SupriMAX-3U

Hardware and Reference Manual
Rev. 1.0 April 09

MUSICAM USA

CCS

SupriMAX Manual

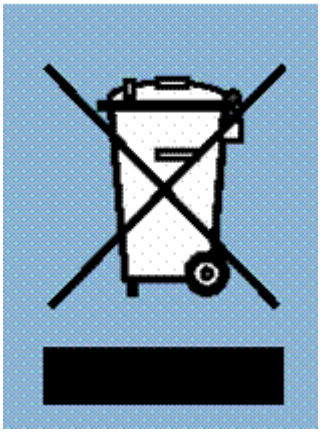
Table of Contents

SupriMAX Manual

CE Declaration of Compliance

CAUTION

SupriMAX uses a Lithium battery.
Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturers instructions.



Your product is designed and manufactured with high quality materials and components, which can be recycled and reused.

When this crossed-out wheeled bin symbol with black bar underneath is attached to a product it means that product is covered by the European Directive 2002/96/EC.

Please, inform yourself about the local separate collection system for electrical and electronic products.

Please act according to your local rules and do not dispose of your old products with your normal household waste. The correct disposal of your old product will help prevent potential negative consequences for the environment and human health.

SupriMAX Manual

Chapter I

INTRODUCTION

SupriMAX has been designed to provide a high density Audio over IP platform. The system is based on a 19" 3U chassis which can house up to 14 IP audio codec cards or up to 7 couples of ISDN/X21+IP cards. Each IP audio codec card is based on the successful ProntoNet IP codec, which mechanic has been adapted to be connected as a compactPCI card. All features present in a ProntoNet are available on SupriMAX, providing the best space-saving solution when many IP audio codecs are required.

All modules support **hot-swapping** allowing live insertion and extraction while the unit is running. This means that it is possible dynamic reconfiguration and easy maintenance.

SupriMAX comprises power supplies modules and the numbers of audio cards that users need. Two power supplies modules can be fitted, one main and one redundant. The power supply switch over is hit-less for any communication in progress.

SupriMAX supports individual remote control of each IP audio codec via embedded web server or global system centralized management via ProdysControl application including a centralized alarms receiving centre.

I.1 The set of Manuals

The Suprima IP Family User Manual is applicable to most of the common features provided by the Suprima IP Family of codecs.

For some specific features or restrictions, the user is referred to the proper Hardware and Reference Manual applicable to the codec in use. Installation requirements, physical and electrical parameters are also included in this document.

Hardware and Reference Manuals are available for:

- Suprima
- Suprima LC
- Suprima IP Decoder
- SupriMAX
- SupriMAX-1U
- RoadWarrior
- RoadWarrior LC

Suprima Family IP codecs provide the user with a control protocol which allows the user to develop customized management software. The control interface for this protocol is either the RS232 serial port or the Ethernet port. For detailed description please refer to the Suprima IP Family codec SDK User's Manual.

I.2 Hardware and Reference Manual

The information is arranged in the following sections:

- **Chapter II – Overview.**
  This chapter describes the main features of SupriMAX and its components.

- **Chapter III – Installation Guide.**
  This chapter provides hardware requirements and instructions for installing the **SupriMAX** unit.

- **Appendix A – Technical Specifications.**

SupriMAX Manual

Chapter II

OVERVIEW

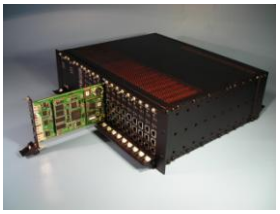
SupriMAX architecture is based on a midplane where can be accommodated up to 14 audio codec cards and a backplane for one or two power supplies. Both midplane and backplane are passive to help ensure high reliability, that is, they contain no active logic, just connectors and traces. All cards are hot-swappable and can be installed without interrupting the operation of the system.

The midplane performs the following functions:

- Provides a mechanical connection for all codecs cards.
- Provides the 12 VDC power from the power supply to each codec card.
- Provides the interconnection between the codec card and the audio interfaces located on the rear panel.

