

PRODUCT OS308M

8 CHANNEL MINI MULTIPLEXER FOR TELECOMMUNICATIONS.

USER MANUAL 09 March 2004

## OS308M Test Certificate

Model no: \_\_\_\_\_ Description: \_\_\_\_\_

Serial no: \_\_\_\_\_ Job no: \_\_\_\_\_

No	Test	Parameter	Result	Passed
Optic	Power supply	5V/-5V		
	Optic transmit level			
	Minimum receive level			
	Receive VCXO centre freq	16.384MHz		
	PLL Voltage	2.5V		
	Optic bypass	No controller card		
Control	PSU	12V/5V		
	Power up sequence			
	Alarm contact	Fibre/Power fail		
	Master osc frequency	16.384MHz		
	DTE VCXO centre freq (P10)	16.384MHz		
	PLL Voltage (P9)	2.1V		
Exchange	PSU	5V/-5V		
	Audio Tx level	0dB +- 0.2		
	Audio Rx level	0dB +- 0.2		
	Ring detect			
	16kHz detect			
	Line loop			
Telephone	PSU	5V/-5V		
	Audio Tx level	0dB +- 0.2		
	Audio Rx level	0dB +- 0.2		
	Ring voltage	55Vrms		
	17Hz ring signal	1.5Vrms		
	16kHz meter signal	1Vrms		
	Loop current	24mA		
4W	PSU	5V/-5V		
	Audio Tx level	0dB +- 0.2		
	Audio Rx level	0dB +- 0.2		
	E & M signalling			
Data	PSU	5V/3.3V/2.5V		
	Configured			
	Asynchronous	19200bps Single Ch 9600bps Dual Ch		
	Synchronous	64000bps		
	DCE/DTE test			

Tester: \_\_\_\_\_

Date: \_\_\_\_\_

Remarks: \_\_\_\_\_

PRODUCT OS308M

8 CHANNEL MINI MULTIPLEXER FOR TELECOMMUNICATIONS.

USER MANUAL



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# 1 PRODUCT DESCRIPTION

## 1.1 GENERAL

The OS308M is an 8 Channel 64kbps audio drop and insert multiplexer. The OS308M forms part of a telecommunication system operating in a ring network. The ring is controlled from a master unit named OS2030. The OS2030 is designed to transmit a 2 Mbps CCITT G703 data link over fibre. This unit interfaces between G704 CAS protocol and several OS308MUX units. The OS308M can also operate in a master mode allowing point-to-point operation with another OS304M on 8 channels.

The unit is housed in a 2U 19" card frame. It comes complete with its controller and power supply. Various optic and power supply options are available. The optic card plugs directly into the card frame. The power supply is mounted on the back of the unit.

The unit has built in 8-port bus system. It can house any combination of line terminating equipment. This equipment is in the form of individual cards and can be arranged and plugged into the card frame as required. At present the following modules are available.

Exchange unit stock code 'OS3081E'

This interfaces directly with an exchange line and simulates the functions of a telephone.

Telephone unit stock code 'OS3081T'

This unit can couple directly to a telephone and simulates the functions of an exchange.

4W E & M unit stock code 'OS3081W'

This is an audio interface with E & M signalling.

RS232 interface unit stock code 'OS3081R'

This unit has a DB25 connector and supports data speeds up to 64k bits/sec sync.

Asynchronous data can be transmitted up to 28800 bits/sec. Data is sampled at 64 k samples/sec thus jitter increases with baud rate.

X.21 V11 interface unit stock code 'OS3081X'

This unit has a DB15 connector and supports data speeds up to 64k bits/sec sync.

Asynchronous data can be transmitted up to 28800 bits/sec. Data is sampled at 64 k samples/sec thus jitter increases with baud rate.

The unit also supports standards such as RS422.

The OS308M can be configured to accept any of the above line terminating units.

To configure the OS308 a PC with dedicated software is required. The configuration can be downloaded directly to the unit using its RS232 port. Or it can be downloaded to the OS2030 master unit that will in turn forward the configuration to the OS308 via the supervisory channel.

The unit is modular in design and can thus be upgraded with different optics or power supply. The distance over which the system can operate is determined by the fibre interface used. The options are limited to 3, 12, 16, 24, 36, 50 and 70 Kilometres. The power supply can be replaced by exchanging the power supply module with a 220VAC, 110VAC or 48VDC unit. Other voltages can be supplied on request.

The system uses the latest technology in line driving and decoding integrated circuits and therefore complies fully with the stringent CCITT standards.

The unit is housed in a 19" rack with a height of 2U.

#### Software upgrades

Should it be required, new software for the OS308 unit can be downloaded to the OS2030 master unit that will in turn forward it to the slave units. New software can also be installed using a pre programmed EEPROM. These are available from the supplier.

#### Setting up of channel configurations.

The software running on a PC also allows setting up of line configurations and gain adjustments for each time slot / channel. Once the alterations are done it must be downloaded. The alterations will take effect after a short delay. A Backup copy of the configuration for a particular system can be stored on the system disk. The unit will be able to allocate timeslots to users as per selection from the management system.

The unit has a built in framer. The framer will take the received data and re-time the data for transmission further down the line. Whenever a timeslot allocated to a particular outstation is reached, the time slot will be dropped off to the correct line interface and the interface data is then inserted in the frame.

#### Telephone line interface

The line interface will consist of a CODEC that is programmed by the intelligent unit.

The CODEC will be programmable and will control the following.

Transmit gain adjustable over a 10dB scale in steps of 0,1dB. Max gain is 6.9dB.

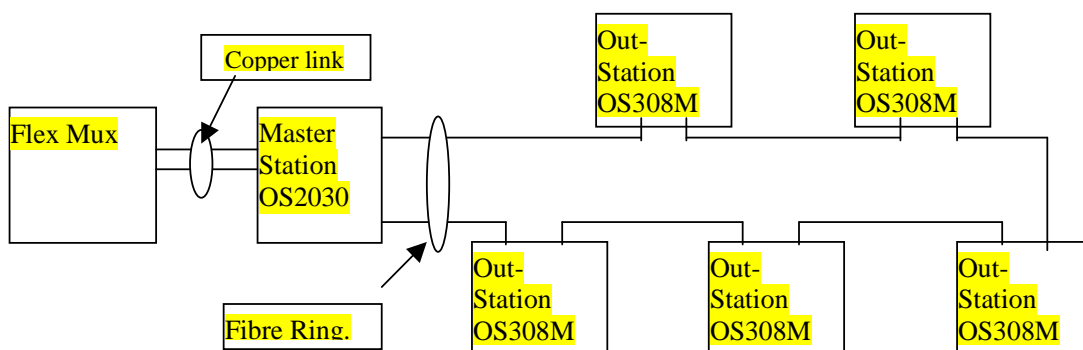
Receive gain adjustable over a 10dB scale in steps of 0,1dB. Min sensitivity is -18dB

Adjustable Hybrid balance registers.

