

# **DN9650/DN9652**

## **Network Bridge**

### Operator Manual

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In line with the company's policy of continual improvement, specifications and function may be subject to change without notice. This Operator Manual was correct at the time of writing. E&OE.



# IMPORTANT SAFETY INSTRUCTIONS



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

- 1** Read these instructions.
- 2** Keep these instructions.
- 3** Heed all warnings.
- 4** Follow all instructions.
- 5** Do not use this apparatus near water.
- 6** Clean only with a dry cloth.
- 7** Do not block any of the ventilation openings. Install in accordance with the manufacturer's instructions.
- 8** Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 9** Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- 10** Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- 11** Only use attachments/accessories specified by the manufacturer.
- 12** Unplug this apparatus during lightning storms or when unused for long periods of time.
- 13** Refer all servicing to qualified personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- 14** Use the mains plug to disconnect the apparatus from the mains.
- 15** **Warning: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.**
- 16** **Warning: Do not expose this equipment to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the equipment.**
- 17** **Warning: The mains plug of the power supply cord shall remain readily operable.**

## INSTRUCTIONS DE SÉCURITÉ IMPORTANTES



Le symbole représentant un éclair fléché dans un triangle équilatéral a pour but d'alerter l'utilisateur de la présence d'une "tension dangereuse" non isolée à l'intérieur du boîtier, pouvant être d'une force suffisante pour constituer un risque d'électrocution.



Le point d'exclamation dans un triangle équilatéral a pour but d'alerter l'utilisateur de la présence d'instructions importantes concernant le fonctionnement et la maintenance, dans la documentation qui accompagne l'appareil.

- 1** Veuillez lire ces instructions.
- 2** Conservez ces instructions.
- 3** Respectez toutes les consignes de sécurité.
- 4** Suivez scrupuleusement toutes les instructions.
- 5** N'utilisez pas cet appareil près d'un point d'eau.
- 6** Utilisez uniquement un chiffon sec pour le nettoyer.
- 7** N'obstruez aucune des ouïes de ventilation. Installez-le en respectant les instructions du fabricant.
- 8** Ne l'installez pas près de sources de chaleur tels que radiateurs, panneaux chauffants, étuves, ou autres appareils produisant de la chaleur (dont les amplificateurs).
- 9** Ne pas utiliser d'adaptateur pour supprimer la prise de terre des prises à trois fiches. Si la prise fournie ne peut pas être branchée dans la prise électrique, adressez-vous à un électricien qui remplacera la prise obsolète.
- 10** Protégez le cordon secteur afin que l'on ne marche pas dessus et qu'il ne soit pas pincé, surtout au niveau des prises, ou à l'endroit où il sort de l'appareil.
- 11** Utilisez exclusivement des fixations et des accessoires recommandés par le fabricant.
- 12** Débranchez l'appareil en période d'orage ou s'il doit rester inutilisé pendant longtemps.
- 13** Confiez toutes les réparations et interventions à un personnel qualifié. Une intervention est nécessaire si l'appareil a été endommagé d'une façon ou d'une autre, si son cordon ou sa prise secteur ont été endommagés, si du liquide a été renversé ou si des objets sont tombés à l'intérieur, ou encore si l'appareil a été exposé à la pluie ou à l'humidité, s'il ne fonctionne pas normalement, ou s'il est tombé.
- 14** Débrancher l'appareil du réseau électrique par la prise de secteur.
- 15** **Avertissement : afin de réduire le risque d'incendie ou de choc électrique, ne pas exposer cet appareil à la pluie ou à de l'humidité.**
- 16** **Avertissement : n'exposez pas cet équipement aux éclaboussures et veillez à ce qu'aucun récipient rempli de liquide, verre ou vase, ne soit posé dessus.**
- 17** **Avertissement : la prise secteur doit toujours rester directement accessible.**



**EC-Declaration of Conformity**

The undersigned, representing the following manufacturer

**Manufacturer:**

**Address:**

Midas Klark Teknik Ltd.

Klark Industrial Park, Walter Nash Road,  
Kidderminster. Worcestershire. DY11 7HJ.

hereby declares that the following product

Product Type Number	Product Description	Nominal Voltage(s)	Current	Freq.
DN9650	Network Bridge	115V AC 230V AC	218mA 123mA	50/60Hz

is in conformity with the regulations of the following marked EC-directives and bears the CE-mark accordingly

reference number	title
2004/108/EC	EMC Directive (EMC)
2006/95/EC	Low-Voltage Directive (LVD)

The conformity of the product with EC directives for use in environments E1, E2, E3 and E4 is provided by the compliance with the following standards:

Standards/date:

reference number	title
EN 60065:2002	Audio, video and similar electronic apparatus. Safety requirements.

Applied EMC *emission* test standards:

ref. no.	title
FCC/CFR 47; Part 15:2008	ANSI C63.4:2003, Class A: Radiated disturbance, 30.0MHz to 2.0GHz
Canadian Standard ICES-003:Issue 4	CISPR 22: 1997 inc A2:2003: Radiated disturbance and conducted disturbance
EN55022:2006 inc A1:2007	CISPR 22: Class A: Radiated disturbance, 30.0MHz to 1.0GHz CISPR 22: Class A: Conducted disturbance, ac port EN 61000-3-2:2006: Mains harmonics EN 61000-3-3:2008: Mains voltage flicker

Applied EMC *immunity* test standards:

ref. no.	title
EN 55024:1998 inc A1:2001 and A2:2003	EN 61000-4-2:1995 Electrostatic discharge EN 61000-4-3:1996: Radiated RF disturbance, 80-1000MHz EN 61000-4-4:1995: Fast transient bursts, ac & signal ports EN 61000-4-5:1995: Surge, ac port EN 61000-4-6:1996: Conducted RF field, ac & signal ports EN 61000-4-11:1994: Mains voltage dips and interruptions

**Place, date:** Kidderminster, UK  
7th February 2011



**SVP, Midas Klark Teknik**  
Printed name: John Oakley



**AVP, Product Development**  
Printed name: Alex Cooper





**EC-Declaration of Conformity**

The undersigned, representing the following manufacturer

**Manufacturer:**

**Address:**

Midas Klark Teknik Ltd.

Klark Industrial Park, Walter Nash Road,  
Kidderminster. Worcestershire. DY11 7HJ.

hereby declares that the following product

Product Type Number	Product Description	Nominal Voltage(s)	Current	Freq.
DN9652	Dual Network Bridge	115V AC 230V AC	252mA 138mA	50/60Hz

is in conformity with the regulations of the following marked EC-directives and bears the CE-mark accordingly

reference number	title
2004/108/EC	EMC Directive (EMC)
2006/95/EC	Low-Voltage Directive (LVD)

The conformity of the product with EC directives for use in environments E1, E2, E3 and E4 is provided by the compliance with the following standards:

Standards/date:

reference number	title
EN 60065:2002	Audio, video and similar electronic apparatus. Safety requirements.

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ref. no.	title
FCC/CFR 47; Part 15:2008	ANSI C63.4:2003, Class A: Radiated disturbance, 30.0MHz to 2.0GHz
Canadian Standard ICES-003:Issue 4	CISPR 22: 1997 inc A2:2003: Radiated disturbance and conducted disturbance
EN55022:2006 inc A1:2007	CISPR 22: Class A: Radiated disturbance, 30.0MHz to 1.0GHz CISPR 22: Class A: Conducted disturbance, ac port EN 61000-3-2:2006: Mains harmonics EN 61000-3-3:2008: Mains voltage flicker

Applied EMC *immunity* test standards:

ref. no.	title
EN 55024:1998 inc A1 & A2	EN 61000-4-2:1995 Electrostatic discharge
	EN 61000-4-3:1996: Radiated RF disturbance, 80-1000MHz
	EN 61000-4-4:1995: Fast transient bursts, ac & signal ports
	EN 61000-4-5:1995: Surge, ac port
	EN 61000-4-6:1996: Conducted RF field, ac & signal ports
	EN 61000-4-11:1994: Mains voltage dips and interruptions

**Place, date:** Kidderminster, UK  
7th February 2011



**SVP, Midas Klark Teknik**  
Printed name: John Oakley



**AVP, Product Development**  
Printed name: Alex Cooper





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# Chapter 1: Getting Started

This chapter shows you how to prepare the DN965X for operation, which includes:

- Unpacking
- Installation
- Connecting up
- Switching the unit on/off
- Initial configuration

**Before installing, setting up or operating this equipment, make sure you have read and fully understand all of the "IMPORTANT SAFETY INSTRUCTIONS" at the front of this document.**

**Important:**

**You must set up the IP address and netmask of your computer (PC/Mac) before using it for the first time.**

## Unpacking

Carefully unpack your DN965X equipment package. Then, inspect the DN965X unit carefully for any signs of damage that may have occurred during transit and notify the courier immediately if you discover any.

