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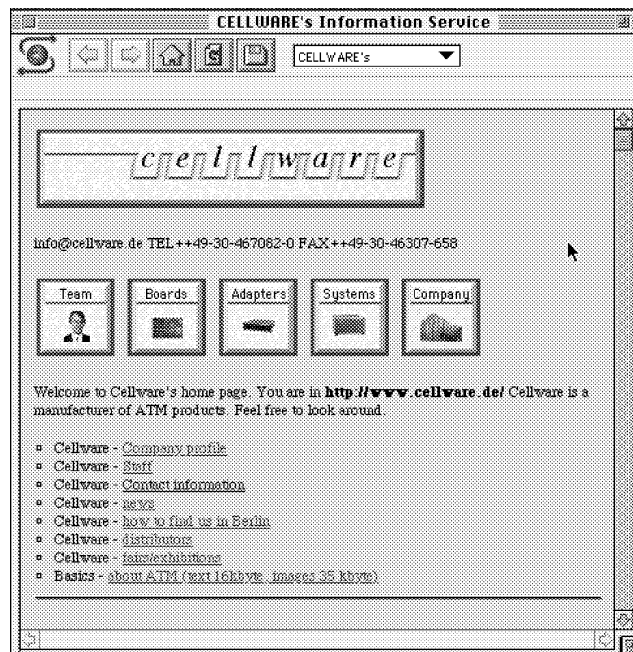
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## ALTERNATIVE MANUAL - FOREWORD

One of the problems with documenting innovative technology, is the constant improvements which are associated with innovation. As soon as the new manual comes off of the press, it is out of date.

One interesting alternative here is to use the Internet. As an experiment, Cellware has put this manual into the World Wide Web. We are interested to see if this approach to documentation improves the situation. Let us know what you think, but first take a look.



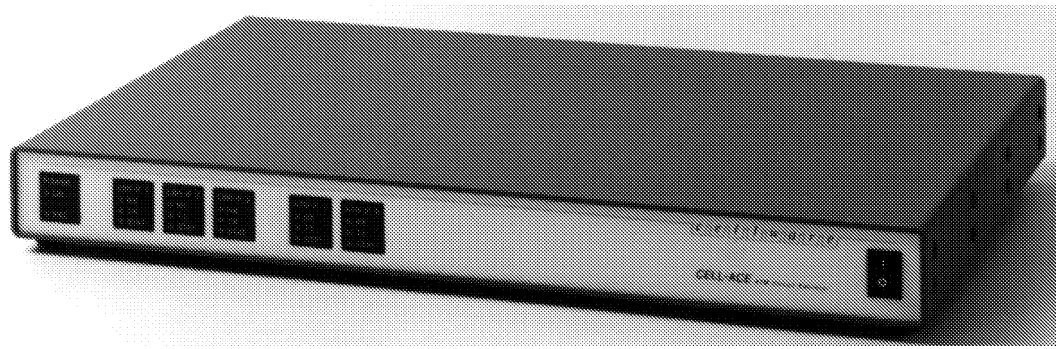
The entrance to the Web server is at **<http://www.cellware.de>**

## INTRODUCTION

This manual covers three ATM adapters which are very closely related. CELL-ACE, TA-PABX and TA-VIDEO. Circuit emulation is the basis of all of these adapters. The attached equipment “sees” a leased line, or circuit. This is useful for any equipment which is designed for use with a G.703 leased line, not just for PABXs and VIDEO CODECs although these are the most frequent applications.

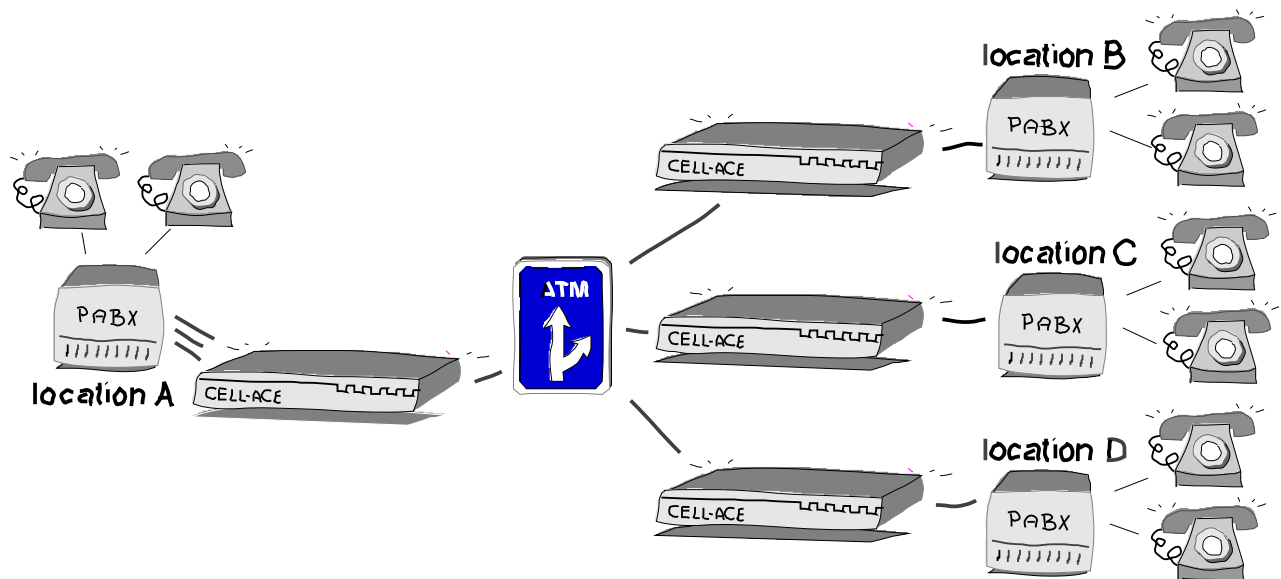
Throughout this manual, where you see TA-PABX, you can usually substitute CELL-ACE or TA-VIDEO.

## CELL-ACE



CELL-ACE is an adapter that enables private telephone exchanges (PABX) to be linked via an ATM network.

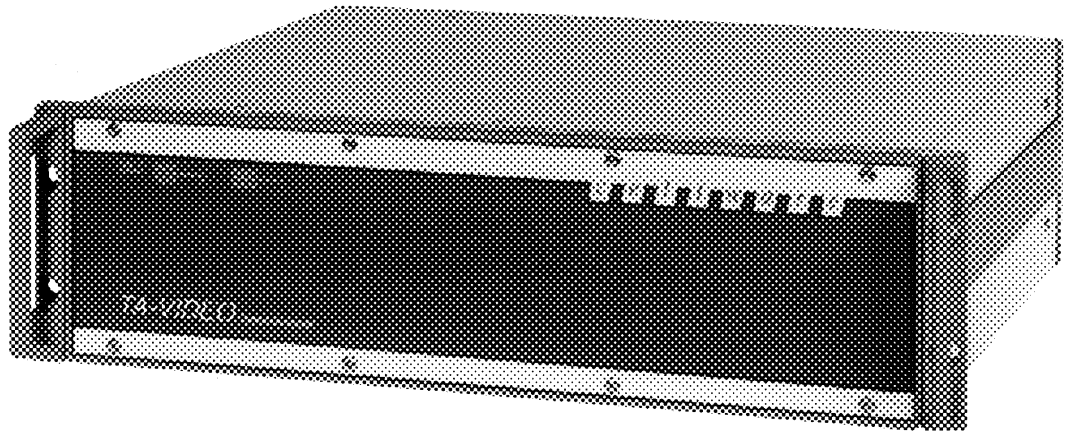
- 155 and 34 Mbit/s ATM interfaces available
- G.703 circuit emulation
- Emulates up to 3 x E1 or 3 x T1 or 3 x E3 or 3 x T3 leased lines
- Local management via VT100 interface
- SNMP support via SLIP or Ethernet for remote management
- HP OpenView support planned



CELL-ACE provides an ATM Circuit Emulation service (ACE) which offers electrical G.703 interfaces. The attached equipment "sees" a leased line, or circuit. This is useful for any equipment which is designed for use with a G.703 leased line, not just for video CODECs. The most common application is however telephony.

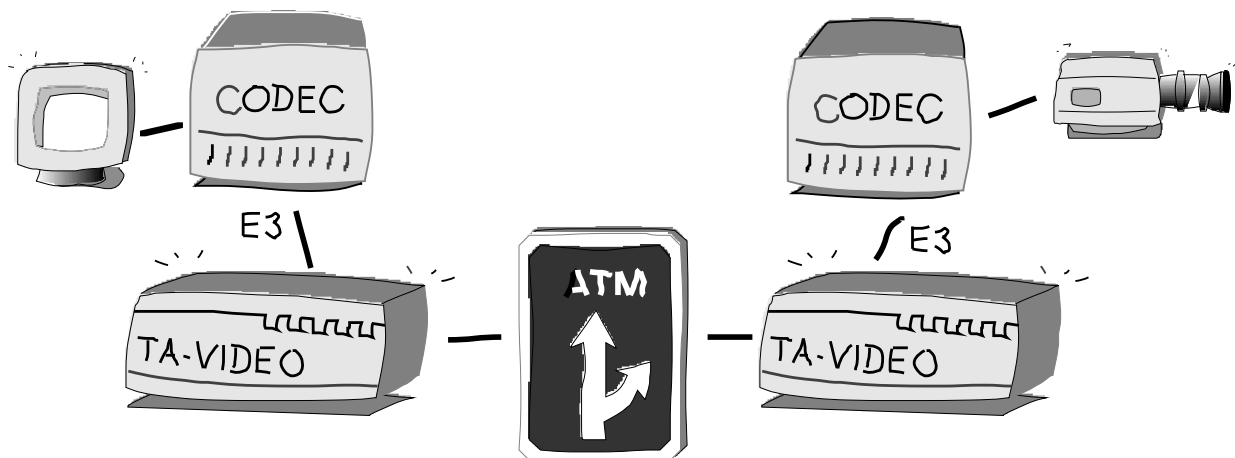
CELL-ACE is a second generation product, derived from TA-VIDEO and TA-PABX. It is an optimised design and is not quite as flexible as the other VMEbus based units.