A dipswitch setting will identify the location of the OS308M.

Note that dipswitch number 4 will select between master and slave in a point-to-point system.

The system operates over a single Fibre ring. The optical interface can be interchanged to suit the application.



## 1.2 ALARMS AND INDICATIONS

Power indication

Indicates power to the processor.

Lock indication

Indicates optic receive data valid.

Ring and loop

Each channel has a ring and loop indication mimicking the signalling to that channel.

## 1.3 DIP SWITCH SETTINGS

### 1.3.1 CONTROLLER

The OS308M (which handles 8 x peripheral cards) is essentially a dual OS304M (this could handle 4 x peripheral cards). For compatibility reasons the setting of the address (SW1/2/3) of the controller card has been arranged as follows:

SW1	SW2	SW3	OS304M	OS308M
Off	Off	Off	Addr = 1	Addr = 1 + 2
On	On	Off	Addr = 2	
Off	Off	On	Addr = 3	Addr = 3 + 4
On	On	On	Addr = 4	
Off	Off	Off	Addr = 5	Addr = 5 + 6
On	On	Off	Addr = 6	
Off	Off	On	Addr = 7	Addr = 7 + 8
On	On	On	Addr = 8	

From the above table it can be seen that SW1 on the OS308M is not used as SW2 and SW3 fully define the dual address/Station that each OS308M can be set to. These addresses/stations are important because they are used in conjunction with the Timeslot tab in the Management software (see manual) to determine the set-up of the system

SW4 is used to determine the Master or Slave configuration. The default is OFF (Slave)

### 1.3.2 DATA CARD (RS232/RS485/X.21)

The data card dipswitch settings look as follows

1200/4800/9600/19200/64000/DTE/DUAL/CLKINV (SW1/2/3/4/5/6/7/8)

1200/4800/9600/19200/64000	- sets the synchronous clock rate (default all OFF)
DTE	- switches to DTE mode (default OFF is DCE)
DUAL	- switches on dual port capability (default is OFF, single)
CLKINV	- clocks sync data on +ve edge (default is OFF, -ve edge)

### 1.3.3 TYPICAL SETUPS

#### Controller Master (OS308M) – Controller Slave (OS308M)

Master Controller dipswitch X/OFF/OFF/ON

- SW4 is ON to indicate the Master
- SW1/2 are OFF/OFF indicating addresses 1+2 (see above)

Slave Controller dipswitch X/ON/OFF/OFF

- SW4 is OFF to indicate SLAVE
- SW1/2 are ON/OFF indicating addresses 3+4 (see above)

In this set-up the first 8 slots in the Timeslot tab of the management software would set up the first 8 peripheral cards in the Master unit. This corresponds to Stn 1 Line 1 to Stn 2 Line 4. The timeslots would typically be set to TSTx from 1-8 and TSRx

from 1-8. The next 8 slots in the Timeslot tab of the management software would set up the second 8 peripheral cards in the Slave unit. This corresponds to Stn3 Line 1 to Stn 4 Line 4. For these to work with the Master unit the timeslots would also then be set to TSTx from 1-8 and TSRx from 1-8. This will then allow the first two cards to communicate with each other (e.g. Tel and Exc card) etc.

#### Data card

When one data card (RS232/RS485/X.21) communicates with another (between Master and Slave units), these cards can be set up to communicate in a number of different ways.

1. Asynchronous (OFF/ OFF/ OFF/ OFF/ OFF/ OFF/ OFF/ OFF) – This typical condition allows data to be transferred in full duplex at up to 19200kbaud between the two data cards. The data is sampled at 64kbits/sec and therefore a certain amount of jitter will be present. This jitter will get less the lower the baud-rate that is used. At present no handshake signals are transferred in SINGLE mode. If DUAL is chosen then the second channel can be used to transfer RTS albeit that the first channel can then only transfer data at a maximum rate of 9600Baud.
2. Synchronous DCE 1200baud–19200 baud (X/X/X/X/OFF/OFF/OFF/OFF). This configuration provides a clock (selected by setting one of the X baud-rates) generated by the data card to be output on each data card connector. This clock is used by the connected DTE equipment to clock data into the card. The actual data is however still sampled at 64kbits/sec and transferred as in example 1 above.
3. Synchronous DCE - 64kbaud (OFF/OFF/OFF/OFF/ON/OFF/OFF/OFF). This configuration provides a clock generated by the data card to be output on each data card connector at a rate of 64kbits/sec. This clock is used by the connected DTE equipment to clock data into the card at the highest possible rate. The data is not sampled but sent at the maximum rate.
4. Synchronous DTE - 64kbaud (OFF/OFF/OFF/OFF/OFF/ON/OFF/OFF). This configuration locks onto a 64kbit/sec clock generated by an external DCE device. This causes the OS308m Master unit to lock onto an external device.  
**Only one card per system can be configured in this way.**

See ANNEXURE A5 for typical data card applications

## **1.4 MANAGEMENT FACILITIES**

The unit is equipped with an RS232 connector, which enables the unit to be configured. A dedicated software package (Mini-mux management software) that runs under windows allows setting up of time slots and interface options.

If the configuration is known at the time of manufacture the units can be delivered pre-configured. Alternatively it is necessary to configure the system before it can be operated. Special configuration facilities can be accessed using the software package on a portable computer.

The software allows the following facilities.

Uploading and Downloading of software on the OS2030

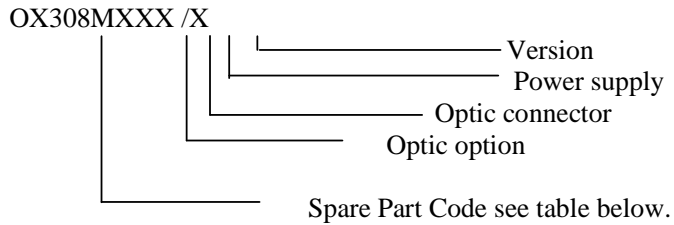
Should it be required, new software for the OS308M unit can be downloaded. The user can choose which software must be downloaded. Once downloaded the unit must be reset for the software to be become active. This is done automatically in a properly installed system.

Setting up of channel configurations.

The software also allows setting up of line configurations and gain adjustments for each time slot. Once the alterations are done it must be downloaded. The alterations will take effect after a short delay. A Backup copy of the configuration for a particular system can be stored on the system disk

## 2 SPARE PART CODES

Define stock code and add spare part code in second character position.