Please retain the original packing in case you should need to return the equipment to the manufacturer or supplier, or transport or ship the unit later.

## Installation

When installing the unit, take the following into consideration.

- Do not install the equipment in places of poor ventilation.
- Do not install this equipment in a location subjected to excessive heat, dust or mechanical vibration. Allow for adequate ventilation around the equipment, making sure that its vents are not obstructed. To prevent excessive heating of the equipment, avoid mounting it directly above power amplifiers or other devices that radiate significant amounts of heat, such as radiators and heaters. Keep the equipment out of direct sunlight.
- This unit is designed for mounting in any 19" EIA standard rack. Four rack-mount holes in the front panel are provided for rack mounting and are designed to fully support the weight of the unit in the rack. **Avoid over-tightening the rackmount screws, as this could damage the front panel.**



## Handling the equipment

Completely isolate the equipment electrically and disconnect all cables from the equipment before moving it.

When lifting or moving the equipment, always take its size and weight into consideration.

## Radio frequency interference - Class A device

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 his own expense.

## Electric fields

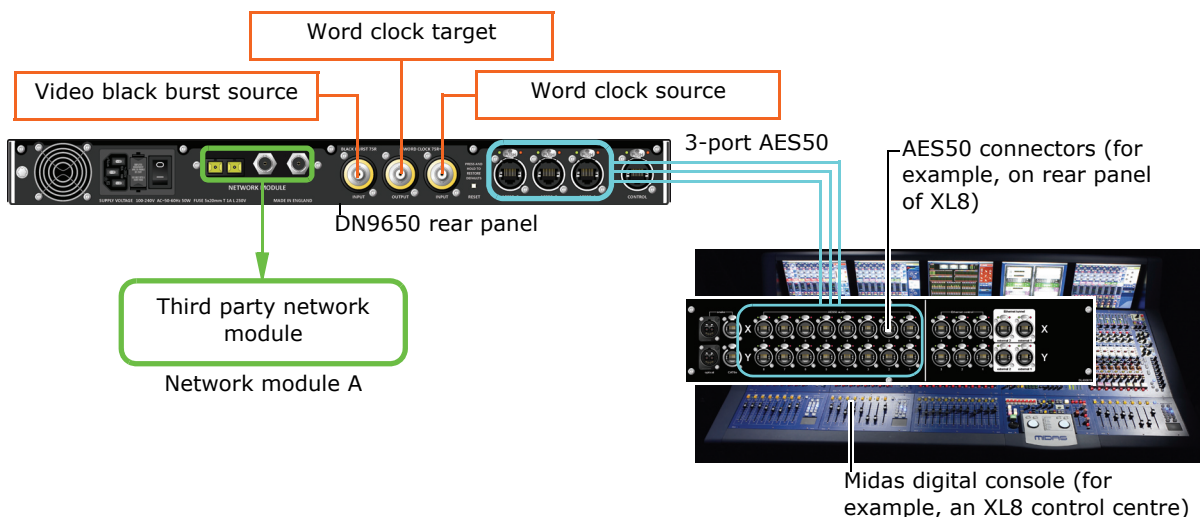
### Caution:

**In accordance with Part 15 of the FCC Rules & Regulations, "... changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment."**

Should this product be used in an electromagnetic field that is amplitude modulated by an audio frequency signal (20Hz to 20kHz), the signal to noise ratio may be degraded. Degradation of up to 60dB at a frequency corresponding to the modulation signal may be experienced under extreme conditions (3V/m, 90% modulation).

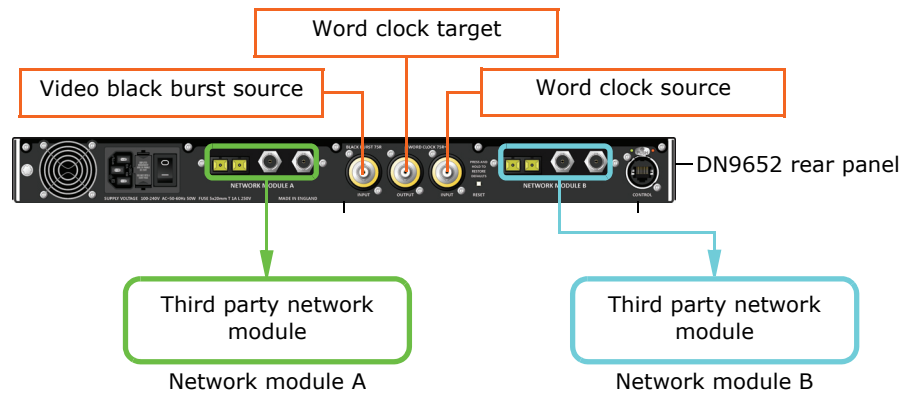
## Connecting up the DN965X

Making sure that all equipment is switched off, connect the DN965X to the rest of your audio equipment, as shown in the following diagrams.



*Typical DN9650 audio connection configuration*





*Typical DN9652 audio connection configuration*

## Powering the unit

This section shows you how to connect the unit to the mains, switch the unit on/off and electrically isolate the unit.

The internal power supplies are of the switch mode type that automatically sense the incoming mains voltage and will work where the nominal voltage is in the range 100VAC to 240VAC.

### >> To switch the unit on/off

Making sure that the mains power at the power outlet is off, connect the mains cable supplied with your DN965X to the mains power outlet and then to the mains socket at the rear of your unit. To switch the unit on/off, use the mains on/off switch on the rear of the unit. The blue KT roundel on the front of the unit will illuminate to show that power is on.

To electrically isolate the unit, switch it off and remove the mains cable from mains IEC socket on the rear panel.



## Configuring the unit for the first time

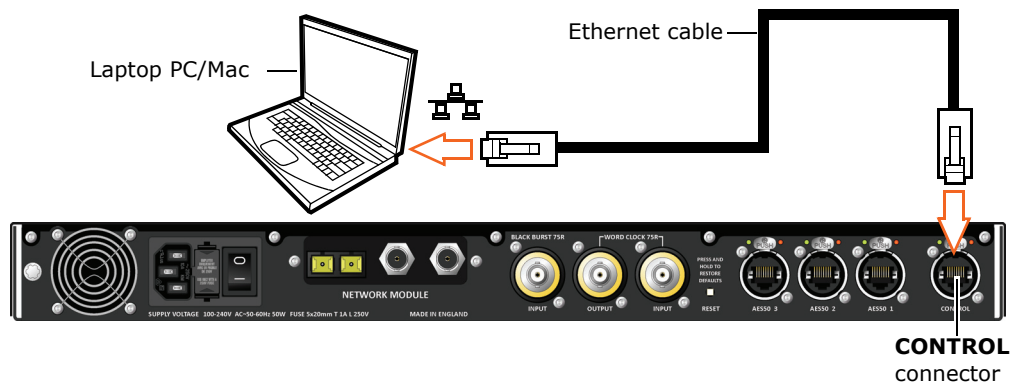
### Important:

**Before you use the unit for the first time, you must configure your computer with the IP address and netmask to suit the range used by the DN965X.**

Before you can use the DN965X as a network bridge, you must first configure it by choosing the type of network module card(s) that are fitted in the unit and then setting them up. Configuration involves connecting the DN965X to a computer running an up-to-date web browser. To make sure your computer is compatible with the DN965X, you will need to change its IP address and netmask. For more information on configuration, see Chapter 5 "Configuring the DN965X" on page 17.

### >> To connect the DN965X to a computer and then open its configuration menu in the web browser

- 1 Connect an Ethernet cable to the **CONTROL** socket on the rear panel of the DN965X and then to the Ethernet port of your computer.



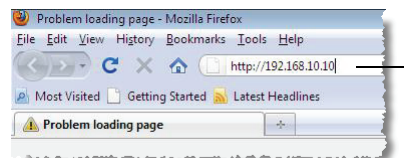
### Connecting a DN965X to a computer

- 2 Switch on the DN965X and your computer. (Note the default IP address of the DN965X, which is displayed on its LCD screen during power up.)
- 3 To make sure your computer is compatible with the DN965X, we recommend that you change the IP address and netmask of your computer to 192.168.2.1 and 255.255.0.0, respectively; for instructions, refer to your computer's help and support information.
- 4 Open your computer's web browser.