## TA-VIDEO



TA-VIDEO is terminal adapter for the interconnection of 34 Mbit/s (E3) video CODECs via an ATM network

- CELLWARE's full range of ATM interfaces available
- Emulates up to 3 x E3 G.703 leased lines
- Local management via VT100 interface
- SNMP support via SLIP for remote management
- HP OpenView support planned

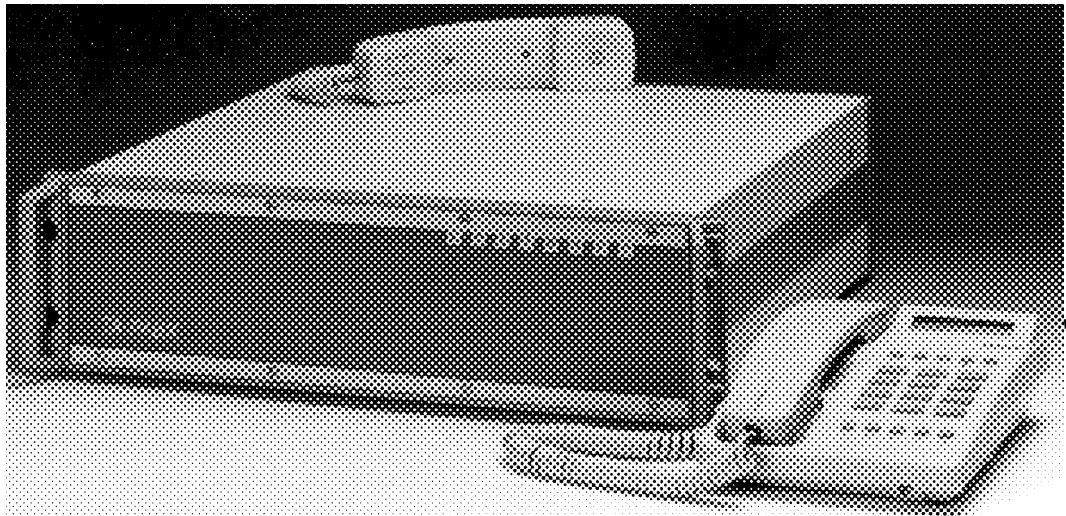


*TA-VIDEO application*

The TA-VIDEO provides a circuit emulation service which offers electrical G.703, E3 interfaces. The attached equipment "sees" a leased line, or circuit. This is useful for any equipment which is designed for use with a G.703 leased line, not just for video CODECs.

This may present a cost effective alternative to satellite transmission.

## TA-PABX



The TA-PABX is an adapter that enables private telephone exchanges (PABX) to be linked via an ATM network.

- CELLWARE's full range of ATM interfaces available
- G.703 circuit emulation
- Emulates up to 3 x E1 or 3 x T1 leased lines
- G.704 option for E1 version
- Local management via VT100 interface
- SNMP support via SLIP for remote management
- HP OpenView support planned

### E1 interfaces

The E1 interface provides an electrical G.703/G.704 interface. G.703 specifies the physical layer - 75 ohm coaxial cable. G.704 is an option which can be ordered for framing, the so-called PCM30 structure, which divides the 2.048 Mbit/s signal into 32 timeslots of which 30 are used for voice traffic.

TA-PABX can either provide a completely transparent 2 Mbit/s channel or, in the "structured" mode (if ordered) can supply a G.704 frame to the PABX and check the G.704 frame generated by the PABX. The structured mode optionally supports 1.984 Mbit/s transmission in the ATM network, regenerating the missing time-slot at the receive end to produce the full 2.048 Mbit/s signal. Note that in either case, TA-PABX does not process and cannot "understand" CAS or any other telephone signalling produced by a PABX. It provides a circuit emulation

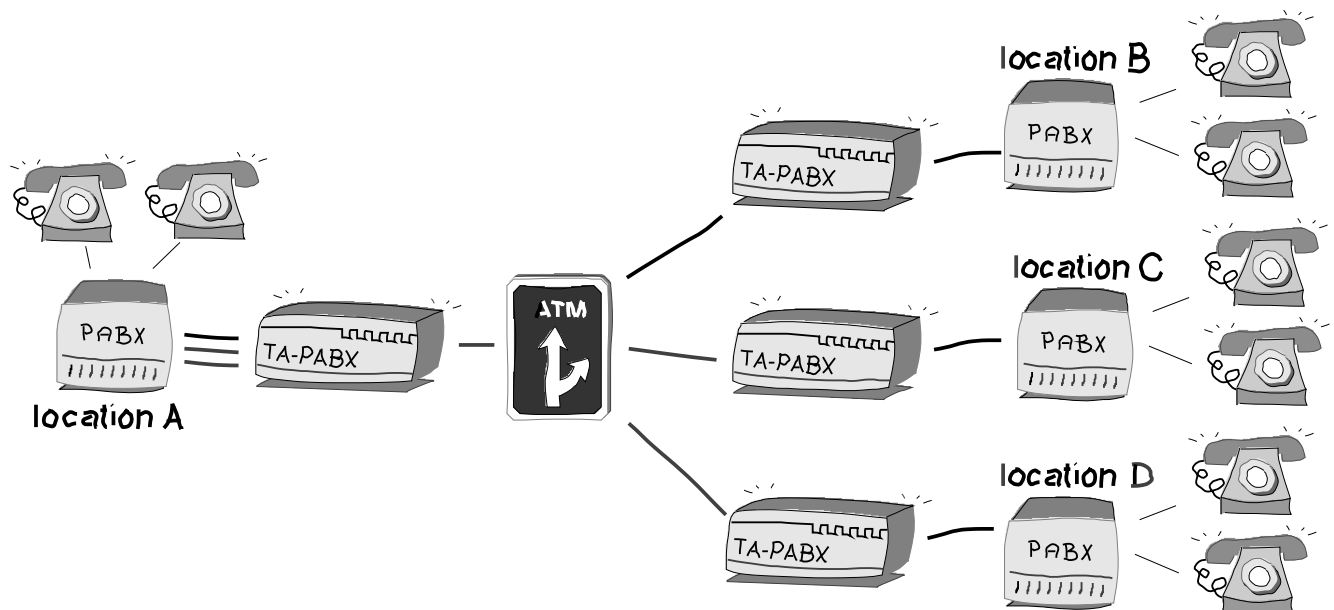


service (CES) and whether individual timeslots are active or not, the entire signal (1.984 or 2.048 Mbit/s) will be transported completely to one destination. Individual 64 Kbit/s timeslots cannot be separately routed through the ATM network.

### T1 interfaces

The T1 interface (1.544 Mbit/s) is an electrical, twisted pair G.703 interface.

## TA-PABX example



*Typical TA-PABX scenario*

Please consider this example carefully. As far as the PABXs are concerned, three leased lines link location A to locations B, C and D. The exchange at location A deals with call routing between the three other locations. The ATM infrastructure in this scenario cannot route individual calls.

# WHO CAN I TALK TO?



You can always talk to CELLWARE here in Berlin. There is usually someone in the office from 9 o'clock in the morning to 6 o'clock in the evening, Central European Time (CET).

Klaus Lohse is our general manager and he can either help you himself or he will organise the right specialist to help with your problem.

---

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# CELL-ACE SPECIFICATIONS

Note that there is more information on the circuit emulation interfaces in the section on TA-PABX/TA-VIDEO. The sub-modules used are identical. The Ethernet AUI interface is the same and thus also only documented in that section.

## General

### Dimensions

(W) 44 x (D) 33 x (H) 4.5 cm. (19 inch rack mounting)

### Electrical

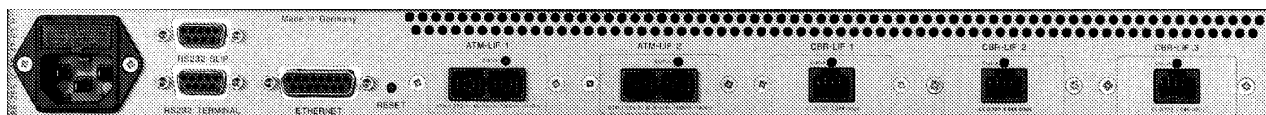
#### Supply voltage

88-265 Vac, 47-63 Hz

Power consumption: 50 W max.

### Weight

Without cables, weight is approximately 4kg.



*view of prototype CELL-ACE rear-panel*

## E1 circuit emulation interface

- Electrical - G.703, 2 x 120 twisted pairs
- Connectors - Western RJ45
- Distances - Defined by G.703, the useable range is determined by the cable quality.
- Protocols - G.704 framing is optional for E1

## T1 circuit emulation interface

- Electrical - G.703, 100 ohm, 2 twisted pairs
- Connectors - Western RJ48C
- Distances - Defined by G.703, the useable range is determined by the cable quality.
- Protocols - G.704 framing is optional for T1





produce at least 1dB loss. Be aware that if a third party unit delivers more than -14dBm at the input, this will overload the input and no transmission will be possible. Maximum cable length depends on the fibre quality, connector loss etc.

#### Distances

With CELLWARE products at both ends, you have a start of life optical power budget of 10dBm. A typical 62.5/125 multimode fibre will offer less than 1 dB/km, but multimode transmission suffers from signal "smearing" over longer distances. For distances over 2km, consider using the monomode module for ranges up to 15km.

### **SONET/SDH monomode ATM interface**

155 Mbit/s ATM SDH/STM-1 monomode optical interface  
(SONET option via configuration)

Physical /optical characteristics of digital interfaces to CCITT G.957-S1.1, inter-office / short haul using 1310 nm fibre.

Optical interface for 9/125um monomode fibre

Connectors	- duplex SC
Line coding	- NRZ
Centre wavelength	- 1310 +/- 50nm
Laser output power	-15 dBm min. -8.0 dBm max.
Input sensitivity	-28 dBm min.
Input saturation level	-8 dBm min.