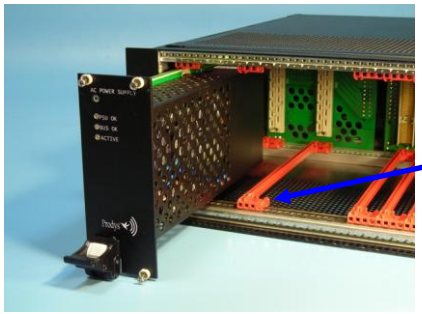
Consequently, each audio over IP codec card actually consists of two cards: the front card which is in charge of the communications and the transition card with the audio interfaces:






Each audio over IP codec card is totally independent from each other and there is not a control module to manage all of them. Therefore, it is necessary to connect the Ethernet interface of each card in order to gain access to it. It is possible to install one ISDN/X21 card per IP card (up to 7 couples). This ISDN/X21 card does not require the installation of any additional audio I/O card.

SupriMAX can accommodate up to 2 power supplies. The base system comes fitted with one 200 watt power supply as standard, but optionally one power supply can be added to provide redundancy in the event of a power supply failure.
The power supply requires no configuration but it is possible to monitor their status through the web page of each card or from the Prodys Control application.



Slot for redundant power supply

II.1 SupriMAX Components

II.1.1 Main power supply.

The same power supply can work as Master or Slave and it is the slot where it is installed which decides the operation mode: if the power supply is installed in the left most slot, it will work as Main power supply and if it is installed in the second one, it will work as secondary power supply.

Power supply requires no special setup. As long as it is installed (plugged) into the slot and power is applied, it is operating. It is possible to monitor its status from the web browser control of each card or from the Prodys Control application.

LED's description:

PSU OK	AC power present	• Green → AC power is available to the Power supply. • Orange → AC power supply is NOT available to the Power supply.
BUS OK	Backplane power supply	• Green → Backplane power supply OK. • Off → Power supply backplane fail.
ACTIVE	Power supply active	• Green → Power Supply operating. • Orange → Power supply as backup.

On the rear panel there are two separated AC power inlets, one for the Main power supply and the other one for the secondary or backup power supply.

II.1.2 Secondary power supply:

Each SupriMAX system can contain a second power supply for redundancy. If the main supply fails, the system will continue operating using the redundant power supply. To install a redundant power supply, simply insert the second power supply into the redundant power supply slot (its LED indicators will light up identically to those in the main supply).

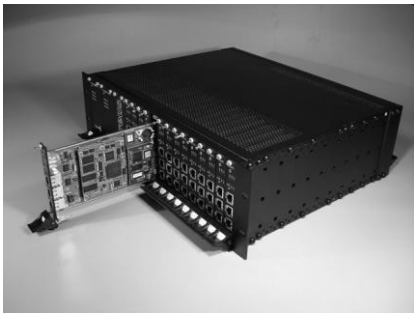
When a power supply fails it may be removed and a new power supply module inserted without powering down the system. Given that there are independent power connectors for each power supply, the insertion of a new power supply with its plugging connected must be avoided.

It is always installed in the second slot of the power supply backplane.

II.1.3 Audio over IP codec cards:

The audio over IP codec cards are totally independent and contain all the necessary interfaces to work with them. Each codec actually consists of two cards: one is installed on the front panel and the other one with the audio connections, on the rear panel. There are 14 slots in the midplane where they can be installed.

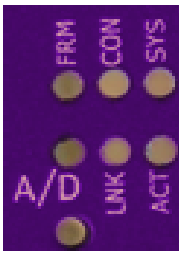
SupriMAX Manual



The front panel connectors and LEDs are the following:

- LAN connector: The LAN socket is a standard 100Base-Tx (10/100 Mbps) Ethernet connection that takes a RJ45 plug. Through this Ethernet port it is possible to transmit and receive audio, as well as manage the equipment.
- RS232 connector: It allows the transmission and reception of auxiliary data along with the encoded audio in IP communications.
- GPIO connector: The GPIO port connector allows remote control/signalling by means of remote contact closures. There are four ground contact inputs and open collector outputs.

LED Description:



	Functionality	
FRM	Decoder status	• Green → Decoder framed. • Off → Decoder NOT framed.
CON	Communication status	• Green → Line connected. • Off →
SYS	System status	• Green → Normal operation. • Green blinking → Booting process. • Red → Alarm activated. • Red blinking → Sw updating in process. • Orange → Past alarm.
A/D	Audio input selected	• Green → Analog input selected. • Red → Digital input selected.
LNK	LAN connection status	• Green → LAN connected (physical level detected). Good connection between the card and network. • Red → LAN disconnected. No connection between card and network.
ACT	Rx LAN activity	• Green → Data from the LAN detected. • Off → No data detected.

There is a mechanical switch close to the LED's to select manually between analog or digital audio input.

On the rear panel the audio interface cards are installed, with two separated connectors for analog and digital interfaces.