**Note:** Make sure your web browser is up-to-date.

- 5 In the web browser's address bar, type in the following default IP address (displayed on the unit's LCD screen during power up) and then press ENTER:

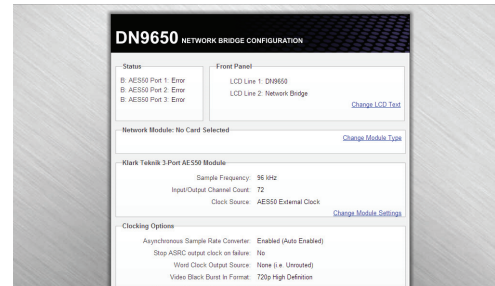
"http://192.168.10.10"



Typical browser address bar

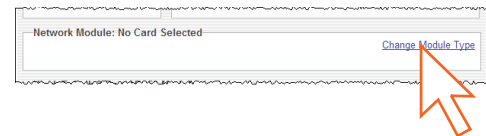


- 6** The **DN965X NETWORK BRIDGE CONFIGURATION** menu will open in the web browser's **Klark Teknik DN965X Configuration** tab.



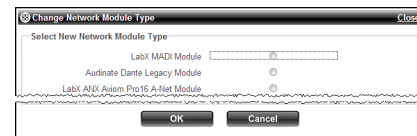
>> To select which network card(s) are fitted in the unit

- 1** In the configuration menu, click **Change Module Type** in the desired network module section. If no network module type has been set up, its section will look similar to the one shown right. On the DN9650, network module B is always a **Klark Teknik 3-Port AES50 Module**.



For details of which network module section on the configuration menu applies which network module card fitted in the rear panel of the unit, see Figure 2 "Typical configuration menu" on page 18 and Figure 1 "Rear panel of the DN965X" on page 15.

- 2** In the **Change Network Module Type** window, select the appropriate network module type and then click **OK**.



- 3** Your DN965X is now ready for use as a network bridge. However, if you want to change the settings of the network module cards, see "Setting up a network module" on page 19





## Chapter 2: Overview

Thank you for purchasing a Klark Teknik DN9650/DN9652 Network Bridge. The DN965X is a user-friendly, high-performance, digital audio network bridge.

Both the DN9650 and DN9652 units compliment each other. The DN9650 allows AES50-equipped Midas digital systems, such as the XL8 and PRO6, and Klark Teknik DN9696 High Resolution Audio Recorders to connect to third party multi-channel digital audio networks, while the DN9652 allows two dissimilar digital audio networks to interface simply and reliably.

Your DN965X was conceived by Klark Teknik to offer audio professionals high-performance audio equipment, designed to provide no-compromise sonic quality with a feature set that offers all essential facilities and functions. It represents the very best of British design and engineering combined with contemporary, efficient manufacturing methods, and will give you many years of reliable service.

All this is backed up, of course, by the standard Klark Teknik three year warranty.

Please take the time to complete and return the registration card or fill in the Warranty Registration Form online by visiting our website at [www.klarktechnik.com](http://www.klarktechnik.com) and, to obtain the best results with a minimum of effort, also read this operator manual.

Finally, enjoy your Klark Teknik Network Bridge!

### About the DN965X units

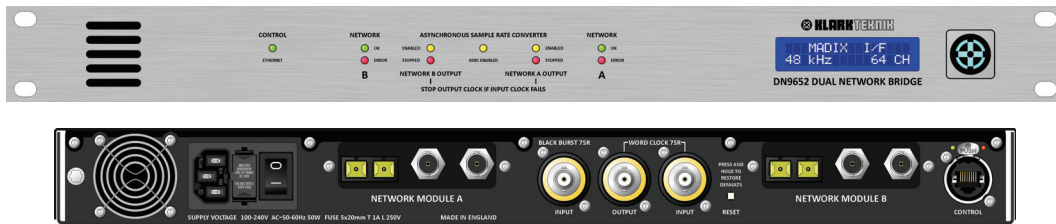
The DN965X units provide bi-directional sample rate conversion of 24-bit resolution digital audio between two clock domains, all in a standard 1U high 19" rack mount chassis.



*Front and rear panels of the DN9650 Network Bridge*

The DN9650 has an AES50 and a network clock domain, provided by a three-port AES50 digital audio interface and a third party network module interface, whereas both clock domains of the DN9652 are of the network type and are provided by two, third party network module interfaces.

Supported network modules are designed and manufactured by Lab X Technologies and Audinate Pty Ltd. and conform to Cirrus Logic Inc. CM-1/CM-2 interface to support protocols, which include MADI, Audinate Dante and Aviom A-Net.



Front and rear panels of the DN9652 Network Bridge

Since the network clock domains (A and B) contain digital audio, an intermediate asynchronous sample rate converter (ASRC) effectively resamples the audio as it passes between them, while obeying Nyquist sampling theory<sup>1</sup>. The ASRC has a bypass option for when both domains are locked to the same sample clock; this has the facility to select one of the clock domains as a master, which allows one to be synchronously clocked from the other to minimise latency.

- **AES50 clock domain** Supports either internal or external synchronisation. The DN9650 uses its on-board clock oscillator for internal synchronisation. For external synchronisation, the incoming clock is connected to one of the AES50 ports. Additionally, the AES50 clock domain has the option of slaving to the network clock domain, word clock and video black burst if the SRC is bypassed.
- **Network clock domain** Supports clock synchronisation to the incoming clock via a third party network module, word clock in or video black burst (supporting PAL/NTSC formats) interfaces. Additionally (DN9650 only), the network clock domain has the option of slaving to the AES50 clock domain.

Supported third party multi-channel digital audio interfaces are as follows:

- LabX MADI V1.14
- Audinate Dante
- Aviom a-Net
- Ethersound
- It is intended that more third party protocols will be supported

The DN965X has an internal Linux web server running a platform-independent HTML-based interface that allows unit configuration via a computer (with up-to-date browser), which is connected to the Ethernet port on the rear panel of the unit. Supported platforms are: PCs (Windows); Apple Macs; and Linux-based PCs.

The units are capable of operating from a 100 to 240V  $\pm 10\%$ , 50 to 60Hz AC power source.

## Key features

The DN965X has the following key features:

- 1U high, 19" rackmount unit.
- Able to interface between AES50 and third party multi-channel audio networks (DN9650 only) or dual networks (DN9652 only).

1. The Nyquist sampling theory defines the process of sampling audio within a digital system.



- Supports up to 64 bi-directional channels of 24-bit, 96kHz audio per network or AES50 port (DN9650 only) with 1:1 channel mapping.
- Supports operation at 48kHz and 96kHz sampling frequencies. Bi-directional ASRC on every channel with bypass facility to isolate network domains.
- High channel count asynchronous sample rate conversion (ASRC).
- Platform-independent web browser configuration interface software hosted on integrated Linux web server.
- Ethernet port for remote computer connection (unit configuration and software updating).
- Ultra-high stability reference - grade 1 part per million (1 ppm) temperature-controlled clock oscillator.
- User-selectable stop output clock facility if input clock fails to function, to propagate network failure across ASRC for automatic or manual redundancy switchover.
- Flexible third party interface clock synchronisation options:
  - Network module incoming and outgoing clocks.
  - Word clock input.
  - Word clock output.
  - Video black burst in (PAL/SECAM/NTSC formats in standard definition (SD) and high definition (HD) resolutions).
- Clock Synchronisation:
  - Clock synchronisation scheme divided into two network domains, separated by the ASRC, and either domain can be selected as clock master;
  - AES50 clock source (DN9650 only) may be internal or external (incoming AES50 clock, word clock and video black burst);
  - Network clock source may be incoming network module clock, word clock in or video black burst in.
- 100V-240V universal power supply, 50Hz to 60Hz.
- Upgradeability.

## Host software version and updates

This manual is for DN9650 and DN9652 units running host software version 1.00 and later.

An Ethernet Control port is provided on the rear panel to facilitate software updates.

## Changing the network module

Both CM-1 and CM-2 network modules must only be changed by qualified service personnel. Contact Midas Klark Teknik Limited for details.



### About this manual

This is the operator manual for the DN9650 and DN9652 Network Bridge units. It is intended to help get your units installed and in operation as quickly as possible by giving you unpacking, installation, connection, configuration and setting up instructions. To help familiarise you with the units, there is a description of the front and rear panels, along with easy-to-follow user instructions.

When referring to both DN9650 and DN9652 type units you will see "DN965X". Any information applying only to one type of unit will include the name of the unit.

### Trademarks

Mac and the Mac logo are trademarks of Apple Inc., registered in the U.S. and other countries.

Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and other countries.