#### Distances

Achievable distances depend on the power budget of the end to end configuration. Using monomode fibre, 15 km is a typical value. The TX power ranges from -8 to -15 dBm and the receiver sensitivity from -28 to -44 dBm. This results in a worst case of 13dBm available to compensate for transmission losses - e.g. fibre loss per km, loss due to splices and loss due to connectors. Please calculate your own power budget to see what range is achievable in your installation.

## E3 ATM interface

- Electrical - G.703, 75 ohm, coaxial pair
- Connectors - DIN 47295, {1,6/5,6 mS (75 )}, IEC 169-13
- Distances - Defined by G.703, the useable range is determined by the cable quality.

## DS3 ATM interface

- Electrical - G.703, 75 ohm, coaxial pair
- Connectors - TNC, IEC 169-17
- Distances - Defined by G.703, the useable range is determined by the cable quality.

## RS232 port 2 interface for management

VT100 compatible - fixed configuration.

- Speed 19 200 Baud
- Data bits 8
- Parity none
- Stop bits 1 (8N1)
- Required signals TXD, RXD, GND
- Protocol XON/XOFF

Distances

The maximum length allowed for an RS232 cable depends upon the Baud rate used. At 19 200 Baud, the maximum is 10 metres.

Connectors

9 way D-type (CELL-ACE has female connectors, cables must thus have male connectors)

Pin-outs

1	DCD	data carrier detected
2	TXD	transmitted data
3	RXD	received data
4	DTR	data terminal ready
5	GND	signal ground
6	DSR	data set ready
7	nc	not connected
8	CTS	clear to send
9	nc	not connected

## Environment

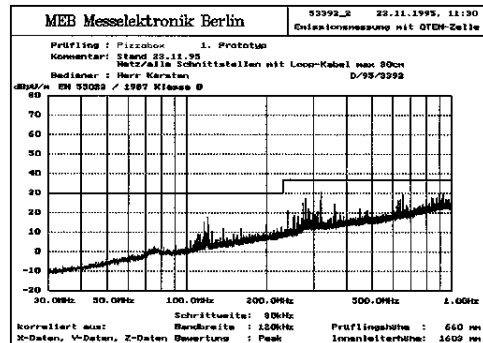
### Emission

### Improve your German! (Pizzabox is the German working title for CELL-ACE)

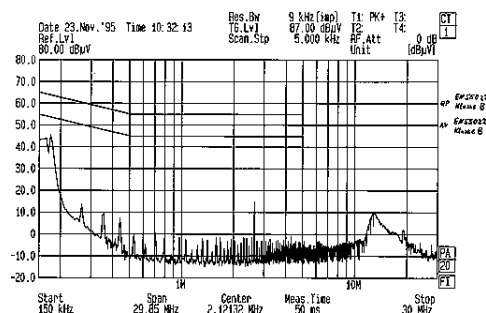
Prüfling - Device under test.  
 Prototyp - prototype  
 Kommentar - comment  
 Stand - version  
 Netz - network  
 alle - all  
 Schnittstellen - interfaces  
 Loop - loop  
 Kabel - cable  
 Bediener - operator  
 Klasse - class  
 Schrittweite - stepsize  
 korreliert - correlated  
 Bandbreite - bandwidth  
 Höhe - height  
 Daten - data

Bewertung - evaluation

Easy huh!



### Disturbances into the power feed



CELL-ACE has been thoroughly tested in Berlin and meets the following standards:

- DIN EN55022:1995 class A (radiated interference)
- DIN EN55022:1995 class B (interference injected into the power feed)
- DIN EN60801 T2:1994 (susceptibility to electrostatic discharge)
- DIN V ENV50140:1995 (susceptibility to electromagnetic fields)
- prEN 6100-4-4:1994 (susceptibility to fast voltage transients - bursts)

Simply expressed. CELL-ACE meets the requirements to carry the CE symbol.

### Temperature

At the time of going to press, no definitive measurements had been made but we expect an environment from 0 to 70°C to be O.K.



# TA-PABX/TA-VIDEO SPECIFICATIONS

TA-VIDEO and TA-PABX have many common aspects. The boxes are the same size, the ATM interfaces are the same and the management interfaces are the same. The differences are in the Circuit Emulation interfaces. TA-VIDEO currently supports only 34 Mbit/s, TA-PABX supports only 2.048 & 1.544 Mbit/s.

## General

### Dimensions

(W) 48 x (D) 31 x (H) 14 cm. (19 inch rack mounting)

### Electrical

#### Supply voltage

230V ac (207V to 244V), 48-52 Hz

Power consumption: 100 W max.

(On request a 110V ac version can be factory configured)

### Weight

Without cables, weight is approximately 9kg.

## ATM interfaces

Note that various ATM interfaces can be fitted:

- 155 Mbit/s ATM SDH/STM-1 electrical interface
- 155 Mbit/s ATM SDH/STM-1 multimode optical interface
- 155 Mbit/s ATM SDH/STM-1 monomode optical interface (also SONET)
- 100 Mbit/s ATM (TAXI) multimode optical interface
- 34 Mbit/s ATM electrical interface (TA-PABX only)

Each interface is now covered in turn.

## Electrical (G.703) 155 Mbit/s ATM interface

Performance

353 207 cells per second

SDH interface

155.520 Mbit/s  $\pm 20$ ppm

G.703 electrical (twin 75  $\Omega$  coaxial cables)

CMI line coding

53 byte ATM cells in STM-1/STS3c structure

Distances

Achievable distances depend on the cable quality. The updated specification in G.703 says “...The attenuation of the coaxial pair should be assumed to follow an approximate  $\sqrt{f}$  law and to have a maximum insertion loss of 12.7 dB at a frequency of 78 MHz...”

With a good cable, you may reach up to 200 metres. It all depends on the cable. Good cables are stiff and expensive. As a very small example consider the following table.

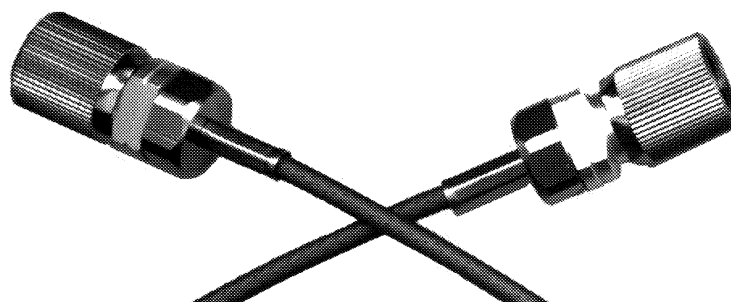
### Cable

Cable description	Supplier	Diameter	Loss (dB/100m @ 100MHz)	Max. range	Price/m ( ECU)
V45466-D2-B25	Siemens	6.00mm	15	85m	2.00
CT100	RS	6.65mm	6.4	200m	0.60
CT125	RS	7.80mm	4.9	260m	0.77
CT167	RS	10.10mm	3.7	340m	1.27
RG-11	Conrad	10.30mm	7.5	170m	1.63
1-GA-75	Conrad	7.00mm	9	140m	0.75

Note that the larger diameter cables may not fit directly into the required DIN 47295 connectors. Try and avoid complex cables with too many connections. Each connection will present a discontinuity in the characteristic impedance of the link and will reduce the useful distance.

This information is offered as a rough guide only, please check with the manufacturers for precise information.

## Connectors



DIN 47295 {1,6/5,6 mS (75 °C)}

## Multimode optical 155 Mbit/s ATM interface

### Performance

353 207 cells per second

SDH/SONET interface

155.520 Mbit/s  $\pm 20$ ppm

Optical interface for 62.5/125 $\mu$ m multimode fibre

NRZ line coding

Centre wavelength            1260nm min. 1380nm max.

LED output power            -21dBm min. -13.0 dBm max.

Input sensitivity            -31dBm min.

Input saturation level       -14dBm min.

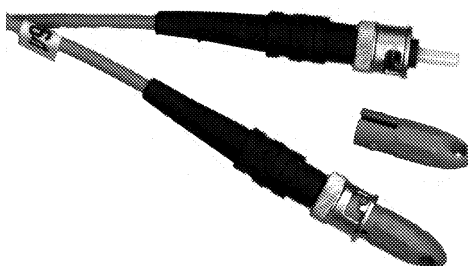
53 byte ATM cells in STM-1/STS3c structure

### Distances

The minimum cable length, in the worst case, is that which produces a 1dBm attenuation.

The maximum cable length is set by the signal dispersion and the attenuation caused by loss in the fibre, connectors etc. CELLWARE does not recommend the use of this interface for ranges exceeding 2km. A 10dB power margin is predicted for worst-case conditions over 50 000 hours.

### Connectors



ST



## Monomode optical 155 Mbit/s ATM interface

Performance

353 207 cells per second

SDH/SONET interface

155.520 Mbit/s  $\pm 20$ ppm

Optical interface for 9/125 $\mu$ m monomode fibre  
(Receiver module has 50/125 $\mu$ m pigtail, thus ensuring compatibility to mono and multimode systems.)

NRZ line coding

Centre wavelength            1273 nm min. 1355nm max.

Laser output power        -15dBm min. -8.0 dBm max.

Input sensitivity            -36dBm min.

Input saturation level    -7dBm min.

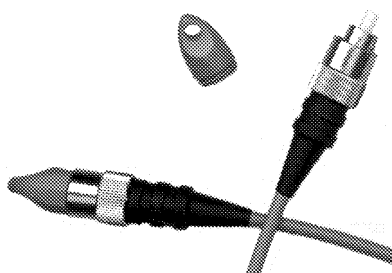
53 byte ATM cells in STM-1/STS3c structure

Distances

The minimum cable length is zero.

The maximum cable length is set by the attenuation caused by loss in the fibre, connectors etc. The available, worst case, power budget is 21dBm which may typically correspond to a 15km range when using monomode fibre. Please calculate your own power budget to see what range you can achieve.