### SPARE PART OPTION

Spare Part Code	Description
A	POWER SUPPLY CARD
B	PROCESSOR CARD
C	OPTIC CARD
D	DISPLAY CARD
E	19" CARD FRAME
F	BACKPLANE
G	POWER CABLE

Additional Spare parts

Stock Code	Description
OS3081E	Line interface unit for Exchange
OS3081T	Line interface unit for Telephone
OS3081W	Line interface unit for 4W E & M
OS3081R	Data interface RS232
OS3081X	Data interface X.21 V11

## 3 PREPARATION FOR USE

### 3.1 UNPACKING

Check for physical damage caused during transport. Return any damaged equipment.

### 3.2 INSTALLATION

See connection diagram annexure 'A3'.

Check the Voltage supply rating of the equipment before installation commences.

Ensure that the link loss over the fibre cable is within the power budget of the equipment. See the model number and optic option.

AUTHOR: W.J.W.V.

ISSUE: 1.32

The unit is installed in 19" rack

Connect the chassis earth leads to the card frame. It is very important to properly earth all equipment.

Connect the Line and optic cables. The Optic link must be connected local transmit to remote receive and visa versa.

It is necessary to observe the modules with which the unit is equipped and to connect the circuits according to the attached diagrams. Should it be necessary to change the line interface units it is important to power down the complete unit. Then carefully replace the line interface module with the required unit. Then also make sure the correct configuration is programmed for that interface.

When circuits are used that are exposed to lightning and other EMI interference these lines must have additional protection.

It is very important to earth the system properly to protect against any interference.

If the alarm extension is required then connect the extension wire to the voltage free alarm contacts at the front of the unit.

Connect the power cable.

Should the unit operate on DC power then the D.C. power connections are shown on the rear panel.

The equipment has a on/off switch to ease power down in case of maintenance.

### **3.3 COMMISSIONING**

At switch on the unit will take some time to start up. It will then flash the red power indication on the controller card until all software is verified and loaded.

If the link is correctly connected the 'lock' indication will light up and the power indication will turn green.

## **4 OPERATORS INSTRUCTIONS**

The unit need no operator intervention to function, however when a fault arises, it is necessary to observe the alarm indications.

See maintenance instructions for any other functions.

## **5 MAINTENANCE INSTRUCTIONS**

### **5.1 INSTRUMENTS AND TOOLS REQUIRED**

Multimeter

Optic power meter

## **5.2 FIRST LINE MAINTENANCE**

When arriving at a suspect link it is necessary to note the alarm condition of the equipment.

First observe the power indication. If the power indicator is off then check the power supply. The AC unit has a fuse inside the connector at the rear and an additional fuse inside the unit. The DC unit has a fuse inside the unit. Replace it with a fuse of the correct value if necessary.

Next observe the alarm conditions.

‘Lock’

If the ‘Lock’ led fail to operate then the Fibre optic input signal has failed.

Measure the received optic power using the Optic power meter. A Level of  $> -28\text{dB}$  at 1300nm must be measured.

‘Ring and loop indications’

If in addition to the lock indication being off the power indication on the controller card flashes then it indicates corrupted software in the unit and new software must be downloaded to the unit. See the management manual ‘OS2030M’ on downloading of software.

## 6 SPECIFICATIONS

### POWER SUPPLY

115/230VAC 50/60Hz 15Watt  
-48VDC. 15Watt.

### OPTICAL

Connectors:

FC-PC/ST

Fibre Compatibility

Multi-mode 50/125 micron

Single-mode 9/125 micron

Optic power budget: >20dB on single mode fibre

: >10dB on multimode fibre

### FUNCTIONS

Indicators.

Power,

Lock,

Optic receive

Optic transmit

Dip switch.

Station select

Master/Slave operation.

### ALARM OUTPUT

Voltage free alarm output contact.

### PHYSICAL

Depth: 220mm Height: 60mm

Width: 480mm Weight: 1.5Kg

### ENVIRONMENTAL CONDITIONS

Temperature: -5°C to +45°C

Humidity: 0-95% non-condensing.

### TELEPHONE LINE CHARACTERISTICS

Impedance:

600 ohms on all circuits

Frequency response 300 to 3400Hz

Tel line parameters:

Line current: 24mA

Line Voltage: > 36VDC

Line ringing Voltage: 55VRMS 17Hz

Meter signal: 200mV RMS, 16kHz

Max loop resistance: 1500 ohms

Connection:

RJ11 6 pin

2W Tel and Exchange Card

Pin1: Nc

Pin2: Nc

Pin3: Line a

Pin4: Line b

Pin5: Nc

Pin6: Nc

4W E & M card

Pin1: E  
Pin2: Receive Audio a leg  
Pin3: Transmit Audio a leg, Tel a leg  
Pin4: Transmit Audio b leg, Tel b leg  
Pin5: Receive Audio b leg  
Pin6: M

DATA CARD CHARACTERISTICS

Baud rate: 64-kbaud sync  
Async : Up to 19200 baud, sampled at 64 k samples/second.  
Up to 9600 baud in DUAL mode.  
DUAL selected on front panel card, default SINGLE

RS232 V24 Connection.

DB25 female connector.  
Pin1 Shield  
Pin2 RS232 TX Data In  
Pin3 RS232 RX Data Out  
Pin4 RS232 TX Data In (In DUAL mode)  
Pin5 RS232 RX Data Out (In DUAL mode)  
Pin7 Ground  
Pin15 RS232 TX Clock Output  
Pin17 RS232 RX Clock Output  
Pin24 RS232 EXT Clock Input  
Pin12 +15V pullup  
Pin13 -15V pullup

X.21 V11 Connection.

DB15 Female connector.  
Pin1 Shield  
Pin2 + Receive data into OS308  
Pin9 - Receive data into OS308  
Pin4 + Transmit data out off OS308  
Pin11 - Transmit data out off OS308  
Pin 6 + Signal timing clock out  
Pin13 - Signal timing clock out  
Pin8 Ground

Dip Switch:

SW1 1200Baud  
SW2 4800Baud  
SW3 9600Baud  
SW4 19200Baud  
SW5 64000Baud  
SW6 DTE(ON)/DCE(OFF)  
SW7 DUAL(ON)/SINGLE(OFF)  
SW8 Inverts 'Clock Out'

AUTHOR: W.J.W.V.