### Service and support

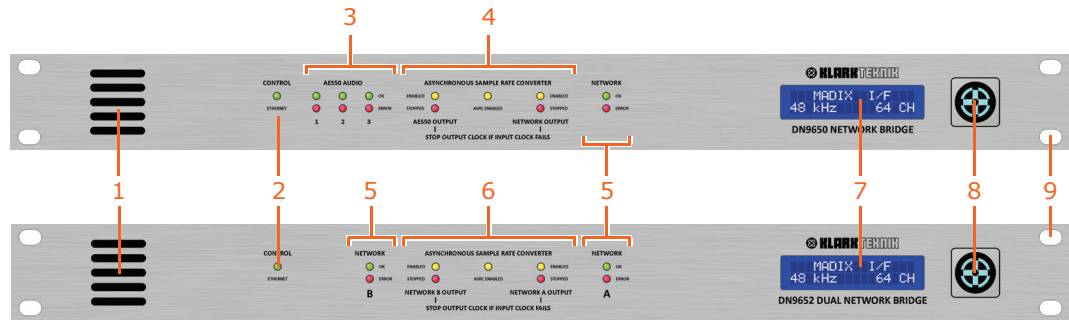
We provide superb levels of support and service to give users confidence in Klark Teknik products. For more information, please contact your local distributor or Klark Teknik at the address shown in the front of this manual.





# Chapter 3: Front Panel

This chapter describes the front panel of the DN9650 and DN9652 units, which comprise the following.



Front panel of the DN9650 (top) and DN9652 (bottom)

Item	Description	Illustration
1	<b>Ventilation grill</b> Air intake for internal cooling via an internal fan. <b>Do not obstruct.</b>	N/A
2	<b>CONTROL section</b> A green <b>ETHERNET</b> LED illuminates to show the communication status between unit and PC, as follows: <ul style="list-style-type: none"> <li>• Illuminated = traffic detected.</li> <li>• Extinguished = no traffic detected.</li> </ul>	
3	<b>AES50 AUDIO section (DN9650 only)</b> Three sets of LEDs provide status information for the three AES50 audio connectors. The green <b>OK</b> and red <b>ERROR</b> LEDs per set show the following: <ul style="list-style-type: none"> <li>• Pulsating green with red extinguished = synchronised and with audio activity.</li> <li>• Green extinguished with red illuminated = loss of synchronisation and no audio activity.</li> </ul>	
4	<b>ASYNCHRONOUS SAMPLE RATE CONVERTER section (DN9650 only)</b> This section shows the status of the configured clock source, which can be AES50 output, ASRC or network output. Each source has a yellow <b>ENABLED</b> LED, which illuminates to show that the source is enabled. The DN9650 also has the facility to stop the output clock if the input clock fails. This condition is indicated by the illumination of the red <b>STOPPED</b> LED.	

For the LED status, see Table 1 "DN9650 ASRC LED status" on page 13.



Item	Description	Illustration
5	<p><b>NETWORK section</b> This section shows the status of the network module connection, as follows:</p> <ul style="list-style-type: none"> <li>• Constantly illuminated green with red extinguished = cable/fibre is synchronised, but there is no audio activity.</li> <li>• Pulsating green with red extinguished = cable/fibre is on with audio activity.</li> <li>• Green extinguished with red illuminated = cable/fibre are off.</li> </ul>	
6	<p><b>ASYNCHRONOUS SAMPLE RATE CONVERTER section (DN9652 only)</b> This section shows the status of the configured clock source, which can be ASRC or network output. Each source has a yellow <b>ENABLED</b> LED, which illuminates to show that the source is enabled. The DN9652 also has the facility to stop the output clock if the input clock fails. This condition is indicated by the illumination of the red <b>STOPPED</b> LED.</p> <p>For the LED status, see Table 2 "DN9652 ASRC LED status" on page 13.</p>	
7	<p><b>LCD display</b> This backlit, alphanumeric display has two rows of 16 digits. During boot up the display shows the unit's current IP address and subnet mask for about five seconds and then the user-configured text thereafter.</p>	
8	<p><b>Klark Teknik roundel</b> Has a blue backlight, which illuminates to show that power is on.</p>	
9	<p><b>Cut-out</b> There are four cut-outs for rack mount fixings.</p>	N/A

**Table 1: DN9650 ASRC LED status**

<b>AES50 OUTPUT LEDs</b>	<b>ASRC ENABLED LED</b>	<b>NETWORK OUTPUT LEDs</b>	<b>Status</b>
Yellow LED = off Red LED = off	Off	Yellow LED = off Red LED = off	When ASRC is disabled, AES50 and network output indication does not play any role.
Yellow LED = on Red LED = off	On	Any condition	The network clock output is working. The AES50 output clock is let onto the ASRC AES50 clock input.
Yellow LED = on Red LED = on	On	Any condition	The network clock output is not working. The AES50 output clock is stopped (and the ASRC AES50 clock input is disabled).
Any condition	On	Yellow LED = on Red LED = off	The AES50 clock output is working. The network output clock is let onto the ASRC network clock input.
Any condition	On	Yellow LED = on Red LED = on	The AES50 clock output is not working. The MADI output clock is stopped (and the ASRC network clock input is disabled).

**Table 2: DN9652 ASRC LED status**

<b>NETWORK B OUTPUT LEDs</b>	<b>ASRC ENABLED LED</b>	<b>NETWORK A OUTPUT LEDs</b>	<b>Status</b>
Yellow LED = off Red LED = off	Off	Yellow LED = off Red LED = off	When ASRC is disabled, network output indication does not play any role.
Yellow LED = on Red LED = off	On	Any condition	The network B clock output is working. The network A output clock is let onto the ASRC network B clock input.
Yellow LED = on Red LED = on	On	Any condition	The network B clock output is not working. The network A output clock is stopped (and the ASRC network B clock input is disabled).
Any condition	On	Yellow LED = on Red LED = off	The network B clock output is working. The network A output clock is let onto the ASRC network A clock input.
Any condition	On	Yellow LED = on Red LED = on	The network B clock output is not working. The MADI output clock is stopped (and the ASRC network A clock input is disabled).





## Chapter 4: Rear Panel

This chapter describes the rear panel of the DN9650 and DN9652 units, which comprise the following.

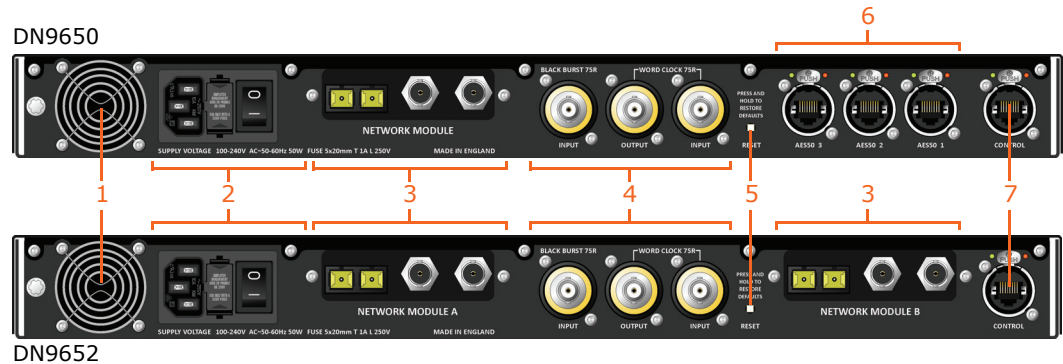


Figure 1: Rear panel of the DN965X

Item	Description
1	<b>Ventilation grill</b> Air outtake for internal fan cooling. <b>Do not obstruct.</b>
2	<b>Mains input section</b> (see "Mains input" on page 16).
3	<b>Network module section</b> Each network module section contains a replaceable network module.  <b>! Network modules should only be replaced by approved service personnel.</b>
4	<b>Clock section</b> (see "Clock section" on page 16).
5	<b>RESET button</b> This white, square, recessed reset button restores the unit to its default condition. To activate the button, press and hold for about five seconds.
6	<b>AES50 section</b> (see "AES50 section (DN9650 only)" on page 16).
7	<b>CONTROL connector</b> (see "CONTROL connector" on page 16).



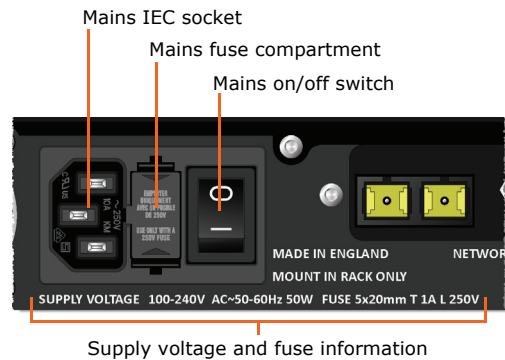


## Mains input

**!** Always replace the mains fuse with one of the same type and rating, as printed underneath the fuse drawer.

The mains input section has a mains IEC socket, mains fuse compartment and on/off switch. Printed underneath is the mains supply voltage and fuse specifications.