Connectors



FC-PC

## Multimode optical 100 Mbit/s ATM interface (TAXI)

### Performance

235 849 cells per second

### TAXI interface

100 Mbit/s  $\pm 20$ ppm (125 MBaud line rate) 62.5/125  $\mu$ m multimode fibre 4B/5B line coding, based on ANSI X3T9.5 code used for FDDI

Centre wavelength      1270nm min.      1380nm max.

LED output power SOL -18.5dBm min.      -14dBm max.

(allow a reduction of 1.5dB over 100 000 hours lifetime)

Input sensitivity      -31dBm min.

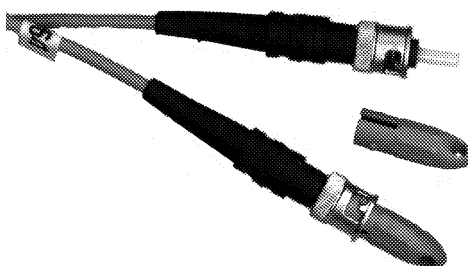
Input saturation level      -14dBm min.

53 byte ATM cells

### Distances

Achievable distances depend on the fibre quality. Multimode fibre causes dispersion of the signal. The fibre bandwidth should be such that a 5ms exit response time is achieved after 2km fibre. CELLWARE does not recommend ranges greater than 2km.

### Connectors



ST

## Electrical 34 Mbit/s (E3) ATM interface

Performance

approx. 80 000 cells per second

E3 ATM interface

34.368 Mbit/s  $\pm 20$ ppm

G.703 electrical (twin 75  $\Omega$  coaxial cables)

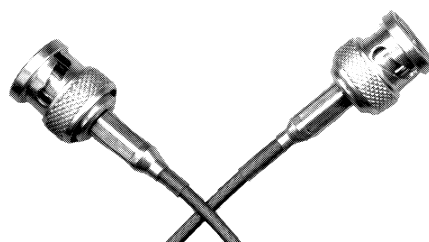
HDB3 line coding

53 byte ATM cells in ETS 300 337 (G.804/G.832) structure

Distances

Achievable distances depend on the cable quality. The G.703 specification says “...The attenuation of this cable shall be assumed to follow approximately a  $\alpha f$  law and the loss at a frequency of 17 184 kHz shall be in the range 0 to 12 dB...”. Using RG-59B/U cable, typically 200 metres will be achievable. It all depends on the cable. Good cables are stiff and expensive - see the table included under 155 Mbit/s electrical ATM interface.

Connectors



BNC

### NOTE

This interface is not suitable for TA-VIDEO as the capacity of the payload is not sufficient for an E3 circuit emulation.

## E1 interface to PABX

E1 circuit emulation - looks like a G.703 leased line for unstructured signals

either 75 ohm twin coax. interface BNC connectors  
or 120 ohm balanced interface RJ45 connector

Line rate 2048 Kbits/s  $\pm 50$ ppm

Line code HDB3

Load impedance 120 Ohm resistive (wire pair) - to special order

Load impedance 75 Ohm resistive (coax) - usually supplied

Nominal peak voltage 3.0V wire pair, 2.37V coax

Nominal pulse width 244ns

Pulse imbalance 1) negative peak = positive peak  $\pm 5\%$

2) positive width at nominal half amplitude

= negative width at nominal half amplitude  $\pm 5\%$

With or without G.704 framing as required

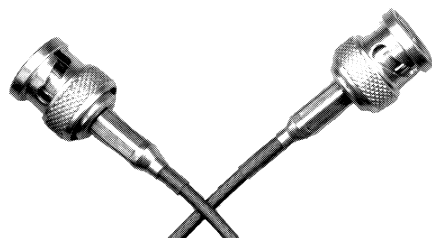
For structured data transfer, optionally TS0 is not transmitted, reducing payload to 1 984 Kbit/s

Synchronous or asynchronous to public ATM network as required

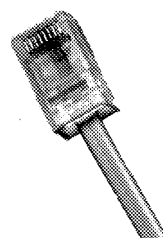
### Distances

Achievable distances depend on the cable quality. The G.703 specification says "...The attenuation of this pair shall be assumed to follow approximately a  $f$  law and the loss at a frequency of 1 024 kHz shall be in the range 0 to 6 dB...".

### Connectors



two BNCs



or one RJ45

## Pin connections RJ45

**N.B. Not to ISO/IEC 10173:1991(E). AAL submodule is configured as a TE**

---

1 nc

---

2 nc

---

3 rx+ (input to TA-PABX)

---

4 tx+ (output from TA-PABX)

---

5 tx- (output from TA-PABX)

---

6 rx- (input to TA-PABX)

---

7 nc

---

8 nc

## T1 interface to PABX

T1/DS1 circuit emulation - looks like a G.703 leased line for unstructured signals. ANSI T1.403-1989 and G.703 circuit emulation over an ATM network

Synchronous or asynchronous to public ATM network as required

Interface	100 ohm balanced
Connector	RJ48C
Line rate	1 544 Kbit/s $\pm 50$ ppm
Line code	B8ZS
Nominal peak voltage	2.4 to 3.6V
Nominal pulse width	324 ns

Distances

This is software configurable. This is in contrast to E1, which is specified to cover a particular power budget without manual intervention. The options available are

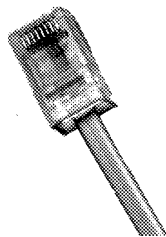
### T1 long loop

- 7.5 dB buildout
- 15 dB buildout
- 0 dB buildout

### T1 short loop

- 0-133 feet
- 133-266 feet
- 266-399 feet
- 399-533 feet
- 533-655 feet

Connectors



one RJ48C

## Pin connections RJ48C

**N.B. Not to ISO/IEC 10173:1991(E). AAL submodule is configured as a TE**

---

1 nc

---

2 nc

---

3 rx+ (input to TA-PABX)

---

4 tx+ (output from TA-PABX)

---

5 tx- (output from TA-PABX)

---

6 rx- (input to TA-PABX)

---

7 nc

---

8 nc

## E3 interface to video CODEC

E3 circuit emulation - looks like a G.703 leased line for unstructured signals

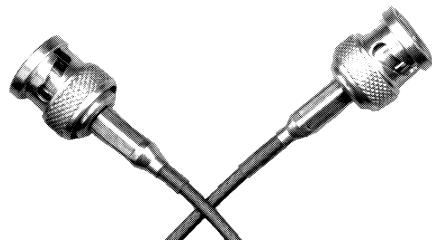
Line rate	34 368 Kbit/s $\pm 20$ ppm
Line code	HDB3
Load impedance	75 $\Omega$ resistive
Nominal peak voltage	1.0V
Nominal pulse width	14.55ns
Connectors	BNC

Synchronous or asynchronous to public ATM network as required

### Distances

Achievable distances depend on the cable quality. The G.703 specification says "...The attenuation of this cable shall be assumed to follow approximately a  $\sqrt{f}$  law and the loss at a frequency of 17 184 kHz. shall be in the range 0 to 12 dB...". Using RG-59B/U cable, typically 200 metres will be achievable. It all depends on the cable. Good cables are stiff and expensive - see the table included under 155 Mbit/s electrical ATM interface.

### Connectors



two BNCs



## RS232C interfaces for management

### RS232C Terminal

VT100 compatible - fixed configuration.

Speed 19 200 Baud

Data bits 8

Parity none

Stop bits 1

(8N1)

Required signals TXD, RXD, GND

Protocol XON/XOFF

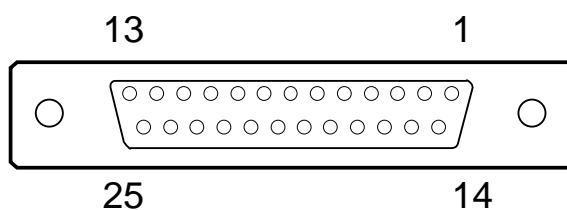
### Distances

The maximum length allowed for an RS232C cable depends upon the Baud rate used. At 19 200 Baud, the maximum cable length is 10 metres.

### Connectors

25 way D-type (TA-PABX has female connectors, cables must thus have male connectors)

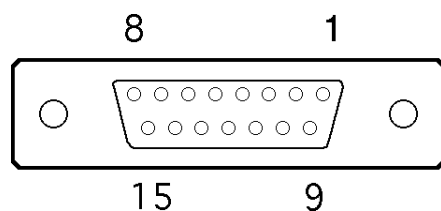
### Pin-outs RS232C Terminal



pin	abbr.	name	I-TA-PABX input O-TA-PABX output
1			nc
2	TXD	transmitted data	O
3	RXD	received data	I
4			nc
5			nc
6			nc
7	GND	signal ground	-
8 through 25			nc

## Ethernet AUI interface

This is the standard Ethernet interface, designed for an external medium adapter unit (MAU).



pin	abbr.
1	COL SHIELD
2	COL+
3	TX+
4	RX SHIELD
5	RX+
6	GND
7	NC
8	NC
9	COL-
10	TX-
11	TX SHIELD
12	RX-
13	+12V PWR
14	PWR SHIELD
15	NC

## Connections

All connections are made at the rear panel.

### Power

The IEC power connector is to the left and there is an ON/OFF switch directly above the connector.

### ATM network

The connection to the ATM network comprises two cables. The cable delivering the signal from the ATM network should be connected to the connector labelled “Line In”. The cable returning an ATM signal to the network should be connected to the connector labelled “Line Out”. The exact connector type will vary with the type of interface.

### Terminal for configuration/supervision

If required, a terminal can be attached via the connection labelled “RS232C Terminal”.

Remote access for configuration/supervision via SNMP or software updates via TFTP

If required, an Ethernet network can be attached via the connection labelled “Ethernet”, via an external Ethernet transceiver appropriate for your Ethernet type. Note that (2Q95) Telnet access is not supported.

## Performance

Performance is not really an appropriate term for equipment providing a circuit emulation service. Either the circuit works correctly or it does not. The concept of packets processed per second as used in the data world is not suitable for data with no end and no beginning.