ISSUE: 1.32

Led indications:

TX data

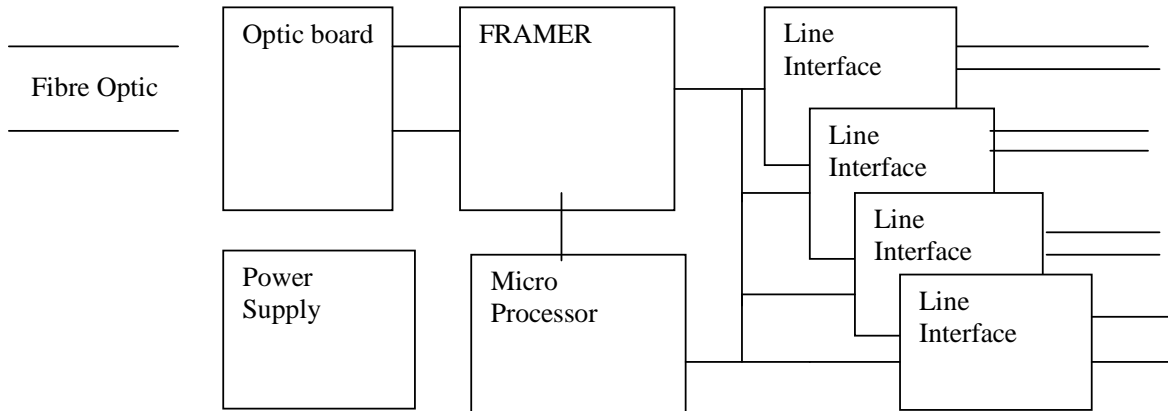
RX data

DTE (ON), DCE (OFF)

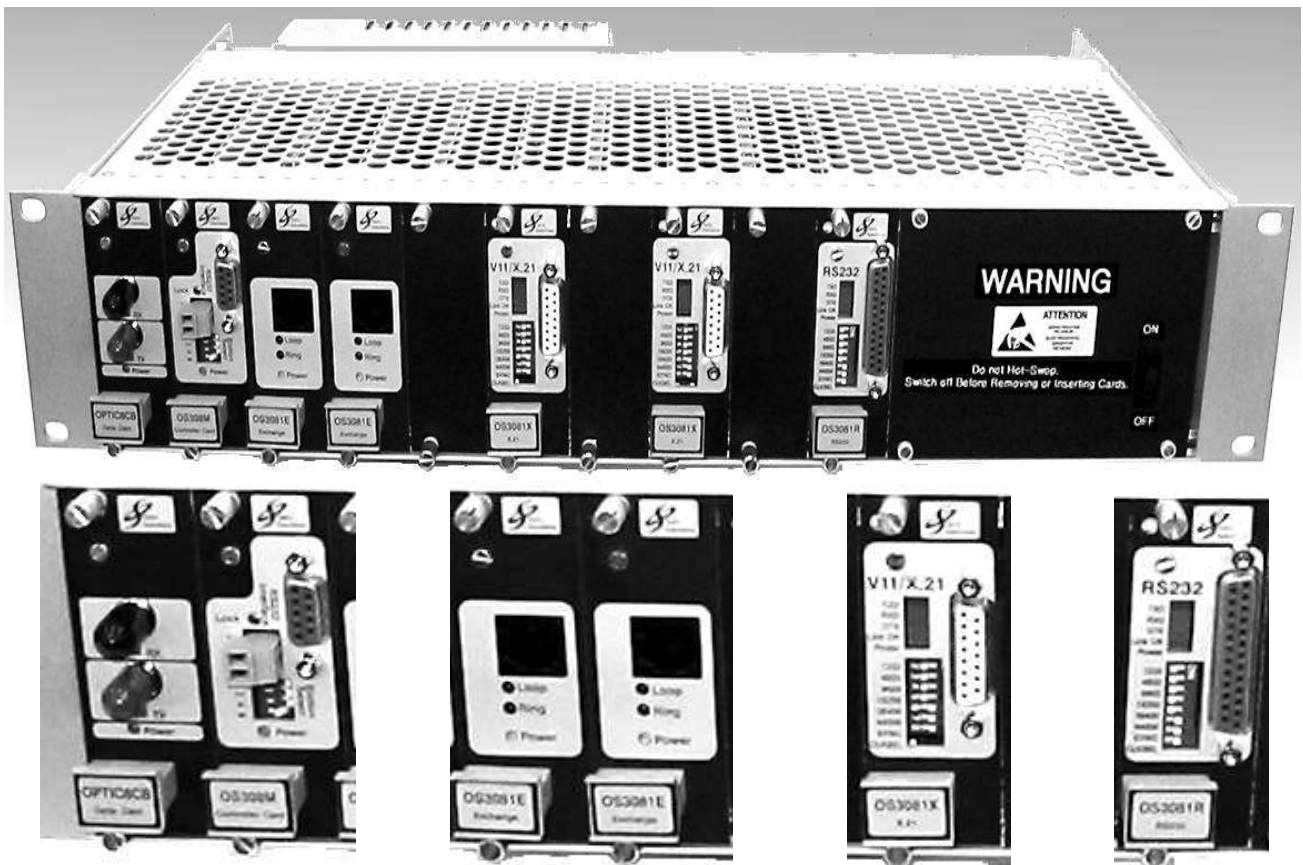
Dual (ON), Single(OFF)