II.1.4 Audio over ISDN/X21 cards

The audio over ISDN/X21 card is optional and contains the necessary interfaces to stream audio over ISDN and leased lines (X21). Each ISDN/X21 card must be plugged along with an IP card. The IP card must be on the left side of the ISDN card. Therefore, up to 7 couples of IP+ISDN/X21 cards can be hosted by SupriMAX.

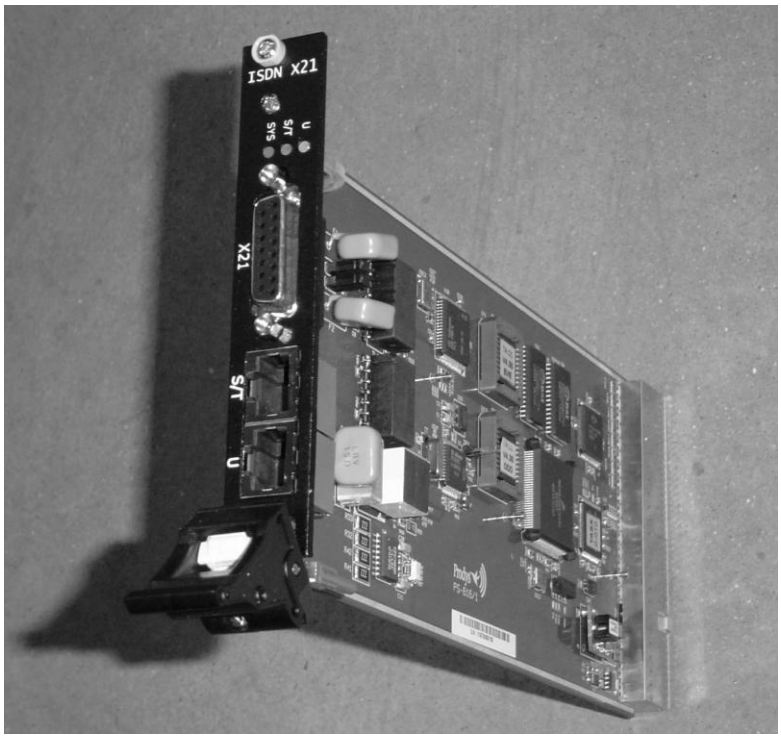
The front panel connectors are the following:

ISDN

- Protocols: EISDN, AT5ESS, DMS100 and NAT.
- 1 BRI connection. S/T and U interfaces.
- **BackUp system:** ISDN as a BackUp for IP or X21 links.
- RJ45 connector.

X21 Port

- Serial Synchronous interface.
- Bit rates: 64, 128, 192, 256, 384 and 576kbps.
- 15 Ways DB female connector.



SupriMAX ISDN + X21 board

Chapter III

INSTALLATION GUIDE

This chapter describes the SupriMAX hardware and user installation.

The installation and servicing instructions in this manual are for use by qualified personal.

III.1 Initial checks

Before unpacking the unit please check its packaging for any signs of damage or mishandling during transportation. Report any damage to the shipping company immediately. Unpack the unit carefully, if you find any damage or the unit does not work correctly, you should contact Prodys or its distributor as soon as possible.

III.2 Installation

SupriMAX is designed to be housed in a standard 19" rack. The unit is 44.45mm high (1U, or 1.75 inches). When choosing a suitable place for installation, please bear the following in mind:

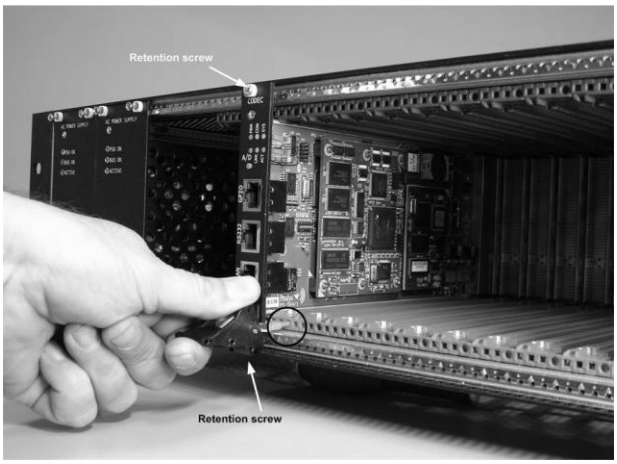
- The position must allow for easy connection of cables to the back of the unit.
- The front panel must also be accessible, both for connections and to be able to see the LED indicators.
- The air vents must not be obstructed.
- We do not recommended that the unit be mounted directly above other equipment, especially ones that generate a lot of heat.