## Electromagnetic performance

TA-PABX meets EN 55022 class B. Note that electromagnetic interference is very dependent upon the exact installation.

Consult an expert if you have problems in this area.

Should you ever remove the lid, please don't forget to reconnect the flying earth connection.



# INSTALLATION

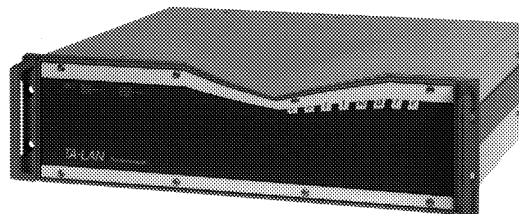
## Before you start

Did you get everything?

- CELL-ACE, TA-PABX or TA-VIDEO with all of the modules ordered
- Power cable

Plus - if explicitly ordered, connection cables.

## Equipment has arrived damaged



CELLWARE takes all possible care when packaging equipment for despatch, but some transporters regard this as a challenge. Should the equipment be damaged when you receive it, please:

- Notify the transport company immediately and
- Send CELLWARE a copy of this notification and
- Contact CELLWARE to discuss further steps.

## Basic precautions

### Earthing

This product is designed to be earthed over the normal power supply cable. Do not use twin conductor power cables without an earth connection. The housing is connected to earth.

### Spilled drinks

Avoid spilling drinks on this product. This can cause permanent damage and such damage will not be repaired under guarantee.

## Operating temperature

These products have a maximum operating temperature, corresponding to an environment of 50°C (70°C for CELL-ACE). Operation in direct sunlight or in a closed housing with no ventilation can result in excess temperatures.

Two fans are fitted, one sucking and one blowing. These fans help to maintain the internal operating temperature within acceptable limits (typically 8°C above ambient). Do not restrict the flow of air to or from these fans. Occasionally the filters should be cleaned of dust. The black plastic frames are push fit and can be removed using both hands, with thumbs and forefingers on the corners and pulling gently. Dust should be blown from the filter. Washing the filters is not recommended.

Excess temperatures will result in the power supply shutting down, to prevent permanent damage. As the equipment cools down, power will be re-established and the system will automatically restart. Should this type of power cycling be observed, check that the ventilation is not obstructed and that the filters are not blocked.

## Electromagnetic interference

The interfaces to this product operate at very high frequencies. Use only good quality screened cables and take care when routing the cables. Long runs parallel to other sensitive cables may result in crosstalk, which interferes with other signals.

## Weight

TA-PABX/TA-VIDEO is a fairly heavy product (depending on how many modules are fitted) and the weight is not evenly distributed. Take care, particularly when using the handles to pull the unit out of a rack.

## Installation

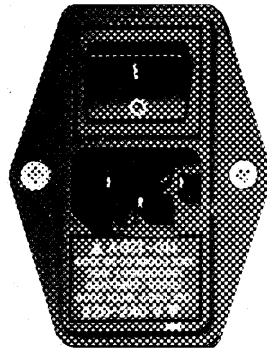
Cellware products are supplied in stand-alone housings. They can be left free standing, or can be fitted into a 19 inch rack mounting system.

## Rack Mounting

The details will depend upon the exact rack mounting system used. If unsure about how to proceed, consult the supplier of your rack.

### Power

TA-PABX/TA-VIDEO are usually supplied for a mains supply of 230 Vac at 50 Hz. 110 Vac versions can be factory configured.



The fuse carrier beneath the power inlet shows the supply voltage as configured before despatch. This is not a voltage switch and the orientation as delivered should be maintained.

CELL-ACE has a self-configuring power unit.

### Coaxial cables

CELLWARE can supply ready-to-use cables - optical and or electrical. Note that cables have a minimum bending radius and that kinking coaxial cables will disturb the dielectric and cause a discontinuity in the characteristic impedance. This will cause reflections and reduce the usable maximum cable length.

Kinking optical cables will quite simply break them.

Kinked coaxial cables must be regarded as damaged and should be replaced.

*(Kinking - bending too much, causing a sudden, damaging bend)*

If the connectors used have a threaded outer sleeve, they should be firmly screwed to the TA-PABX connectors to hold the cable in place and prevent movement which may cause errors.

When removing a cable, DO NOT PULL THE CABLE. Unscrew

the connector and, when the fixing sleeve comes loose, pull the CONNECTOR, not the cable.

TTY cable for configuration & supervision

CELLWARE can supply a cable for the CELLWARE terminal used for configuration. If using your own cable and terminal, check the pin-outs of the “RS232C Terminal” as listed earlier, to ensure that the right signals are used in your configuration.

## **Installing the CELLWARE supplied terminal**

CELL-ACE, TA-PABX & TA-VIDEO must be configured and can provide status and management information. CELLWARE can provide VT100 terminal emulation software to access these functions via a serial link from a PC. If you have a VT100 terminal, or an emulator, there is then no need to install any software. If you have a CELLWARE supplied terminal, this will be preconfigured. It will be supplied with a power cable and a suitable serial cable, which must be fitted to the connector marked “RS232C Terminal”.

## **Is it working?**

Having installed the equipment and terminal turn to the section headed “USING & CONFIGURING CELL-ACE, TA-PABX & TA-VIDEO”.

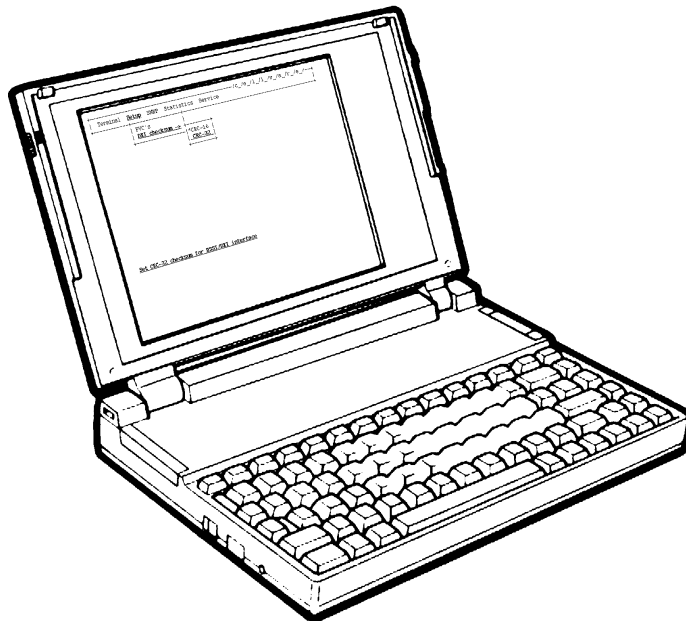
## **Updating the equipment**

As required, CELLWARE will distribute improved software on PC discs. The equipment can then be updated via a PC with a VT100 emulation, attached to the connector labelled “RS232C Terminal”. It is also possible (and much quicker) via Ethernet, using TFTP. The password for the CELL-SCREEN environment is required, but then the update process is easy to use and no training is required, as prompts are issued to help the user. This process is described further in a later section, headed “SW update” in the CELL-SCREEN chapter.



# USING & CONFIGURING CELL-ACE, TA-PABX, TA-VIDEO

CELL-ACE, TA-PABX & TA-VIDEO can all be configured via a local VT100 teletype, or VT100 emulation connected via a serial cable. CELLWARE can deliver a compact PC, preconfigured with a VT100 emulation package. The user interface is called CellScreen.



## CellScreen

The CellScreen application runs within the Cellware equipment, uses the terminal keyboard for input and the terminal screen for display. Display updates are optimised within the application, before the serial link is addressed. Only the changes need transmitting, which results in an acceptable update speed. Pull down menus provide a familiar and easy to use environment, although only a terminal is required. Useful hints are constantly displayed at the bottom of the screen.

### Selecting an option

Use the left ( ) and ( ) right cursor keys to move between the various “pull-down” menus. At each position a menu will appear as shown in the example above. Use the cursor up ( ) and down ( ) keys to move through the options in each menu. The currently selected option will be highlighted. To activate an

option use the carriage return ( ) key. The space bar is used to set/unset radio buttons - (o).

### VT100 compatibility

Note that if you use an emulation package, it is important that it is fully VT100 compatible. The CELL-SCREEN environment makes use of various screen attributes and cursor positioning which are not always correctly emulated. The function will not be affected by missing reverse video in the display, but it can be tiring for the operator. Apart from the preconfigured PC, CELLWARE can recommend either a Wyse VT100 terminal or the use of a Sun window (under Open Windows)

## Logging in

Having connected your local terminal to the connector labelled “RS232C Terminal”, following power-up you should briefly see the following prompt -

```

Booting system complete.  Copyright (c) 1995, Cellware GmbH
-----
SYSTEM CONFIGURATION:
This system will restore settings from previous configuration
HARDWARE CONFIGURATION:
This system will use previous hardware settings
NETWORK INTERFACE PARAMETERS:
IP-address on LAN (Ethernet) is 193.96.231.77
-----
To change any of these settings, press any key within 5 seconds

(M)odify any of this or (C)ontinue ?

```

followed by

```

=== Cellware login ===>> initial password: public <<

Password:

```

If this is not the case, then check that you have configured your terminal correctly:

Speed	19 200 Baud
Data bits	8
Parity	none
Stop bits	1
(8N1)	
Required signals	TX, RX, GND
Protocol	XON/X      OFF

You may see the following prompt.

```
+-----+
| WARNING: Current software is      |
|           not up-to-date,        |
|           please perform software update |
+-----+
=== Cellware login ===> initial password: public <<

Password:
```

In this case, the equipment is not running up-to-date software, but a permanently resident, minimum version. You should update the software immediately. (See INSTALLATION - Updating CELL-ACE/TA-PABX/TA-VIDEO)

### Security

Type in the password as supplied by CELLWARE concluded by a carriage return and you should see the following.

```
+-----TA-PABX:-----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc  Setup  Statistics |
+-----+
| *Info |
| Refresh |
| Password |
| Ping |
| Exit |
+-----+
```

You are now within the CELL-SCREEN environment. (Please note that the options shown depend upon the password and ultimately on the boards fitted. If you need a non-visible option, you must log out and enter the appropriate password)





## Example - Info

If you select the Misc option, you will be presented with the following display. Use the cursor down key until the option “Info” is highlighted.

```

+-----TA-PABX:-----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc  Setup  Statistics |
+-----+-----+
| *Info |
| Refresh |
| Password |
| Ping |
| Exit |
+-----+

What version of the software is running

```

Use the carriage return key and you will see something like this.

```

+-----TA-PABX:-----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc  Setup  Statistics |
+-----+-----+
|
| ***** TA-PABX SYSTEM Info *****
|
| TA-PABX version 1.70
| (C) 1995 Cellware GmbH
| email: info@cellware.de
|
| [ OK ]
|
+-----+-----+

```

Note that the bottom line often offers an explanation of the currently selected option. Please note also, that the menus visible in your system may not include options shown here which are not physically installed in your system.