Power Flashes when setting up or error and stays on when configured

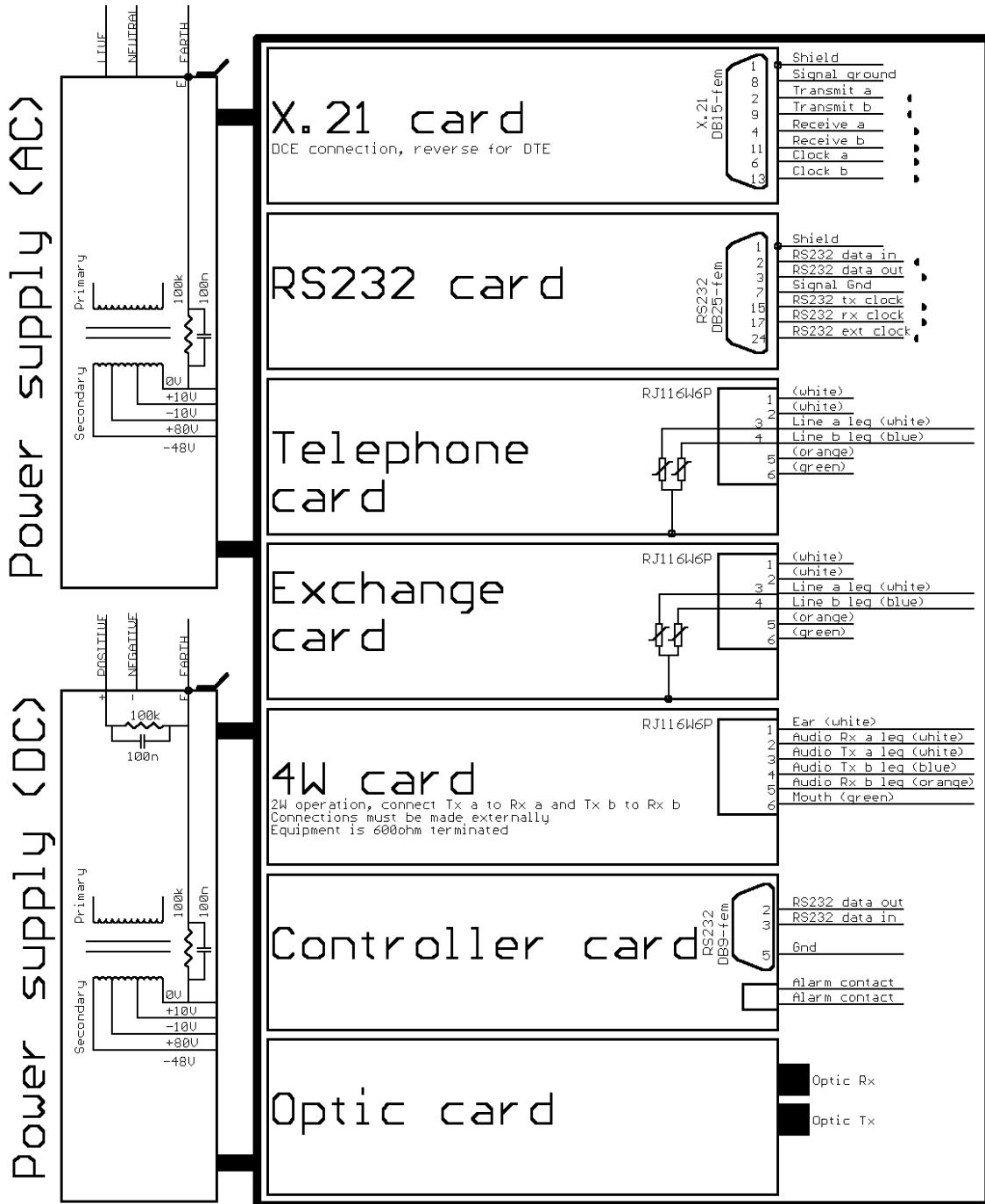
## 7 ANNEXURE A1 DATA FLOW



## 8 ANNEXURE A2 FRONT VIEW



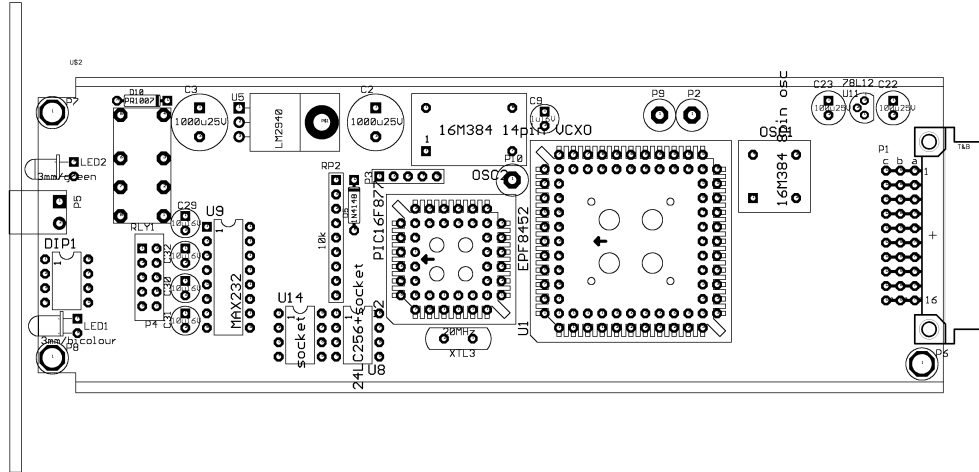
## 9 ANNEXURE A3 CONNECTION DIAGRAM.



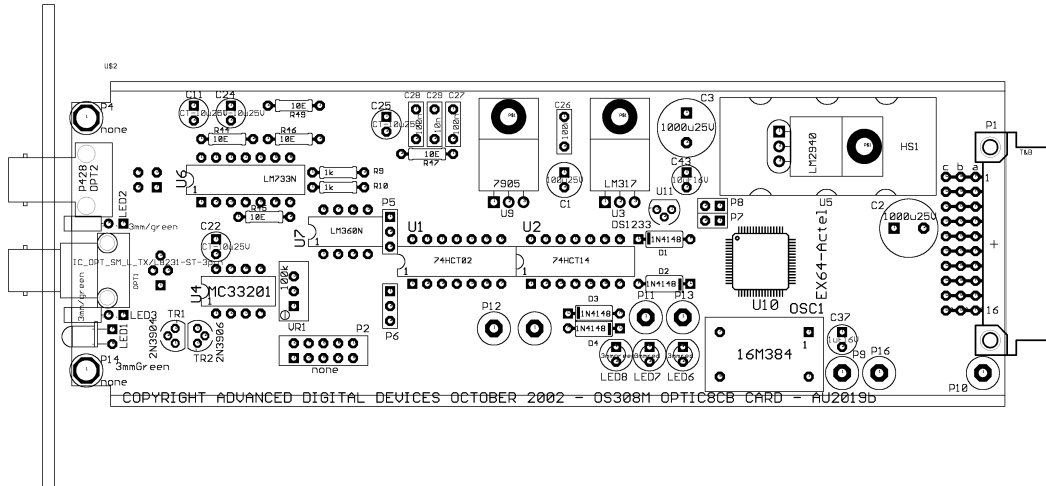
File:	Dr aunc	ECN No:	Date:
Revisions:	Dr aunc	ECN No:	Date:
Size:	Dr aunc	ECN No:	Date:
Sheet:	Dr aunc	ECN No:	Date:
<b>ADD</b>		Drawing Number:	
Advanced Digital Devices		05308M connection diagram	