III.3 Inserting and extracting modules

All cards are hot-swappable and can be installed without interrupting the operation of the system. The following instructions are valid for all modules, including the transition cards.

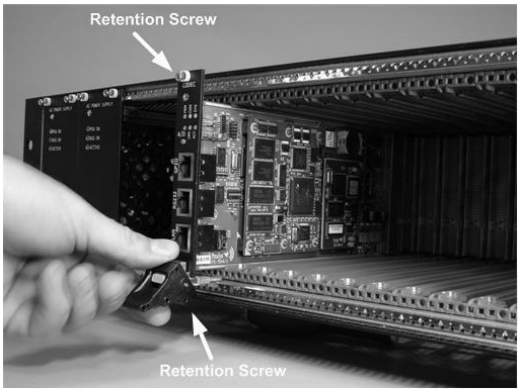
To install a new card follow the next instructions:

1. Slide the card into the appropriate slot making sure the alignment pin at the bottom of the end plate engage in its socket.
2. Using light finger pressure only, ensure the card is correctly aligned and pressed into the connector.
3. When you are sure that the card is positioned correctly, engage the lever simultaneously. The lever will click to indicate it is locked.
4. While sliding the board, ensure that the card extraction lever is aligned perpendicular to the card flange in the unlocked position and that the board connectors are aligned with the transition card connectors.
5. Locating screws should be fitted to secure the top and bottom of the card.



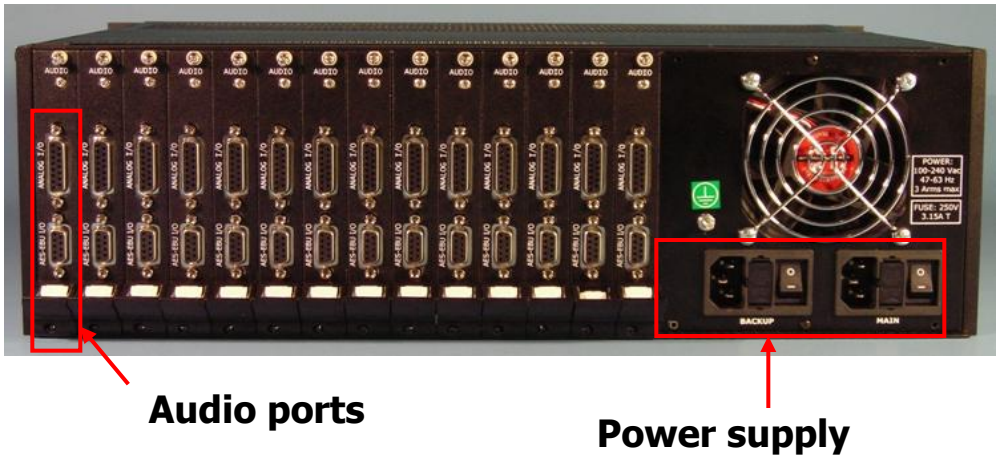
To extract a card follow the next instructions:

1. Remove the two retention screws located at the top and the bottom of the panel.
2. Press the lock of the lever and slide the card gently.



III.4 The rear panel

The connections of SupriMAX are spread between the front and rear panel. On the rear panel are found power and audio connections. The power supply is common for the whole system but any audio over IP card has its own audio connections.



III.4.1 Power Supply

On the back panel you will find the main power inlets, one for the main power supply and the other one for the secondary power supply. You will also find the main power switch and the fuse holder for each power input. SupriMAX is

designed to take AC universal power, from 100 to 240 VAC with frequency between 50Hz and 60Hz.

When it is necessary to replace either fuse, it is important to make sure that it complies with the technical specifications outlined below that will ensure adequate protection.

Fuse requirements:	
Fuse type:	Type T
Amps	2A
Power	250V

ATTENTION – CHANGING THE FUSE

Disconnect the power cable BEFORE changing the fuse.

WARNING!

HIGH VOLTAGE IS PRESENT WHEN THE UNIT IS PLUGGED IN.

TO PREVENT ELECTRICAL SHOCK, UNPLUG THE POWER CABLE BEFORE SERVICING.

POWER SUPPLY MODULE SHOULD BE SERVICED BY QUALIFIED PERSONNEL ONLY.