## Misc menu

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc  Setup  Statistics                                     |
+-----+
| *Info      |
| Refresh    |
| Password   |
| Ping       |
| Exit       |
+-----+

```

### Misc - Info

Shows the installed software versions and date as shown in the example above

### Misc - Refresh

This rewrites the entire screen. Note that some VT100 emulation packages are not completely VT100 conform and may produce some odd displays, which occasionally need correction via refresh.

### Misc - Password

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc  Setup  Statistics                                     |
+-----+
|
| +-----Change password-----+
| |                               |
| | Enter your password          |
| |                               |
| | Password:                    |
| | .....                      |
| |                               |
| | [Cancel] [Change]           |
| |                               |
| +-----+

```

You should change the factory set password(s) to maintain system security. Note that you must first type in the existing password, before entering the new one.

## Misc - Ping

```

+----TA-PABX:----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
|
| ***** PING *****+
| Enter host address: |
| 0.0.0.0 |
| [Cancel] [Ok] |
+-----+

```

Ping is a very useful diagnostic tool in IP networks, checking if a particular IP host is reachable or not. Please ask your system administrator if you are not familiar with this idea.

## Misc - Exit

Quits CELL-SCREEN. A password is then required to re-enter CELL-SCREEN. You should use this option when leaving the equipment unattended, to prevent accidents.

## Setup menu

```

+----TA-PABX:----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
| PVC Setup |
| Interfaces -> |
| SNMP -> |
| *ILMI |
+-----+
Setup PVC table

```

This pull-down menu is used to configure or set-up the equipment. Note that this process may be fairly time consuming when the equipment is first installed. However, all parameters are kept safe in nonvolatile memory, so only changes need entering after the first major effort.



## Setup - PVC Setup

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+

+-----+
| Detected Interfaces: |
|                     |
| ATM interfaces:      | 1 |
| E1 interfaces:       | 2 |
| FDDI interfaces:     | 0 |
| ETHERNET interfaces | 1 |
|                     |   |
|                     | [Ok] |
+-----+

```

When the system is started, an automatic scan takes place, to establish which modules are fitted. The window above shows the results of the scan. When Ok is hit, the following table appears -

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+

+-----+-----+-----+-----+-----+-----+
| PVC | VPI | VCI | AAL | State | Service |
+-----+-----+-----+-----+-----+-----+
| 1 | 0x1 | 0x1 | 1 | UP | E1:1 | |
| 2 | 0x1 | 0x2 | 1 | UP | E1:2 |
| 3 | 0xA | 0xA | 5 | UP | IP:192.168.1.2 |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  |
| 11 |  |  |  |  |  |  |
| 12 |  |  |  |  |  |  |
| 13 |  |  |  |  |  |  |
+-----+-----+-----+-----+-----+-----+

(Q)uit - (A)dd - (C)lear - (E)dit - (F)orwards - (B)ackwards - (R)eset table

```

Note that although only 13 entries are visible, using F and B, far more PVCs are accessible in a sort of scrolling process. Note also that the AAL column is automatic. Having selected the correct service type, the AAL type will be shown here for your information.

The PVC numbers are for convenience only. Each line in the table corresponds to an ATM “channel” or PVC (permanent virtual circuit) with a unique VCI/VPI combination. Each PVC carries a particular service - in the example shown E1 circuit

emulation in PVC1 and IP traffic in PVC3. As other services become available, they will take their place in this table too.

The cursor keys can be used to select an entry, or an unused PVC and hitting carriage return will produce a small dialogue window. If in the State column, hitting carriage return will produce this

```
+-----+
| Back  |
| Down  |
| Up    |
+-----+
```

Allowing an entry to be quickly enabled, disabled. If not in the State column, this will be produced

```
+-----+
| Back  |
| Add new |
| Edit  |
| Delete |
+-----+
```

...and choosing Add new will result in something like this -

```
+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/---+
| Misc Setup Statistics |
+-----+
| ***** TA-PABX PVC CONFIGURATION ***** |
| |
| Add PVC Entry |
| |
| VPI      :   --- Service |
|          :         UNDEFINED |
| VCI      :   ----- |
| |
|          State |
|          (o) Down |
|          ( ) Up  |
| |
|          [Cancel] [Ok] |
+-----+
| 13 | | | | | | |
+-----+
```

Remember that the space bar is used to set/unset radio buttons - (o) and that the cursor keys move the cursor to the various fields, carriage return entering the editing process.

Setting a VPI and VCI is straightforward, when selecting service, you will first see this

```
+-----+
| Setup/Change |
| Back         |
+-----+
```

If this seems a bit on the large side, it is planned to accommodate more services as time goes by. Select a service by moving to the right position using the cursor keys and set/unset an option (o) using the space bar.

This option will firstly show a set of detected interface types. Selecting an option will then move on to the detail.

## Ethernet

```

+----TA-PABX:----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+

***** ETHERNET CONFIGURATION *****
|
| IP Address      :
| 193.96.231.58
|
| Subnet Mask     :
| 255.255.255.0
|
| Default gateway :
| 0.0.0.0
|                                     [Cancel] [Ok]
+-----+

```

The only aspects which are configurable for Ethernet interfaces are the IP parameters. If you are not sure how to set up IP parameters, ask your system manager.

## E1/CES

```

+----TA-PABX:----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
| PVC Setup |
| Interfaces -> +-----+
| SNMP      -> | Ethernet |
| *ILMI      | *E1/CES  -> +-----+
+-----+ ATM      -> | CES:101 |
|                                     | CES:102 |
|                                     | CES:103 |
+-----+

Setup E1/CES interface

```

CES stands for circuit emulation service, which uses AAL1. Select one of these options and you should be offered something like this. The numbers (101 or 102 in this example) are automatically generated index numbers, one for each circuit emulation interface detected during the power-up scan.

Please note that this option is currently split into two main windows, but will soon be integrated into a single screen.

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
+***** CES:101 SETTINGS *****+
|
| Connection Port : 10          Partial Cell Fill :
| Mapped VPI      : 1          0
| Mapped VCI      : 1
|
| CBR Clock Mode :              Maximum buffer size :
| ( ) synchronous          1024
| ( ) srts              Cell delay variation (ms):
| (o) adaptive          4
|
| Line Mode          Cell loss period :
| (o) Transparent    ---
| ( ) MultiFrame without CRC
| ( ) MultiFrame with CRC4      Admin Status :
| ( ) Frame without CRC        (o) up
| ( ) Frame with CRC4          ( ) down
|
| CELL-MASTER timing
| (o) Slave
| ( ) Master
|
| [Cancel] [Ok]
+-----+

```

This window allows an E1 module on an AAL1 board to be configured for a 2 Mbit/s circuit emulation service. Use the cursor keys to move between the fields and the space bar to change the radio buttons (o). See the following chapter "CONFIGURING CIRCUIT EMULATION" for more information on these options

## ATM

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
+**** ATM INTERFACE CONFIGURATION ***+
|
| IP-address
| ----
|
| Subnet Mask
| ----
|
| LifMode
| ( ) Sonet (STS-3)
| (o) SDH   (STM-1)
|
| [Cancel] [Ok]
+-----+

```

For ATM interfaces, the IP parameters are not active. If you need IP over ATM, consider a CELL-MASTER unit instead. Should a 155 Mbit/s ATM interface be fitted, this can be run either in SDH or in SONET mode for North America. Use the space bar to

switch between SONET and SDH, after moving to the right field.

## Setup - SNMP

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
| PVC Setup |
| Interfaces -> |
| SNMP -> +-----+
| *ILMI | Setup Manager |
+-----+ *Display |
+-----+

```

Setup SNMP-Manager parameters

For SNMP there are two options, Setup Manager and Display

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
| **** SNMP MANAGER SETTINGS **** |
| |
| Get-Community name: |
| plb9i? |
| |
| Set-Community name: |
| pli9a?e |
| |
| Managed System: |
| 193.96.231.58 |
| |
| [Local] [Cancel] [Ok] |
+-----+

```

Manager selects the equipment to be accessed by SNMP. This does not have to be the equipment to which the terminal is attached. To look at a remote system, first enter the correct IP address of the remote equipment and then enter the “passwords” which in the SNMP world are called “Community names”.

After successfully selecting a remote system, the prompt in the very top line will change to show the IP address of the remote system and “local” will be replaced by “remote”. Select “Local” to return to the local system. In this case no names need entering.

```

+----TA-PABX:----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
+***** SNMP SYSTEM GROUP *****+
|
| System Description : CELL-MASTER SNMPv1 under test ver . 0.M
| System ObjectID   : 1.3.6.1.4.1.659.5
| System UpTime     : 0 days, 0 hrs, 4 min, 56.0 secs
| System Services   : 79
|
| System Location   :
| Enter my physical location here
|
| System Contact    :
| Enter the contact persons name here
|
| System Name       :
| Enter my IP domain name here
|
| [Cancel] [Ok]
+-----+

```

Display shows the snmp detail describing the particular system chosen in the first window. More detailed SNMP information can be found under the statistics menu.