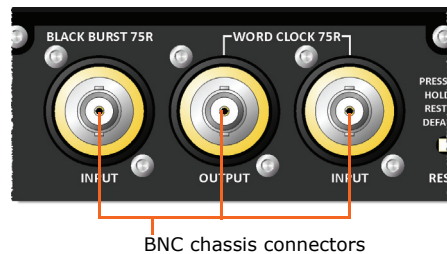
The mains input is an auto-voltage sensing switch mode power supply that operates where normal mains voltage is in the range 100V AC to 240V AC.



## Clock section

This section provides 75 ohm connections for two types of external clock for synchronisation:

- **BLACK BURST 75R** A single **INPUT** socket provides connection for a video signal generator.
- **WORD CLOCK 75R** An **OUTPUT** socket and an **INPUT** socket provide connection for an external word clock source.



## AES50 section (DN9650 only)

The AES50 section of the DN9650 has three EtherCon® XLR chassis connectors for audio connections to/from a Midas digital system or AES-equipped device.

Each connector supports 24 bi-directional channels operating at a fixed sampling frequency of 96kHz for compatibility with existing Midas and Klark Teknik AES50-equipped products.



## CONTROL connector

A single EtherCon® XLR chassis connector lets you connect to a computer to enable unit configuration and software upgrade.





# Chapter 5: Configuring the DN965X

This chapter shows you how to configure the DN965X. Although this chapter uses the DN9650 as an example, the procedures also apply to the DN9652 unless stated otherwise.

## About DN965X configuration

The DN965X is configured via a simple menu-driven user interface (configuration menu) operating in a web browser on a computer, such as a laptop PC or Mac, which is akin to setting up a router. The supporting software is hosted in a Linux-based web server inside the DN965X.

DN965X configuration lets you do the following:

- Change the text displayed in the LCD display on the front panel of the unit (see "Changing the displayed text" on page 19).
- Set up the network module(s) and, on the DN9650 only, the 3-port AES50 module (see "Setting up a network module" on page 19).
- Configure the clocking options (see "Clocking options" on page 20).
- Set up the IP address of the DN965X for Ethernet networking (see "Ethernet IP Addressing" on page 21).
- Update the host software of the DN965X (see "Updating the unit's host software" on page 22).

To configure your DN965X you will need a standard Ethernet cable and a computer with an up-to-date web browser. For more information, see "To connect the DN965X to a computer and then open its configuration menu in the web browser" on page 4.

## About the web browser interface

Supported operating systems and HTTP-compliant web browsers include the following:

- **PC** Windows XP, Windows 7 with Internet Explorer, Mozilla® Firefox®, Google Chrome™.
- **Mac** OS X 10.5 Leopard, OS X 10.6 Snow Leopard with Apple Safari, Mozilla® Firefox®, Google Chrome™.

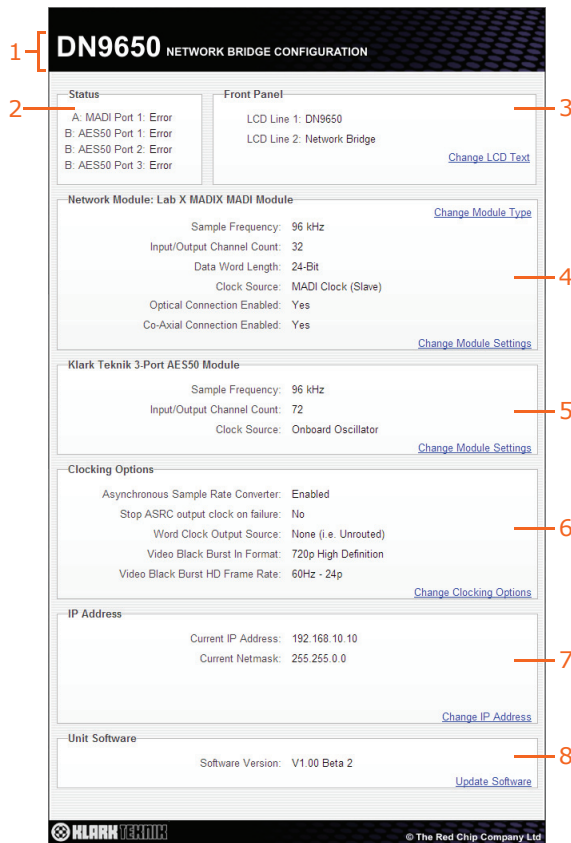


Figure 2: Typical configuration menu

Item	Screen element
1	Unit type and title of web page.
2	<b>Status</b> A view-only section that shows the communication status of the network module(s) and/or the three AES50 audio ports.
3	<b>Front Panel</b> Shows the current display of the LCD screen (DN965X front panel) and lets you change it.
4	<b>Network A module panel</b> Shows the parameters of the currently fitted network module in position A and lets you change its type and settings.
5	<b>Network B module panel</b> Shows the parameters of the currently fitted network/3-port AES50 (DN9650 only) module in position B and lets you change its type and settings.
6	<b>Clocking Options</b> Shows the configuration details of the clock and lets you change its settings.
7	<b>IP Address</b> Shows the current IP address and netmask and lets you change them.
8	<b>Unit Software</b> Shows the current version of the unit's host software and lets you perform an upgrade.



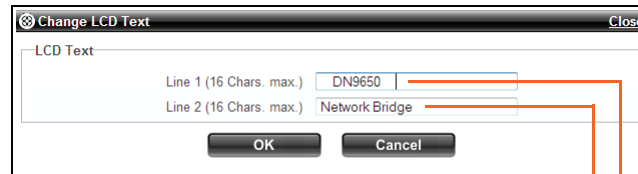


### Changing the displayed text

The LCD display has two rows (lines) of 16 characters that support ASCII characters.

#### >> To change the text displayed on the DN965X's LCD screen

- 1 In the **Front Panel** section of the configuration window, click **Change LCD Text**.



LCD display on front panel of DN965X

DN9650  
Network Bridge

- 2 In the **Line 1** field of the **Change LCD Text** window, type in the desired text. The default display shows the unit type.
- 3 In the **Line 2** field, type in the desired text. The default display shows the unit name.
- 4 Click **OK**.

### Setting up a network module

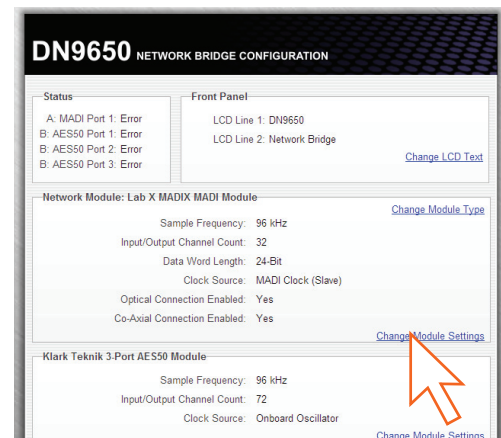
After initially setting up the type of each network module fitted in the DN965X (see "To select which network card(s) are fitted in the unit" on page 5), you can then configure their settings, such as clock source and sample frequency.

**Note:** On some network module cards, it may not be possible to set them up via the configuration menu of the DN965X.

#### >> To configure a network module card

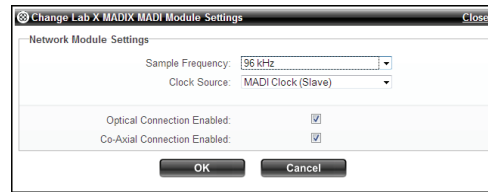
- 1 In the desired network module section, click **Change Module Settings**. For example, in the **Lab X MADIX MADI Module** section.

If a network module card cannot be configured via the configuration menu, text in its **Network Module** section will inform you of this.





- In the **Change XXX Module Settings** window, choose the desired options. For example, select the sample frequency as 96kHz and the clock source as MADI Clock (Slave) for a Lab X MADIX MADI module.



- Click **OK**.