III.4.2 Audio interfaces

Each audio over IP card is actually divided in two different cards. One of them is installed from the front panel and the other one from the rear panel. This card contains the analog and digital audio interfaces and so their audio connectors.

Analog and digital connections are located in separated connectors: a 15 ways DB female connector for analog audio and a DB9 female connector for digital audio.

The audio input can be selected from the control software or from the front panel where a switch to select among analog or digital input is located.

Analog or digital outputs are both available at the same time.

The LED above the switch will indicate which input is selected:

- Green colour → Analog input selected.
- Red colour → Digital input selected.

III.4.2.1. Analog audio I/O

The analog audio I/O is connected through the DB15 connector. The wiring conforms to the following scheme:

Pin	Function	Pin	Function
1	NC	9	NC
2	NC	10	GND
3	GND	11	AUDIO OUT RIGHT -
4	AUDIO OUT RIGHT +	12	AUDIO OUT LEFT -
5	AUDIO OUT LEFT +	13	GND
6	AUDIO IN RIGHT -	14	AUDIO IN RIGHT +
7	GND	15	AUDIO IN LEFT -
8	AUDIO IN LEFT +		

These inputs and outputs are electronically balanced with a maximum level of +22 dBu.

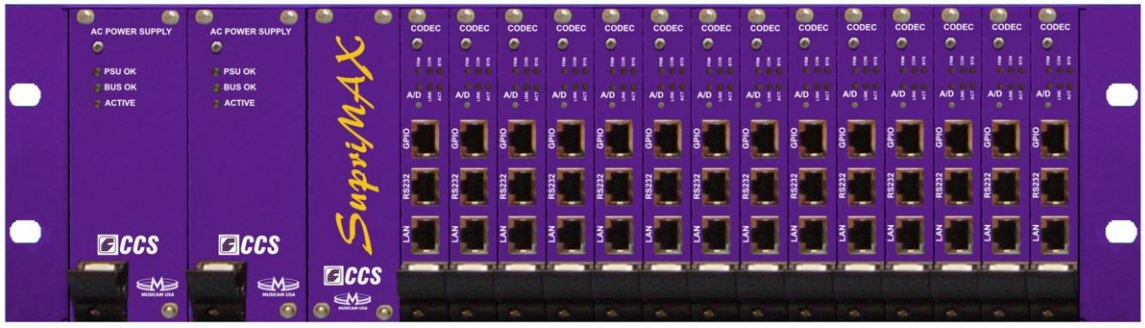
III.4.2.2. AES/EBU Interface

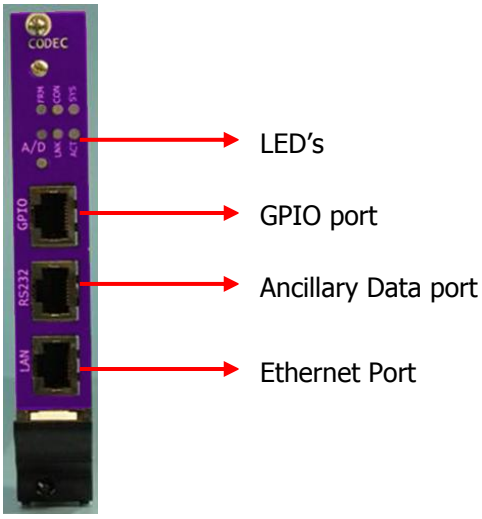
An AES/EBU interface is available via the Sub-D 9 ways female connector on the rear panel of each audio over IP card. This connector provides the option to connect an externally synchronised signal. The user can select via software if the digital output is to synchronise with the audio input or with an external sync signal. The connector is wired in the following way:

Pin	Function	Pin	Function
1	AES/EBU IN -	6	AES/EBU IN +
2	GND	7	SYNC +
3	SYNC -	8	GND
4	GND	9	AES/EBU OUT +
5	AES/EBU OUT -		

III.5 The Front panel

On the front panel of each card the communications interfaces are located. Each card has independent connections for each purpose, that is, audio and management, ancillary data and GPIO connections.