### Setup - ILMl

```

+----TA-PABX:----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
+***** TA-PABX SYSTEM Message *****+
|
| The selected feature
| is not yet implemented
|
| [ OK ]
+-----+

```

This illustrates an option which is still being implemented and has not yet been released. Watch this space!

## Statistics menu

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/---+
| Misc Setup Statistics |
+-----+
| Interfaces -> |
| Protocol -> |
| *Services -> |
+-----+

Display interface statistics

```

The statistics options show whether the individual services are working correctly or not as the case may be. If errors are reported in the statistics, the configuration may need attention, the cabling may need checking or the attached equipment may be causing problems. If you are having trouble, use the statistics to see if you can localise the source of the problems.

There are a lot of statistics screens, this is meant to be helpful. Please don't get discouraged or confused, pick out the right screen to help with your particular problem.

### Statistics - Interfaces

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/---+
| Misc Setup Statistics |
+-----+
| Interfaces -> +-----+
| Protocol -> | Ethernet |
| *Services -> | E1/CES -> |
+-----+ | *LIF -> |
+-----+

```

Display Ethernet statistics (RFC 1213)

The options displayed here will depend upon the modules fitted in the system.



## Statistics - Interfaces - Ethernet

```

+----TA-PABX:----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics / |
+-----+
+***** IF STATISTICS *****+
|
|      Index      : 14
|      Description : Motorola 162 82596CA LANC
|      Type       : Ethernet
|      Mtu        : 1500
|      Speed      : 10000000
|      Physical Address : 08:00:3E:22:C0:19
|      AdminStatus : ---
|      OperStatus  : Up
|      LastChange  : 0 days, 0 hrs, 11 min, 46.0 secs
|
|      InOctets    : 0          OutOctets    : 88
|      InUCastPkts : 0          OutUCastPkts : 0
|      InDiscards  : ---       OutDiscards  : ---
|      InErrors    : ---       OutErrors    : ---
|      InUnknownProtos : 0
|
|                                     [Cancel] [Ok]
+-----+

```

Once again the index number here is automatically generated to differentiate between multiple occurrences.

## Statistics - Interfaces - E1/CES

```

+----TA-PABX:----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics / |
+-----+
| Interfaces -> +-----+
| Protocol   -> | Ethernet |
| *Services  -> | E1/CES   -> +-----+
|             +-----+ *LIF   -> | CES:101 |
|                                     | CES:102 |
|                                     | CES:103 |
|                                     +-----+
|
| Display CES statistics (RFC 1213)

```

CES stands for circuit emulation service, which uses AAL1. The numbers (e.g.101 in this example) are automatically generated index numbers, one for each circuit emulation interface detected during the power-up scan. The display on the following page is provisional and will be improved upon.

“Speed” is a value in bits per second

“AAL1 Header Errors” is the number of errored cells. Some of these may be correctable, those which are not are counted as “uncorrectable of them”.

**“Discarded cells”**. Should a cell arrive out of sequence, it will be discarded.

CELL-ACE / TA-PABX / TA-VIDEO manual

Note that these counters are only 32 bits, which means that after about 9 days, they will saturate and wrap back to zero.

## Statistics - Interfaces - LIF

```
+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
| Interfaces -> +-----+
| Protocol -> | Ethernet |
| *Services -> | E1/CES -> |
+-----+ | *LIF +-----+
| | | 10 |
+-----+
```

Display LIF statistics (RFC 1213)

LIF is an abbreviation for (ATM) line interface. In this example, only one ATM interface was found in the system, with index number 10.

```
+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
+***** IF STATISTICS *****+
|
| Index          : 10
| Description    : An ATM(ifIndex:10) - ILMI not supported,
| Type          : ATM
| Mtu           : 53
| Speed         : 149760000
| Physical Address : ---
| AdminStatus   : ---
| OperStatus    : Down
| LastChange    : 0 days, 0 hrs, 21 min, 13.0 secs
|
| InOctets      : 0           OutOctets      : 700391184
| InUCastPkts   : ---        OutUCastPkts   : ---
| InDiscards    : ---        OutDiscards    : ---
| InErrors      : ---        OutErrors      : ---
| InUnknownProtos : ---
|
| valid cells   : 0
| idle cells    : 0
| detected cell errors : 0
| corrected cell errors : 0
| Loss of cell-sync counter : 0
|
| [Cancel] [Ok]
+-----+
Q -> Quit, C -> Clear, A -> Auto Refresh Mode, Other -> Refresh
```

## Statistics - Protocol

```

| Misc Setup Statistics |
+-----+
| Interfaces -> |
| Protocol -> +-----+
| *Services -> *TCP |
|               IP   |
|               UDP   |
|               ICMP  |
|               SNMP  |
|               +-----+
|
Display TCP statistics (RFC 1213)

```

Which protocol would you like statistics about?

## Statistics - Protocol - TCP

```

+----TA-PABX:----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
+***** TCP STATISTICS *****+
|
| RtoAlgorithm      : 4      EstabResets   : 0
| RtoMin            : 1000   CurrEstab    : 0
| RtoMax            : 64000  InSegs     : 0
| MaxConn           : -1    OutSegs     : 0
| ActiveOpens       : 0     RetransSegs  : 0
| PassiveOpens      : 0     InErr      : 0
| AttemptFails      : 0     OutRsts    : 0
|
|                                     [Cancel] [Ok]
+-----+

```

## Statistics - Protocol - IP

Watch this space!

## Statistics - Protocol - UDP

```

+----TA-PABX:----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
+***** UDP STATISTICS *****+
|
| InDataGrams       : 405      OutDataGrams : 409
| InNoPorts         : 0
| InErrors           : 0
| LocalAddress      : ---      LocalPort      : ---
|                                     [Cancel] [Ok]
+-----+

```

## Statistics - Protocol - ICMP

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
+***** ICMP STATISTICS *****+
|
| InMsgs      : 2      OutMsgs      : 1
| InErrors    : 0      OutErrors    : 0
| InDestUnreaches : 0    OutDestUnreaches : 0
| InTimeExcds : 0      OutTimeExcds : 0
| InParmProbs : 0      OutParmProbs : 0
| InSrcQuenchs : 0     OutSrcQuenchs : 0
| InRedirects  : 0     OutRedirects  : 0
| InEchos      : 1      OutEchos      : 0
| InEchoReplies : 1     OutEchoReplies : 1
| InTimeStamps : 0      OutTimeStamps : 0
| InTimeStampsRepl : 0   OutTimeStampsReplies : 0
| InAddressMasks : 0    OutAddressMasks : 0
| InAddressMaskReplies : 0 OutAddressMaskReplies : 0
|
|                                     [Cancel] [Ok]
+-----+

```

## Statistics - Protocol - SNMP

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics |
+-----+
+***** SNMP STATISTICS *****+
|
| InPkts      : 207      OutPkts      : 210
| InBadVersions : 0      OutTooBig    : 0
| InBadCommunityNames : 0    OutNoSuchNames : 35
| InBadCommunityUses : 0    OutBadValues : 0
| InASNParseErrors : 0      OutReadOnly : ---
| InBadTypes     : ---     OutGenErrors : 0
| InTooBig       : 0      OutGetRequest : 0
| InNoSuchNames  : 0      OutGetNexts  : 0
| InBadValues    : 0      OutSetRequests : 0
| InReadOnly     : 0      OutGetResponses : 206
| InTotalReqVars : 353    OutTraps      : 4
| InGenErrors    : 0
| InTotalSetVars : 0      EnableAuthTraps :
| InGetRequests  : 73      (o) Enabled
| InGetNexts     : 134     ( ) Disabled
| InSetRequests  : 0
| InGetResponses : 0
| InTraps        : 0
|
|                                     [Cancel] [Ok]
+-----+

```

## Statistics - Services

Watch this space

## Supervisor menu

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics Supervisor |
+-----+-----+-----+
|                                     |
| Software Update |
| *Loops          |
| Special         |
| SNMP Agent      |
|                                     |
+-----+-----+-----+

Update CellMaster software

```

This menu will only appear if the supervisor password was used at log-in. This allows more control over access and changes to the equipment.

### Supervisor - Software update

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics Supervisor |
+-----+-----+-----+

** TA-PABX Software Update **
|                                     |
| Select download method           |
|                                     |
| ( ) Serial Line                  |
| (o) TFTP                         |
|                                     |
| [Cancel] [Ok]                   |
+-----+-----+-----+

```

This allows the software to be updated by down-loading a new version. The new version can either be loaded from a local PC using the VT100 interface or remotely via Ethernet using TFTP, initiated from the Cellware box concerned.

```

+---TA-PABX:---193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics Supervisor |
+-----+-----+-----+

* Software Update via T-FTP *
|                                     |
| Filename:                        |
| eric.rm2                         |
|                                     |
| IP Address:                      |
| 193.96.231.89                   |
|                                     |
| [Cancel] [Ok]                   |
+-----+-----+-----+

```

For tftp, you will be asked for the IP address of the source, plus

the filename. If you don't know about IP, ask your system manager for help.

## S-records

Cellware software updates can be delivered on DOS diskettes or fetched from our ftp server in a format commonly known as “S-record”. This format is designed for easy transfer of binary code information (where each byte can have any decimal value from 0 to 255) and is so encoded that only normal ASCII text characters are required for the transmission process, thus avoiding the problem of what to do with decimal values used for control functions e.g. for flow control.

It is not necessary to understand S-records or to do any conversion. Care should be taken however, to use a simple ASCII (plain text) file transfer. If using the serial line interface, do not use a file transfer process designed for “binary” files such as X-modem or Kermit.

Cellware boxes expect to receive an S-record, plain and simple.

## Update procedure

The update procedure is quite simple and is explained step for step, by text prompts on the PC used for CELL-SCREEN. For the serial option, familiarity is required with the “file transfer” process on the PC used. There are many such programmes; the standard terminal within Windows includes an upload option, for example. The exact detail of the process will thus vary from programme to programme.



