Control; Sample VTR Usage

The example given below assumes connection of a Betacam VTR. However, the controls operate in the same manner for Digital Disk Recorders. See Section 7 of this document for more information on using the Clip Control Panel with Duet's Internal Clip Player.

[ ] 1. Power down both Duet and the VTR. Connect one of Duet's serial ports to the VTR's DB-9

REMOTE connector**.** Restore power to both machines and launch Lyric.

[ ] 2. Pull down Lyric's **Tools** menu and select **CLIP CONTROL PANEL**. The dialog box pictured in Figure 6-10 appears.

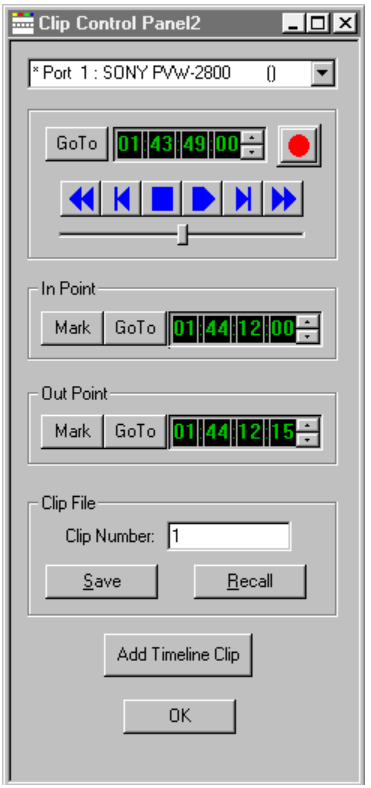


Figure 6-10. Clip Control Panel

[ ] 3. Load a tape with recorded content (but use one that new content can be recorded on). Test the transport controls by clicking with the mouse.

[ ] 4. Next, try the horizontal slider immediately beneath the transport controls. This slider is equivalent to the jog/shuttle knob on the machine itself.

To create a **CLIP** from a segment of recorded material on the external machine:

[ ] 1. use the transport controls to cue the tape or disk to the beginning of the desired content.

[ ] 2. In the **IN POINT** area, click the **MARK** button. Note that the current timecode appears in the timecode window.

[ ] 3. Use the transport controls to cue the tape or disk to the end of the desired content.

[ ] 4. In the **OUT POINT** area, click the **MARK** button. Note that the current timecode appears in the timecode window.

[ ] 5. Give the clip you are creating a **CLIP NUMBER**.

[ ] 6. Click the **SAVE** button and then click **OK.** For more information on using the Clip Control Panel with the Playlist, see Lyric's On-Line Help.

To **Record**:

[ ] 1. Click the red dot to the right of the topmost timecode display. The button will change to a darker red, signifying that the VTR is in 'standby' mode.

[ ] 2. Press the Play button, and a record command will be sent to the device. During recording, the red button will flash on and off. Press the Stop to stop the recording. **Note**: If the Record button is pressed while the device is playing, recording will start immediately.

For more information on the Clip Control Panel, building clips and incorporating them into Lyric Playlists, consult Lyric's On-Line Help and §5.13 in the Lyric Handbook.

6.7.2 GPI Connections

Again, it is strongly recommended that you power down both Duet and external devices before connecting them. Consult the documentation for the external device to determine the proper signal level and duration, and configure Duet appropriately through the Lyric software described in §6.6.

[ ] 1. Connect an appropriate male DB-25 connector to the port labelled **GPIO** on the GPI Extension Bracket.

[ ] 2. Connect the GPI cable to the piece of equipment that will be sending or receiving GPIs to or from Duet. If multiple external systems will be connected, connect the GPI cable to an appropriate break-out box.

Consult On-Line Help and §5.13 of the Lyric manual for information on programming GPI events in Lyric playlists.

Numerics

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