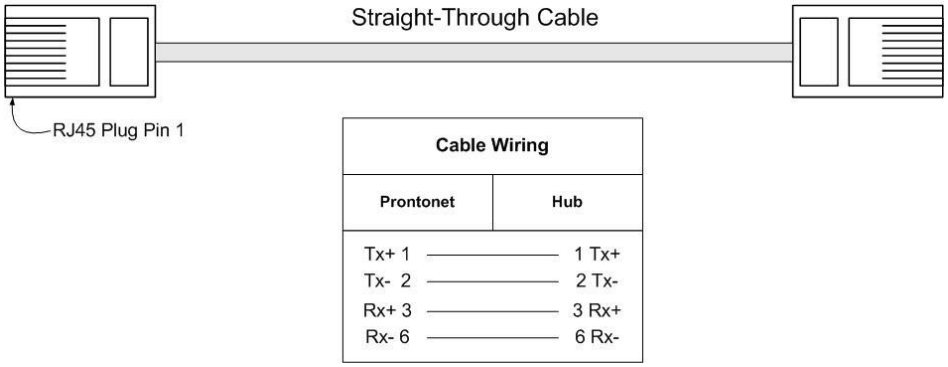


III.5.1.1. Ethernet port – the LAN Connector

The LAN socket is a standard 10/100Base-Tx (10/100 Mbps) Ethernet connection that takes the typical RJ45 plug. Through this Ethernet port it is possible to transmit and receive audio, as well as to control the equipment.

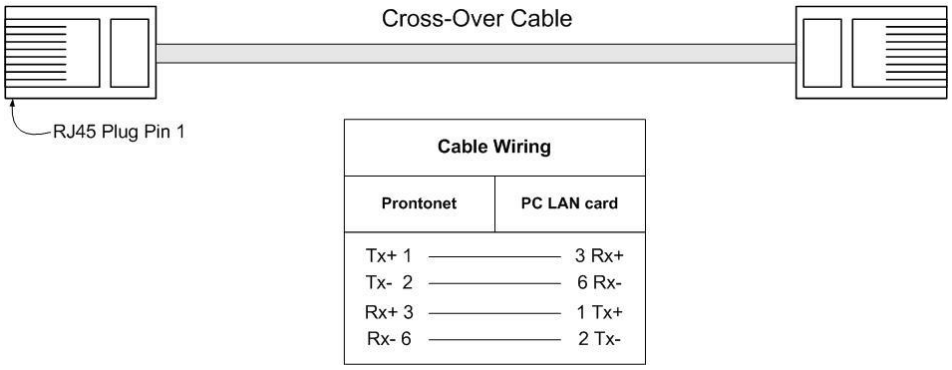
- **Connection to a Hub or Switch**

  In the majority of cases you can simply connect the unit's LAN port to your Ethernet network's Hub or Switch using an Ethernet cable (CAT5). In this case you should use a standard 'straight-through' Ethernet cable (not a 'cross-over' cable). This kind of cable can normally be found in any IT shop. In any case, this cable is described in more detail below:



- **Connection to a PC**

In some cases, such as when you configure the equipment, it is possible that you will want to connect the unit directly to a PC. In this case the PC must have a free Ethernet port to connect to and you must use a 'cross-over' Ethernet cable. Again, any good IT shop will stock these cables. This time the wiring is as follows:



III.5.1.2. ISDN Port (Optional)

The SupriMAX ISDN/X21 module incorporates an ISDN terminal adapter that allows connection to a basic ISDN line (2B+D). It supports different ISDN protocols (EURO_ISDN, DMS100, AT&T 5ESS and NAT1). To connect there are two RJ45 connectors: one for connecting to an S/T interface and the other for connecting to a U interface.

Pin	S/T Connector	U Connector
1	NC	NC
2	NC	NC
3	Tx +	NC
4	Rx+	RING
5	Rx-	TIP
6	Tx-	NC
7	NC	NC
8	NC	NC

- **The U connector is only available if an NT1 interface is installed.**

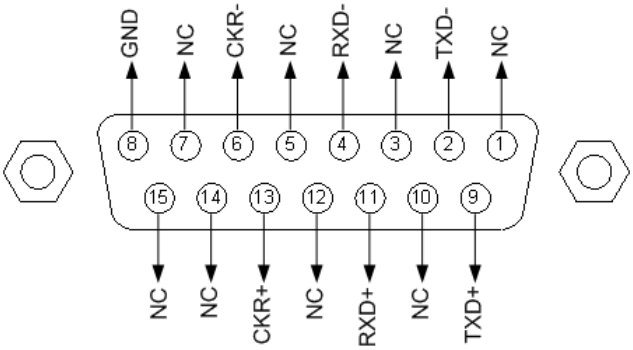
- **The NT1 interface is optional and is not supplied as standard.**

When SupriMAX is connected to a basic rate interface with bus configuration and the unit is the termination point, it must be loaded with 100 Ohm resistors. These may be already fitted in the connection socket, if you do not have external termination; SupriMAX ISDN module has jumpers available internally that can be set to terminate the ISDN line. The jumpers are found next to the RJ45 connectors.