## 10 ANNEXURE A4 PCB LAYOUT

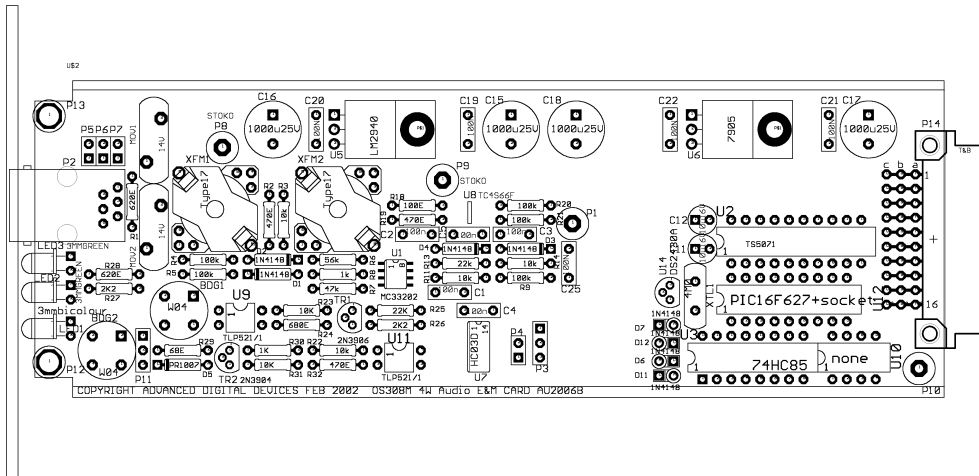
### 10.1 Controller card



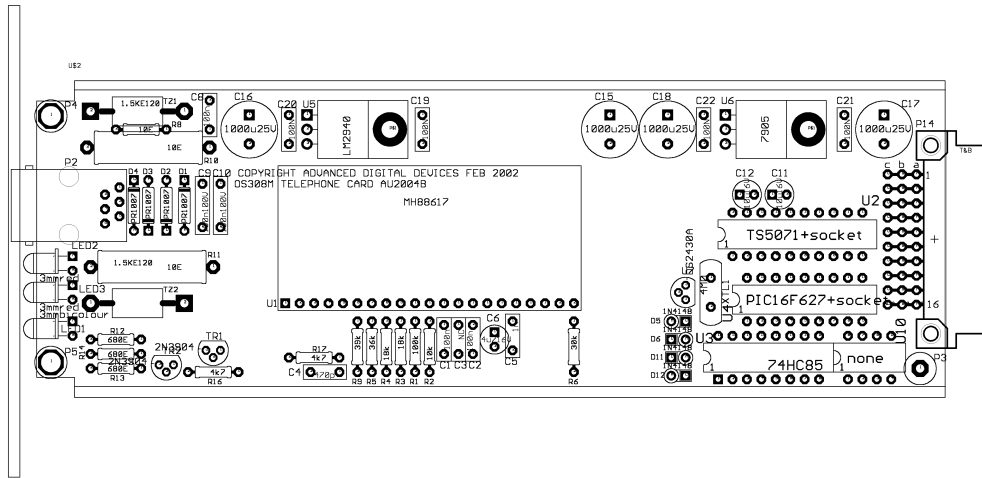
### 10.2 Optic 8CB card



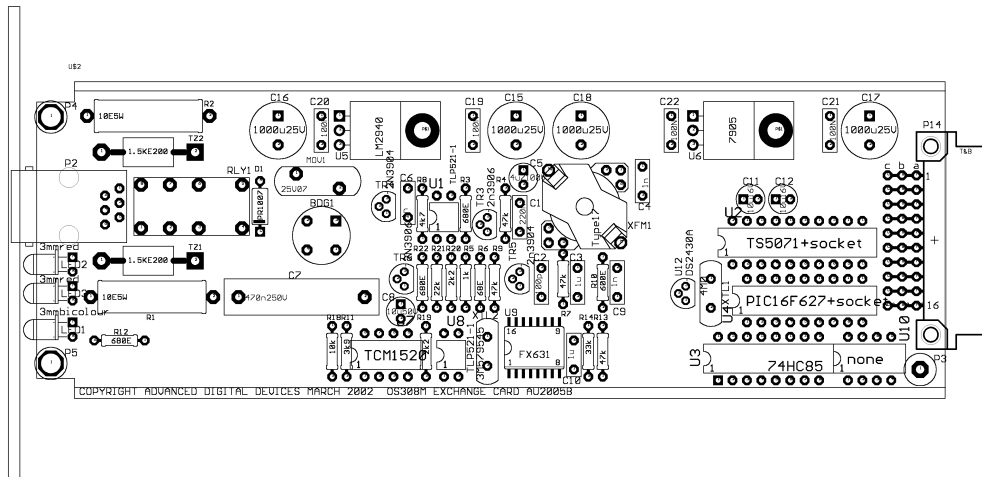
### 10.3 4Wire card



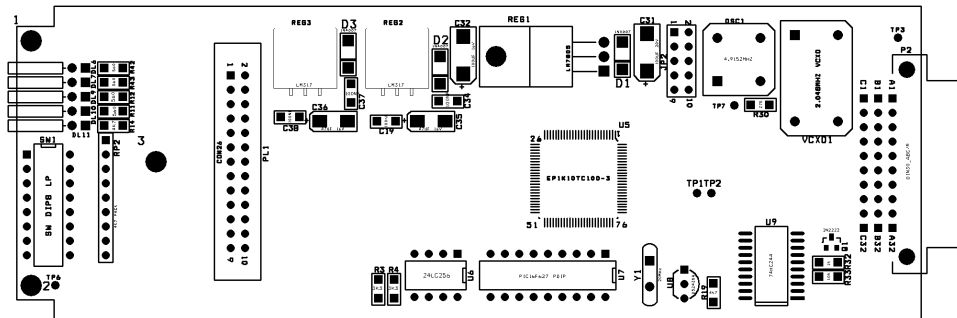
### 10.4 Telephone card



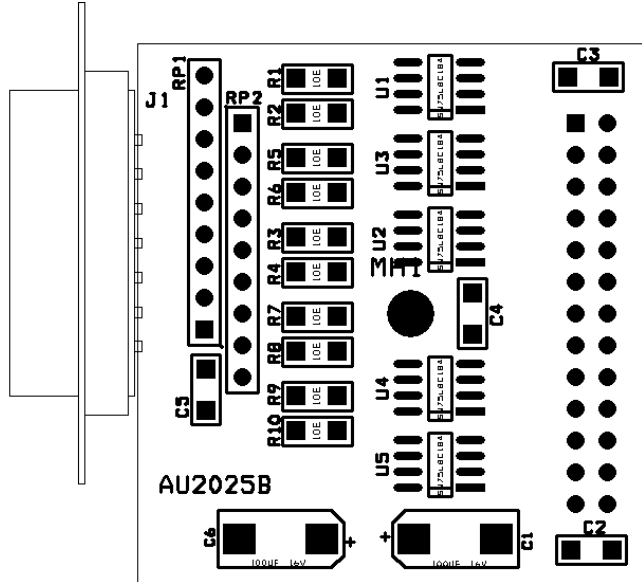