## >> To change the settings of a Klark Teknik 3-Port AES50 Module card (DN9650 only)

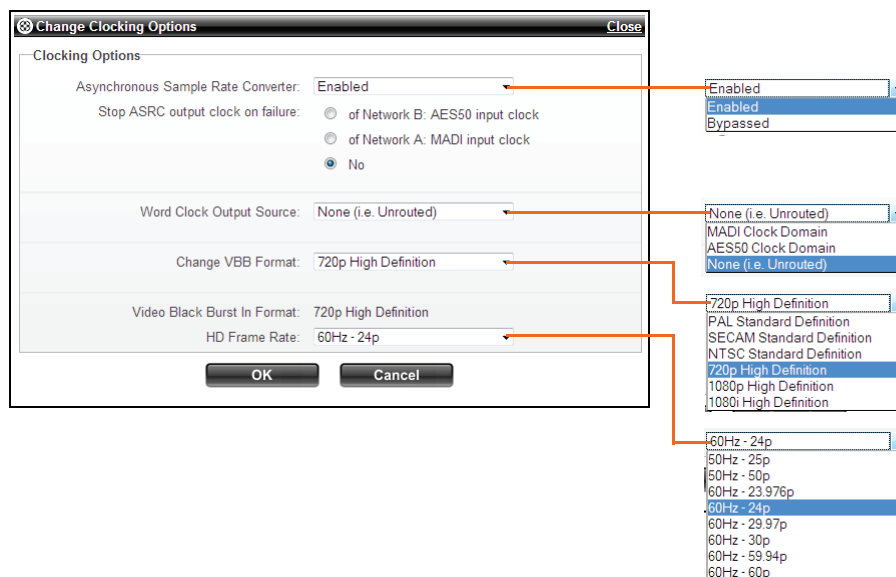
The 3-port AES50 module card is configured in the same way as a network module card (see "To configure a network module card" on page 19).

## Clocking options

The **Change Clocking Options** window lets you set parameters such as enabling the ASRC, selecting the word clock output source, setting the VBB format, etc.

### >> To change the clocking options of a network module

- In the **Clocking Options** section of the configuration window, click **Change Clocking Options**.
- In the **Change Clocking Options** window (example shows a Lab X MADIX MADI Module card), choose the desired options.



- Click **OK**.

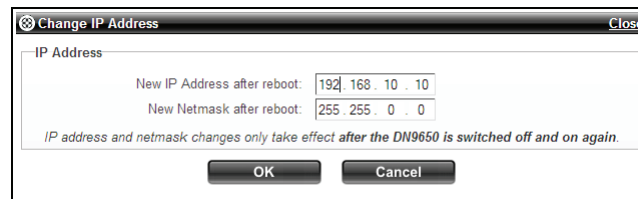


## Ethernet IP Addressing

The IP address (default 192.168.10.10) can be changed via the configuration menu to allow operation as part of an Ethernet network. The default netmask value is 255.255.0.0, but you can also modify this if you want.

### >> To change the IP address of the DN965X

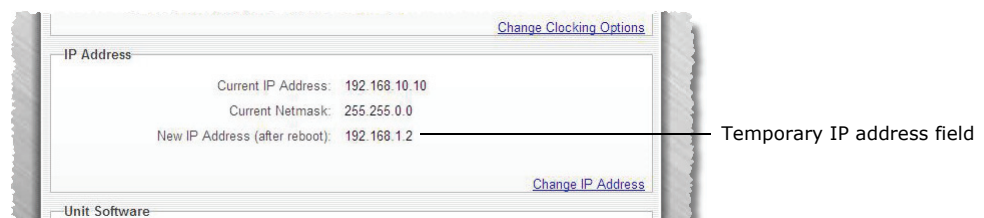
- 1 In the **IP Address** section of the configuration window, click **Change IP Address**.



- 2 In the **New IP Address after reboot** field of the **Change IP Address** window, type in the desired IP address. The range is 0.0.0.0 to 254.254.254.254.
- 3 In the **New Netmask after reboot** field, type in the desired netmask. The range is 0.0.0.0 to 255.255.255.255.

**Note:** If you change the netmask, you will have to reconfigure your computer's IP address/netmask.

- 4 Click **OK**. The **Change IP Address** window will close. The **IP Address** section of the configuration window will now display a new field, which informs you what the new IP address will be after reboot. (This field will disappear after a reboot.)



- 5 For the new IP address and netmask to come into effect, reboot the DN965X by switching it off and then on again. (The new IP address will be displayed during startup.)
- 6 To reconnect to the configuration web page you will need to type in the new IP address in the browser's address (see "To connect the DN965X to a computer and then open its configuration menu in the web browser" on page 4).

**!** If you have changed the subnet, you will also have to reconfigure your computer's IP address/subnet mask.



## Updating the unit's host software

The upgrade procedure involves transferring a number of files individually to the DN965X unit. The files are supplied in a single TAR file. Before you can begin the upgrade these files must be 'unzipped' to a location that is easily accessible from your computer.

The TAR file will contain all of the files required to update any type of unit, as listed in the following table, which also shows the recommended order of upload. Although this order is not critical, it is important that you upload the 9650apps.img file last, as this file triggers a reboot of the DN965X unit.

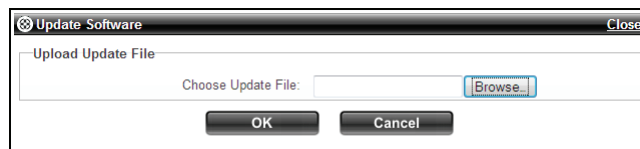
**Table 3: TAR files and recommended file upload order**

Filename	Recommended upload order	
	DN9650	DN9652
9650_ramdisk.gz	1	1
unmanagedredboot.bin	2	2
vmlinux26.bin	3	3
fpgas/dn9650_asrc.bin	4	4
fpgas/dn9650_bridge.bin	5	N/A
fpgas/dn9652_bridge.bin	N/A	5
9650apps.img	6	6

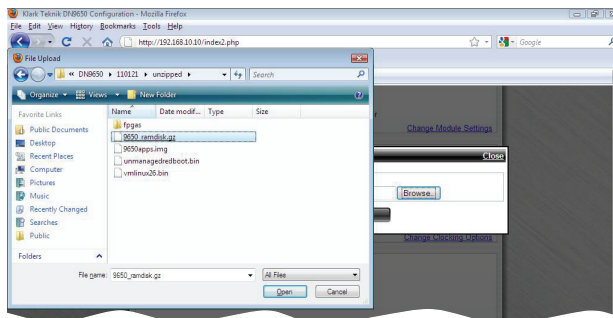
### >> To update the host software of the DN965X

**!** Do not switch the unit off during the software update procedure.

- 1 In the **Unit Software** section of the configuration window, click **Update Software**.
- 2 In the **Update Software** window, select the update file (see Table 3 "TAR files and recommended file upload order" on page 22).



You can locate the file by using the browse facility. Click **Browse** and navigate to the file you want, then select the file.

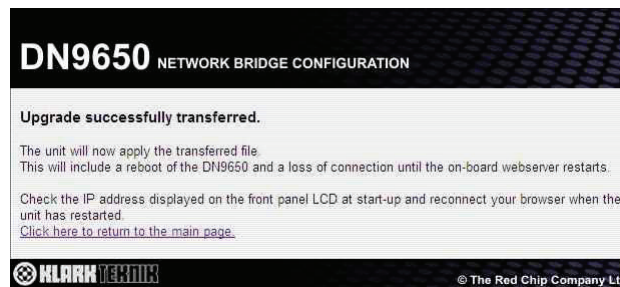




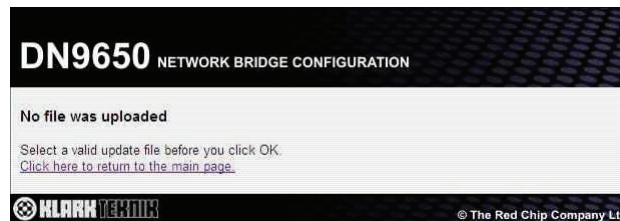
- 3 With the desired file displayed in the **Choose Update File** field, click **OK**. The **Updating** window will open, showing that the update is in progress.



- 4 When the file has been updated you should see an **Upgrade successfully transferred** message (typically as shown below). Click the **Click here to return to the main page** link to go back to the configuration page.



However, if you see the following **No file was uploaded** message, you have probably selected an invalid update file. Click the **Click here to return to the main page** link to go back to the configuration page and try again.