100Ω RESISTORS CONNECTED

III.5.1.3. X21 Port (Optional)

The X21 Port of the ISDN/X21 SupriMAX module allows the transmission and reception of audio via a dedicated digital connection. The socket is the standard 15 ways sub-D with the following connections:



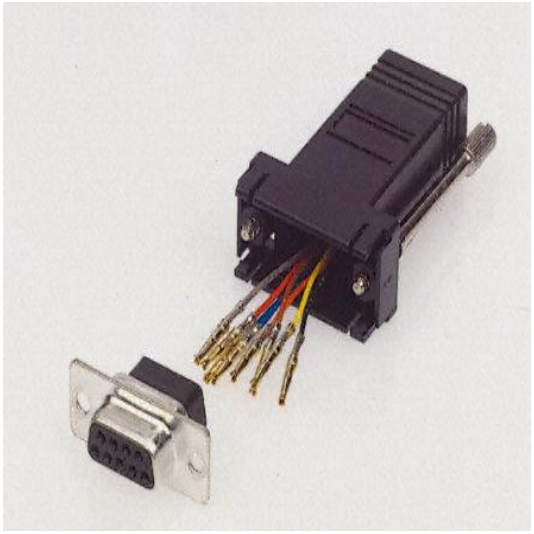
Pin	Function	Pin	Function
1	NC	9	Transmit Data TxD+
2	Transmit Data TxD-	10	NC
3	NC	11	Receive Data RxD+
4	Receive Data RxD-	12	NC
5	NC	13	Clock +
6	Clock -	14	NC (Internally used)
7	NC (Internally used)	15	NC
8	GND		

To connect a V35 port one must bear in mind the following correlation between signals:

Pin	X21 ProntoNet	V35 Signal
2	Transmit Data TxD-	P
9	Transmit Data TxD+	S
4	Receive Data RxD-	R
11	Receive Data RxD+	T
6	Clock -	V
13	Clock+	X

III.5.2 RS 232 Port

The RS232 port is for use as auxiliary data port. This port allows the transmission and reception of data along with encoded audio. Note that this socket is RJ45 connector, as opposed to the typical Sub-D 9 ways connector. To make the conversion between RJ45 and RS232 Sub-D connector there are modular connectors available that should be wired as follows:



Nereus RJ45 Connector	9-pin female D-sub Connector
1 (NC)	1
2 (Rx)	3
3 (GND)	5
4 (NC)	4
5 (NC)	6
6 (GND)	7
7 (Tx)	2
8 (NC)	8

1,4,5,8 must be unconnected

The port is always set to 8 DATA bits, NO parity, 1 START bit and 1 STOP bit. The bit rate can be adjusted to between 300 and 9600 bps via software.

Each card acts as a DCE device; therefore the connection to each of the RS232 ports is wired in the following way:

SupriMAX audio over IP card – Pin 7 connector RJ45.....Pin 2 PC

SupriMAX audio over IP card – Pin 2 connector RJ45.....Pin 3 PC

SupriMAX audio over IP card – Pin 3,6 connector RJ45.....Pin 5 PC

Hardware handshaking signals are ignored.

III.5.3 GPIO Port

A RJ45 socket provides a general purpose connection with 4 inputs and 4 outputs. The connections must be wired according to the following diagram:

Pin	Function	Pin	Function
1	INPUT 4	5	OUT 4
2	INPUT 3	6	OUT 3
3	INPUT 2	7	OUT 2
4	INPUT 1	8	OUT 1

III.5.3.1. Inputs

The inputs are active for grounding (active low).

Ground is connected to the shield of the RJ45 GPIO connector.

III.5.3.2. Outputs

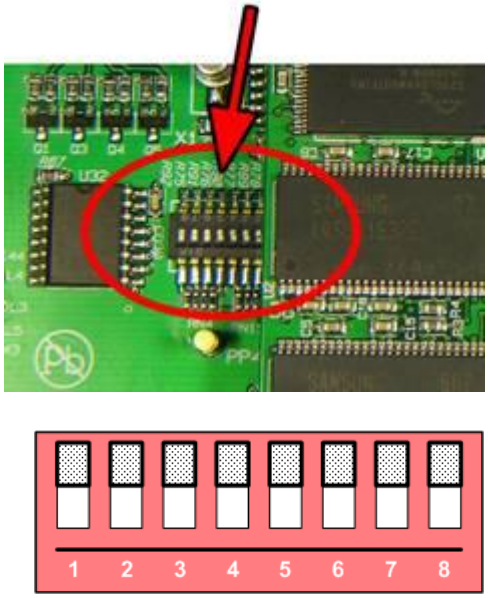
The outputs are "open collector". They allow an output of 5VDC on one pin to facilitate interconnection with the outputs. Each output supports up to a maximum of 40VDC / 40 mA and will require a pull-up resistor to function with other logic inputs. An appropriate value is 2.2 KOhms.