### 10.5 Exchange card



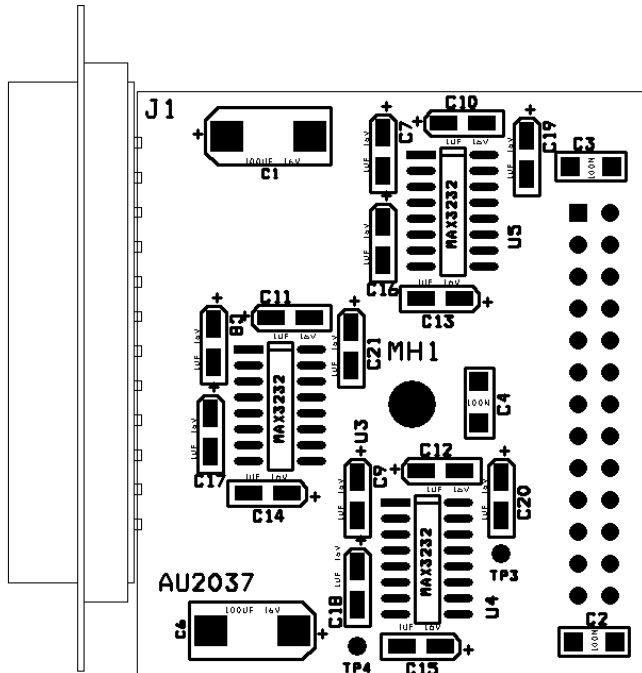
### 10.6 Data card



### 10.7 RS422/X.21 interface card

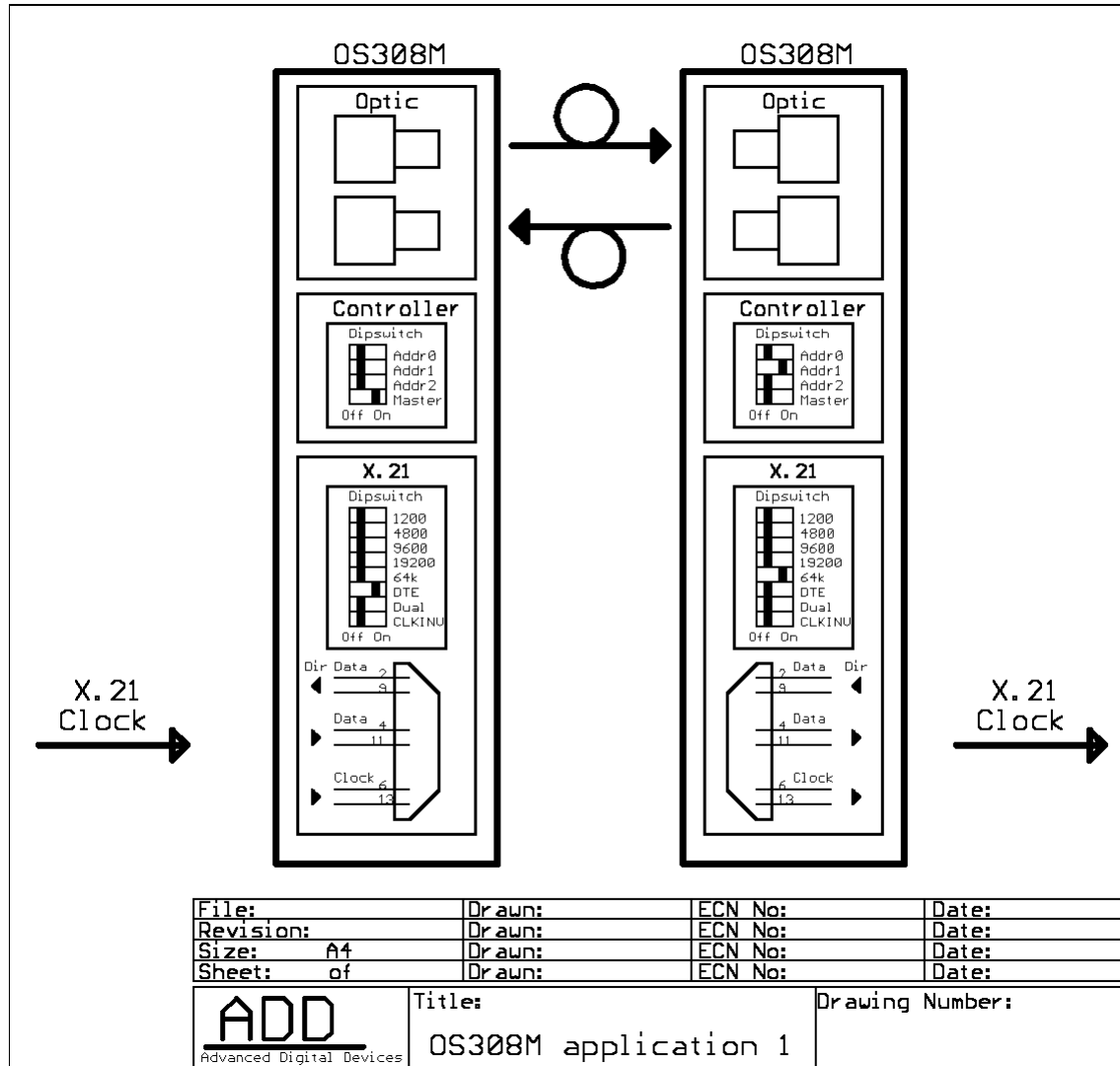


### 10.8 RS232 interface card

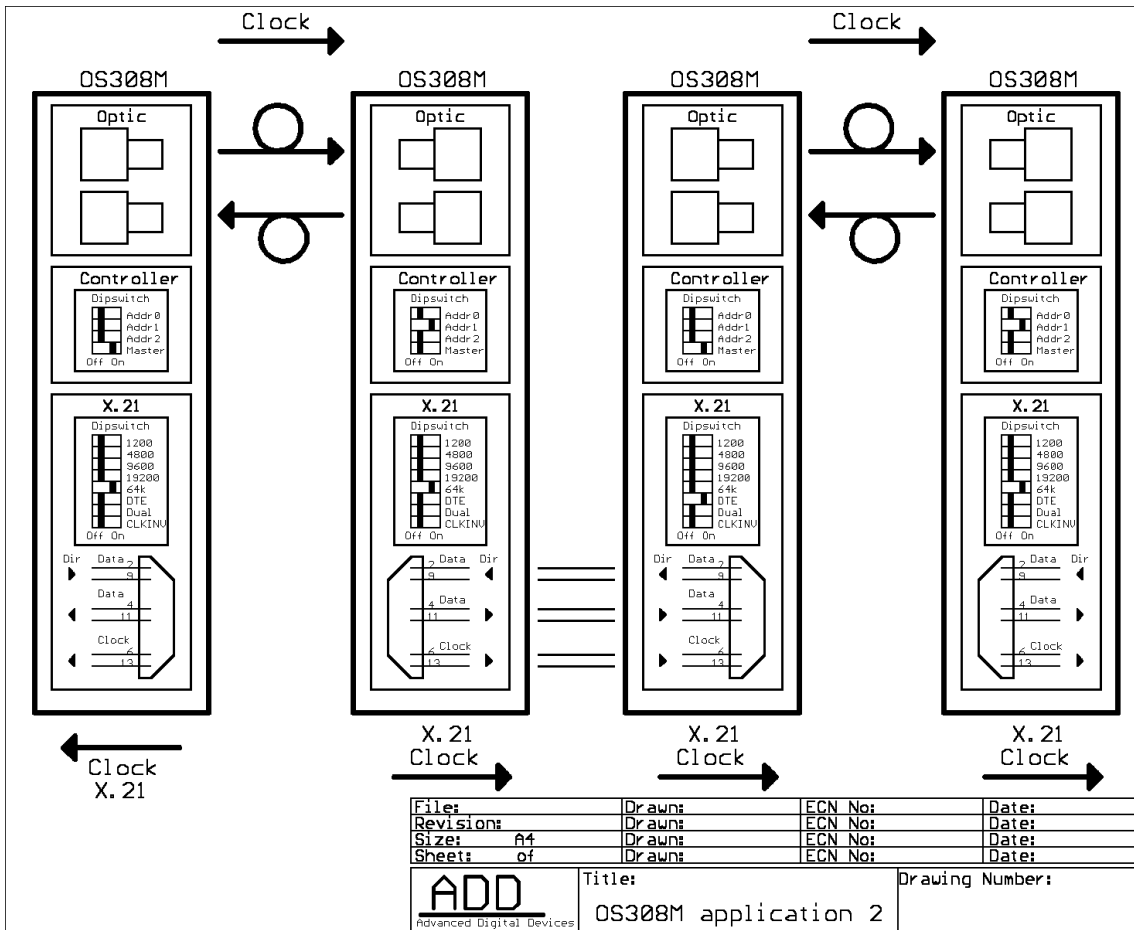


# 11 ANNEXURE A5 DATA CARD APPLICATIONS

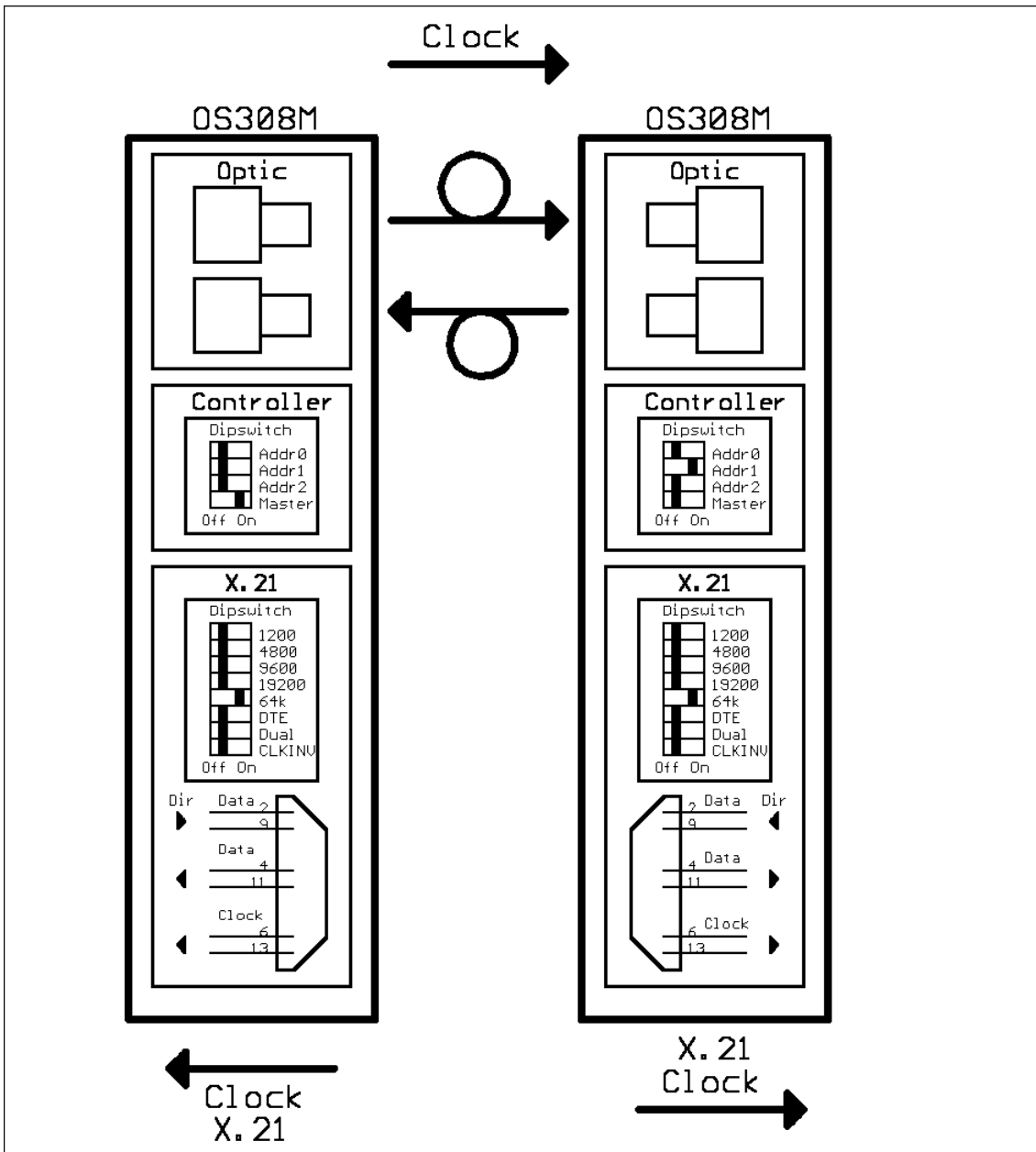
## 11.1 Single ring X.21 DTE/DCE configuration



### 11.2 Double ring X.21 DCE/DCE to DTE/DCE configuration



### 11.3 Single ring X.21 DCE/DCE configuration



File:	Drawn:	ECN No:	Date:
Revision:	Drawn:	ECN No:	Date:
Size: A4	Drawn:	ECN No:	Date:
Sheet: of	Drawn:	ECN No:	Date:

	Title:	Drawing Number:
	OS308M application 3	