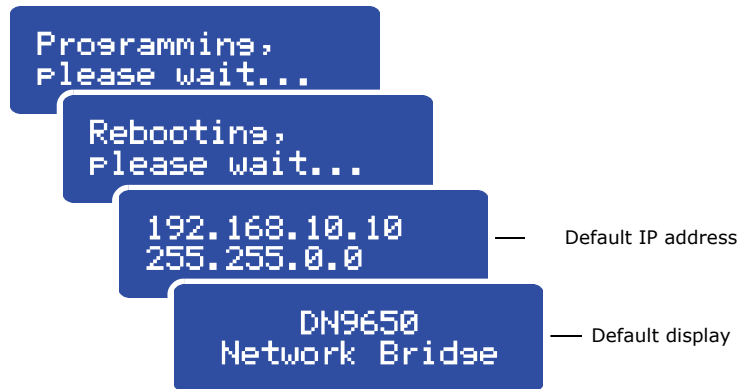


- 5 Repeat steps 1 to 4 for the remaining files, except the 'apps' file (see Table 3 "TAR files and recommended file upload order" on page 22).
- 6 You are now ready to update the 'apps' file. Repeat steps 1 to 4. You should see the **Upgrade successfully transferred** message. *However, this does not mean that the upgrade is complete!*

**!** You must wait until the unit has fully rebooted before operating it.



The unit will automatically reboot to apply the changes. **At this point you *must* monitor the reboot progress on the LCD display screen, which will show the following messages, finally displaying the default.** Note the IP address during the reboot.



- 7 When the default display appears, the DN965X has fully rebooted and it should now be fully updated with the new software. Click the **Click here to return to the main page** link on the to go back to the configuration page. Make sure that the unit has been updated by checking the software version in the **Unit Software** section.

If you cannot get back to the configuration page, try typing in the IP address you saw at reboot (see "To connect the DN965X to a computer and then open its configuration menu in the web browser" on page 4).

- 8 Your unit should now be fully upgraded and ready for operation.

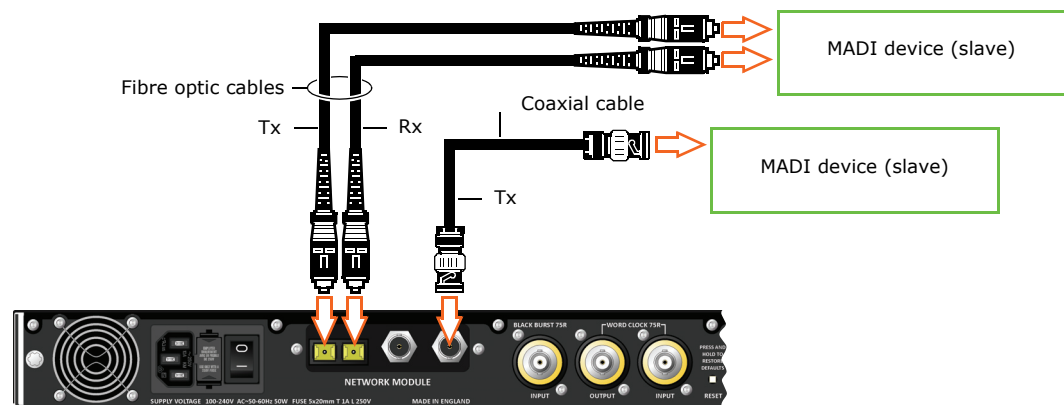


## Chapter 6: Operation

Although there are no operating procedures associated with the DN965X, this chapter shows you how to create a MADI split.

### Using a MADI module as a MADI split

One of the features of the MADI card is that it allows you to create a MADI split. This is because the MADI card has both optical and co-axial connections, which can both be enabled simultaneously in the software (see "Setting up a network module" on page 19). This allows outgoing audio from the DN965x to be received simultaneously on both remote systems. However, this configuration has some very real limitations as compared to a real split (see "Limitations" on page 25).



Typical example of a DN9650/DN9652 connected in a MADI split configuration

#### >> To configure the MADI module as a MADI split

- Set the unit MADI card as clock source (for example, choose master, onboard oscillator, WCLK etc.).
- One format (for example, optical) connected in a loop (Tx and Rx) as usual to a remote system (MADI slave).
- The other format (co-axial in this case) connected by just the Tx connection on the module to another remote system (also MADI slave).

### Limitations

The limitations of using the MADI module as a MADI split are as follows:

- Incoming audio to DN965x unit is only available from one remote MADI system.
- There is no clock domain separation between the two remote systems.
- If the remote system with the bi-directional link goes down or the link is disconnected the other remote system loses its audio feed.
- Errors at the other end of the uni-directional link cannot be detected.







# Appendix A: Technical Specification

This appendix contains the technical specifications specific to the DN9650 and DN9652 Network Bridges.

Due to a policy of continual improvement, Klark Teknik reserves the right to alter the function or specification at any time without notice.

**Table 4: DN9650 technical specification**

<b>Inputs/ outputs</b>	<b>Three</b> Type	AES50, EtherCon®, 24 bi-directional channels of 24-bit, 96kHz audio
<b>Terminations</b>	Audio	AES50, EtherCon®, 24 bi-directional channels of 24-bit, 96kHz audio
	Power	3-pin IEC
<b>Power requirements</b>	Voltage	100VAC to 240VAC $\pm$ 10%
	Frequency	50Hz to 60Hz
	Consumption	<90W
<b>Dimensions</b>	Height	44.5 mm (1.75"), 1U high
	Width	482.0 mm (19")
	Depth	410.0 mm (16.1")
<b>Weight</b>	Net	5.5 kg
	Shipping	7.5 kg
<b>Operation</b>	Temperature	+5°C to +45°C
<b>Storage</b>	Temperature	-20°C to +60°C

**Table 5: DN9652 technical specification**

<b>Terminations</b>	Power	3-pin IEC
<b>Power requirements</b>	Voltage	100VAC to 240VAC $\pm$ 10%
	Frequency	50Hz to 60Hz
	Consumption	<90W
<b>Dimensions</b>	Height	44.5 mm (1.75"), 1U high
	Width	482.0 mm (19")
	Depth	410.0 mm (16.1")
<b>Weight</b>	Net	5.5 kg
	Shipping	7.5 kg
<b>Operation</b>	Temperature	+5°C to +45°C
<b>Storage</b>	Temperature	-20°C to +60°C



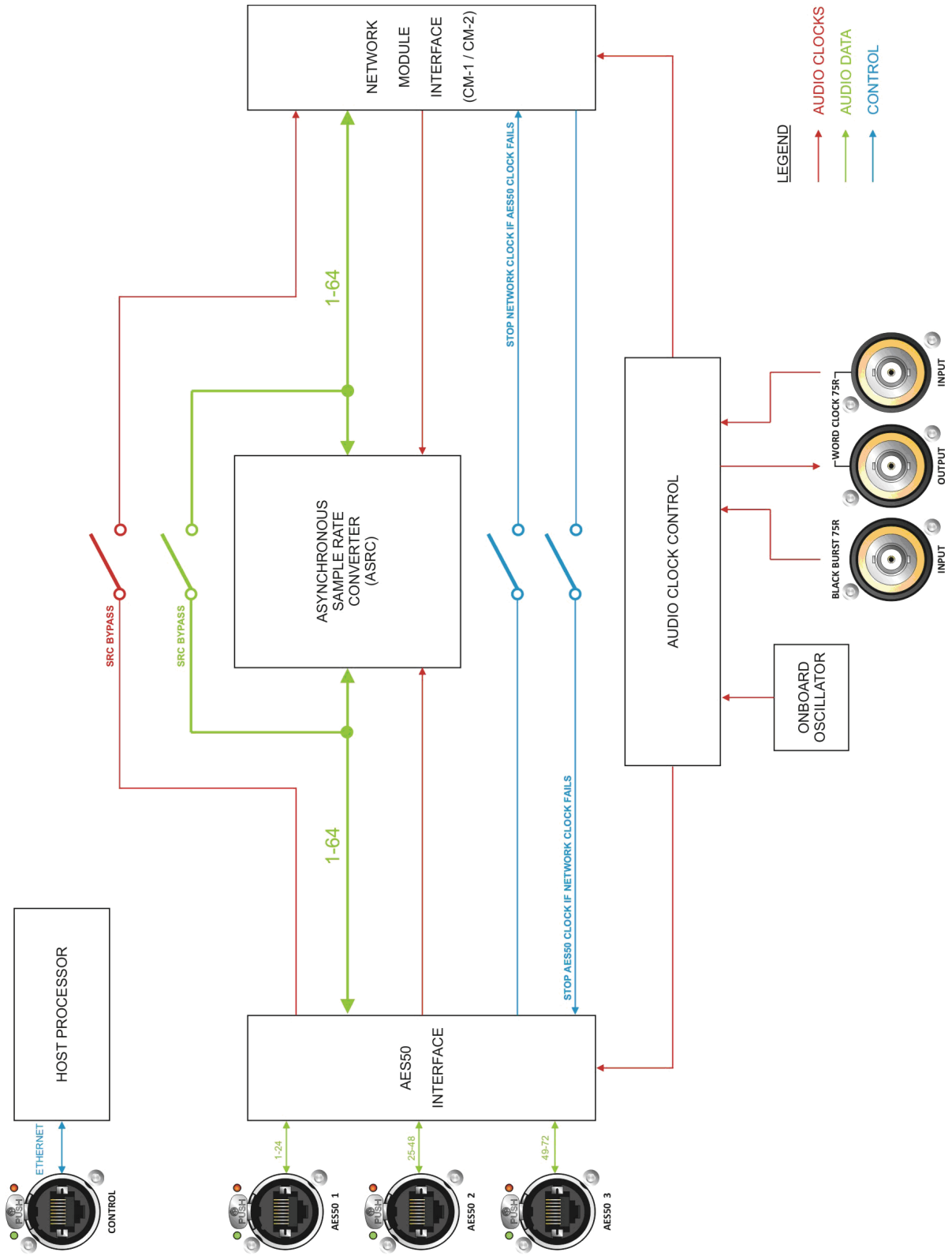


## ***Appendix B: Functional Block Diagrams***

This appendix contains the signal flow diagrams for the DN9650/DN9652 Network Bridges.