III.5.4 LED's Description

	Functionality	
FRM	Decoder status	• Green → Decoder framed. • Off → Decoder NOT framed.
CON	Communication status	• Green → Line connected. • Off → Line disconnected.
SYS	System status	• Green → Normal operation. • Green blinking → Booting process. • Red → Alarm activated. • Red blinking → Sw updating in process. • Orange → Past alarm.
A/D	Audio input selected	• Green → Analog input selected. • Red → Digital input selected.
LNK	LAN connection status	• Green → LAN connected (physical level detected). Good connection between the card and network. • Red → LAN disconnected. No connection between card and network.
ACT	Rx LAN activity	• Green → Data from the LAN detected. • Off → No data detected.
PSU OK	AC power present	• Green → AC power is available to the Power supply. • Orange → AC power supply is NOT available to the Power supply.
BUS OK	Backplane power supply	• Green → Backplane power supply OK. • Off → Power supply backplane fail.
ACTIVE	Power supply active	• Green → Power Supply operating. • Orange → Power supply as backup.

III.5.5 Microswitches

There are 8 microswitches (SW1 label on the main board) which are reserved for special functions. Before turning on the unit the user must check that they are configured according to the following diagram, which is the standard start-up configuration:



Switch number 7 will restore the default factory configuration. The IP address will be changed to 192.168.100.100 and the netmask to 255.255.255.0.

SupriMAX Manual

Appendix A

TECHNICAL SPECIFICATIONS

IV.1 Audio Interfaces

IV.1.1 Stereo Audio Inputs:

- Balanced Analog inputs:
  Maximum input level: +22 dBu.
  Input Impedance: 20 Kohm.

- Digital inputs:
  AES/EBU format: EIAJ CP-340 tipo I/IEC-958 Pro
  Rate Converter: 1:3 to3:1.

IV.1.2 Stereo Audio Outputs:

- Balanced Analog Outputs:
  Maximum output level: +22 dBu.
  Output Impedance: 50 ohm.

- Digital Outputs:
  AES/EBU format: EIAJ CP-340 tipo I/IEC-958 Pro
  Rate Converter: 1:3 to 3:1.

IV.1.3 Audio properties*:

THD+N<0.0035%
S/N > 94 dB typical.
Crosstalk > 94 dB.
Phase Difference < 0.3º.
Quantification: 24 bits.

***With a tone of +22 dBu, Fs=48 Khz, 24 bits**

IV.2 Communications Ports

IV.2.1 ISDN[1]

- Protocols: EISDN, AT5ESS, DMS100 and NAT.
- 1 BRI connection. S/T and U interfaces.
- **BackUp system:** ISDN as a BackUp for IP or X21 links.
- RJ45 connector.

IV.2.2 X21 Port[2]

- Serial Synchronous interface.
- Bit rates: 64, 128, 192, 256, 384 and 576kbps.

IV.2.3 LAN port

- 10/100 Base-TX Ethernet.
- Connector type: RJ-45

IV.2.4 GPIO Port

- 4 TTL inputs and outputs.
- Inputs: Closure to ground.
- Outputs: Open collector. 40 mA Max o 40 VDC max.
- Connector Type: RJ45

IV.2.5 RS232 Port

- RS232 bi-directional asynchronous
- Supports data rates to 38.4 Kbps.
- Connector Type: RJ45

[1] Available on the optional ISDN/X21 module.

[2] Available on the optional ISDN/X21 module.

IV.3 Power Supply

- Universal power Supply
- Operating Voltage: 94-250 V
- Operating Line frequency: 47-65 Hz.
- Power Consumption < 150 W.

IV.4 Dimensions

- 3 U – 19" Rack Mount.
- Depth: 14.2913 in.

IV.5 Environment

- Temperature: 0 – 50ºC.
- Humidity: 10 to 90% non-condensing.