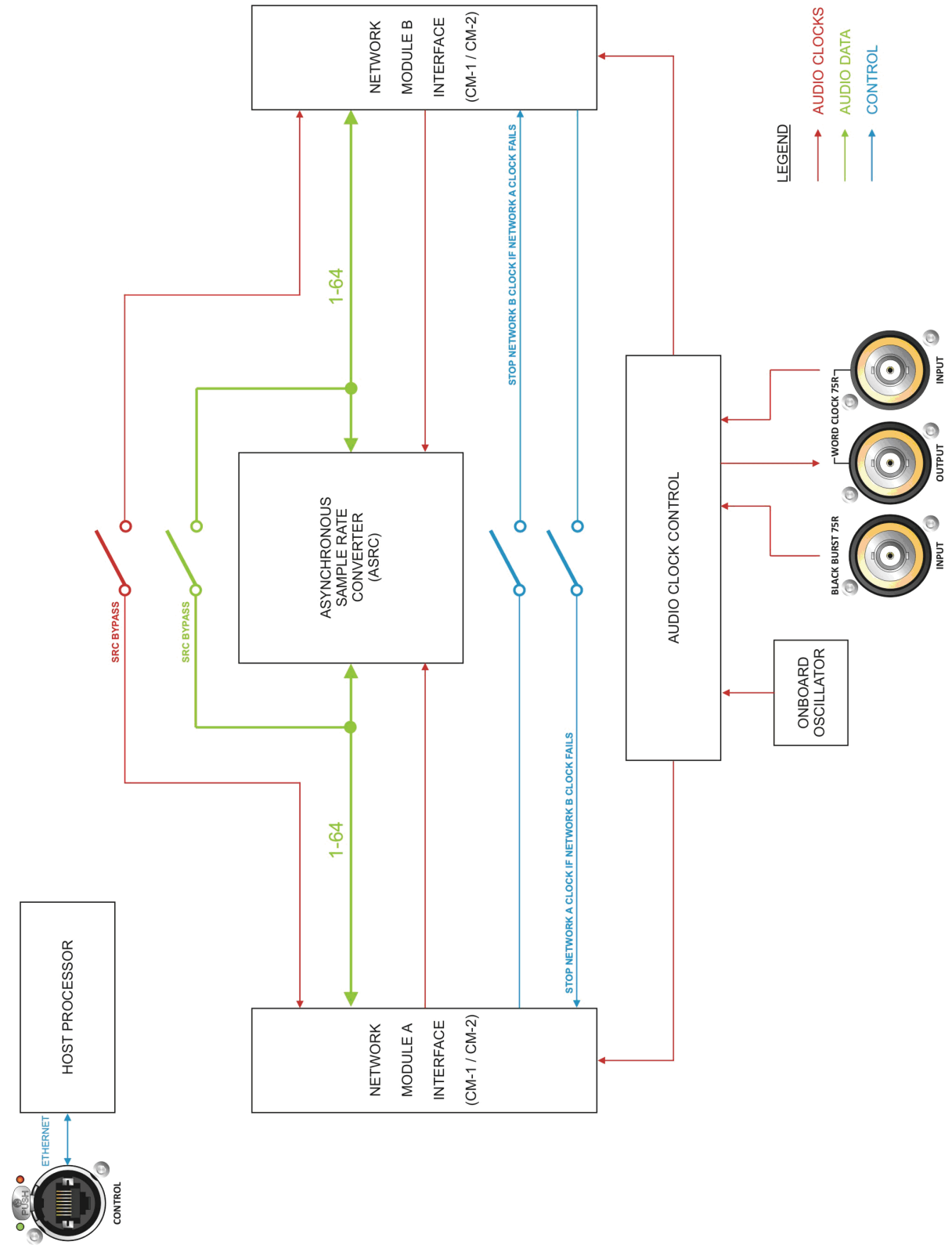


DN9650





# DN9652





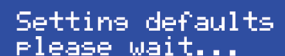


# Appendix C: Service Information

This appendix contains routine service and maintenance instructions.

## Restoring the factory defaults

You can reset the DN965X unit to its factory default settings by pressing the **RESET** button on the rear panel of the unit (see Figure 1, "Rear panel of the DN965X," on page 15). The LCD screen will display the message shown right to inform that the settings are being reset. The unit will then reboot with the factory defaults.



```
Setting defaults
Please wait...
```

## Routine maintenance

To help keep your DN9650/DN9652 Network Bridge unit in good working order and to make sure it gives you optimum performance, we recommend that you carry out the following at monthly intervals:

- Clean the unit (see "Cleaning" below).
- Check the controls for freedom of operation.
- Check the functionality of all controls, that is, control knobs, pushbuttons and LEDs. You can carry out a visual check of all illuminated items (LEDs etc.) by switching the unit off and then on again, as they should all illuminate during power up.
- Check the functionality of the equipment.

## Cleaning

Switch off the unit and electrically isolate it from the mains *before* cleaning.

Clean the DN9650/DN9652 Network Bridge using a dry, lint-free cloth. Do not use harsh abrasives or solvents. When cleaning the unit, take great care not to damage control knobs, pushbuttons etc.

To clean the LCD screen, wipe it carefully with a soft, lint-free cloth using ethanolic liquid, such as a screen cleaner for LCDs, or by using a screen wipe specially designed for the purpose. When cleaning the LCD screen, please take the following precautions:

- Don't use harsh abrasives, such as paper towels.
- Don't apply liquids directly to the screen.
- Don't use ammonia-based cleaners and solvents, such as acetone.



### Checking/replacing the mains fuse

**The equipment must be independently isolated from the mains voltage supply before any attempt is made to change the protective fuse. The fuse and its cover must always be replaced before the equipment is reconnected to the mains voltage supply.**

Only use the correct replacement type when changing the fuse. Fuse specification is printed on the rear cover.

To remove the fuse, pull out the fuse drawer (see "Mains input" on page 16). Then, prise out the fuse from the furthest compartment (the nearest compartment is for a spare fuse); a small, flat-bladed screwdriver may be useful for this.

Insert a new fuse in the rear fuse compartment, and close the drawer.

After replacing a fuse, check that the unit is working properly.

Always ensure that there is a spare fuse available.

### Special accessories

To comply with part 15 of the FCC Rules, any special accessories (that is, items that cannot be readily obtained from multiple retail outlets) supplied with this equipment must be used with this equipment; do not use any alternatives, as they may not fulfil the RF requirement.

### Optional equipment

Unless advised otherwise, optional equipment must only be installed by service personnel and in accordance with the appropriate assembly and usage regulations.

### Equipment disposal

When this equipment has come to the end of its useful life, its disposal may come under the DIRECTIVE 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on waste electrical and electronic equipment (WEEE).

Hazardous substances in WEEE contaminate water, soil and air and ultimately put at risk our environment and health. The directive aims to minimize the impacts of WEEE on the environment during their life times and when they become waste.

The WEEE directive addresses the disposal of products when they have reached the end of their life and contributes to the reduction of wasteful consumption of natural resources. This will help to reduce pollution, and protect the environment and ourselves.



If this equipment carries a 'crossed-out wheellie bin' (shown left), please do not dispose of WEEE as unsorted municipal waste but collect and dispose of in accordance with local WEEE legislation. The horizontal bar underneath indicates that the product was placed on the EU market after 13th August 2005.

For WEEE disposal, see our website at [www.klarktechnik.com](http://www.klarktechnik.com) for information.



Thank you for reading through this Operator Manual.  
We hope you found it useful.

Please feel free to send us your comments.  
Our contact details and website address can be found  
at the front of this manual.



**KLARK TEKNIK**  
SIGNAL PROCESSING BY DEFINITION

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