Important accessory whilst updating

The FLASH memory used for nonvolatile storage is slow to erase and even slower to programme. Erasing may take 2 or 3 minutes, programming (updating) can then take over 10 minutes when using, for instance, the Windows terminal. Other terminal emulation programmes can be very much slower. CELLWARE can not recommend using Norton Commander. An update using TFTP via Ethernet can be as quick as 2 minutes.

## FTP server

Note that Cellware maintains an FTP server from which you can download new versions of the software.

An FTP access to get the latest software version looks something like this:

- establish an FTP connection to 'ftp.cellware.de'
- log in as user 'ftp' or 'anonymous' (no password required)
- cd to tapabx

Here you will find a compressed file with the newest system software. Compressed means “zipped”, which will significantly reduce the transmission time for the file.

For example *software: tap\_xxxn.zip*, where xxxn is the version number (e.g. 2.11b).



**Please Note!** A zipped file is binary coded and you must fetch it bearing this in mind. If your application thinks that it is ascii, it will discard every 8th bit, which is not a great improvement.

CELL-ACE, TA-PABX or TA-VIDEO can then be updated via a PC with a VT100 emulation, attached to the connector labelled “RS232C Terminal”. The password for the CELL-SCREEN environment is required, but then the update process is easy to use and no training is required, as prompts are issued to help the user.

### Fail-safe

A permanent, (unerasable) minimum version of the software is always available, in case an update fails for any reason.

### Supervisor - Loops

Coming soon!

### Supervisor - Special

Watch this space!



## Supervisor - SNMP agent

```

+-----TA-PABX:-----193.96.231.58 <local>-----/c_/e_/l_/l_/w_/a_/r_/e_/--+
| Misc Setup Statistics Supervisor - |
+-----+

+***** SNMP AGENT SETTINGS *****+
|
| ATM-NET Get-Community: Internet Get-Community:
| publicA publicI
|
| ATM-NET Set-Community: Internet Set-Community:
| privateA privateI
|
| Managers address: Managers address:
| 192.168.1.2 193.96.231.111
|
| ATM-NET accesslevel : Internet accesslevel :
| (o) high (o) high
| ( ) middle ( ) middle
| ( ) low ( ) low
| ( ) no access ( ) no access
| [Cancel] [Ok]
+-----+

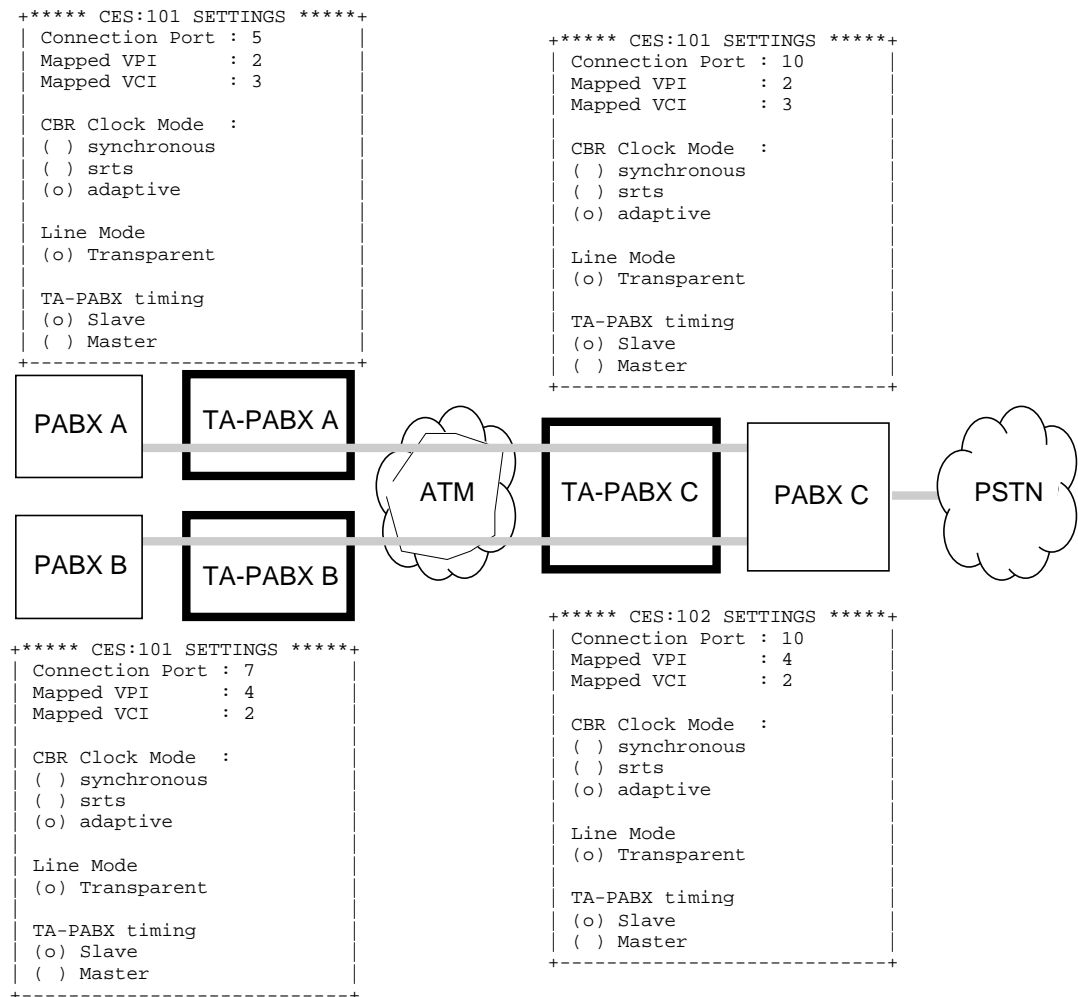
```

This is concerned with the more secure aspects of the SNMP agent, which benefit from the additional protection provided by the supervisor password.



# CONFIGURING CIRCUIT EMULATION

Consider the following example. The exact detail here depends of course upon which modules are fitted in your unit. (The previous chapter shows the complete menu structures for the CellScreen environment.)



(PSTN - public switched telephone network)

You need to

- configure some ATM parameters.
- select the service timing source

(See also the discussion about timing in ATM networks.)

If your equipment supports G.704 framing

- Framing options must be set

If the service timing is to be taken from remote equipment in the ATM network

- The clock recovery mechanism must be selected

## Configuring ATM

Only single ATM channels need to be defined, as circuit emulation is always a point to point service. In our example, the following are required:-

TA-PABX		TA-PABX	VPI	VCI	use
A	<->	C	2	3	E1 CES
B	<->	C	4	2	E1 CES

(NB CES = Circuit Emulation Service)

Each entry has to be made separately. For instance to configure the E1 circuit emulation connection between TA-PABXs A <-> C, using the “PVC Setup” option from the “Setup” menu.

```

***** TA-PABX PVC CONFIGURATION *****
|
|  Add PVC Entry
|
|  VPI   :      0x2      Service = E1
|  VCI   :      0x3
|
|                               State
|                               ( ) Down
|                               (o) Up
|
|                               [Cancel] [Ok]
|
+-----+
TA-PABX A

```

Which then results in a PVC table which looks like this:-

PVC	VPI	VCI	AAL	State	Service
1	0x2	0x3	1	UP	E1:1
2					
3					
4					
5					

TA-PABX A

Corresponding entries would of course be required in TA-PABX C and, the ATM infrastructure (e.g.ATM switches) must also be configured for the same VCI/VPI values.



## CBR ClockMode

```
+-----+
| ( ) synchronous |
| ( ) srts        |
| (o) adaptive    |
+-----+
```

When providing a circuit emulation service over ATM, the timing at the receive side must be synchronised to the timing at the transmitting end.

This timing can be derived from the ATM network, in which case the transmit mode is “synchronous”. This is the preferred, (lowest jitter) mode of operation if the ATM network itself is synchronous e.g. it is a public ATM network. Note also that the “synchronous” option refers to being synchronous to the ATM network, not any PSTN network as for example shown in the scenario above. Some private ATM networks are not synchronous and the synchronous option will not work.

The “srts” option is not currently supported by TA-PABX but is also an option which requires that the ATM network itself is synchronous.

The “adaptive” option is the catch-all solution, which does not require a synchronous infrastructure. The drawback is a poorer jitter performance. Adaptive refers to the mechanism used for clock recovery from the incoming ATM data stream.

## Line Mode

```
+-----+
| (o) Transparent |
| ( ) MultiFrame without CRC |
| ( ) MultiFrame with CRC4  |
| ( ) Frame without CRC    |
| ( ) Frame with CRC4      |
+-----+
```

This set of options is concerned with the fine detail of G.704 framing. The appropriate option will depend upon what the attached equipment requires. Contact your supplier for more detail.

Note that TA-VIDEO only supports the transparent option. The following discussion thus only concerns TA-PABX and CELL-ACE.

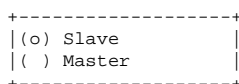
G.704 framing divides the total capacity into 32 “timeslots”, of

which 2 slots are used for synchronisation and signalling purposes.

Transparent means that TA-PABX ignores any structure in the data stream and treats each bit just as a bit and not as part of a 32 x 8 bit long structure.

The effect of choosing a structured option is that TA-PABX will generate the specified frame type, filled initially with dummy data as specified in the ITU-T specification. When data arrive over the network, these will then be put into the correct positions in the frame. The attached equipment will usually respond to the framed signal by producing its own framed signal, which can then be put onto the ATM network, using the structured data transfer (SDT) process as defined for AAL1 in ITU-T I.363.

## Timing



This is relevant for the “adaptive” mode of operation, when the ATM network clock is not used as a reference. In this case an alternative reference is required and this can either be taken from the attached equipment (e.g.PABX) or from the TA-PABX. Both PABX and TA-PABX are capable of locking onto an incoming G.703 signal but it is preferable to fix one and thus prevent possible instability (due to both sides trying follow a moving target). Note that if a PABX has a second connection to a “conventional” public telephone network, it should certainly derive its timing from this conventional connection and the TA-PABX should then take its reference from the PABX.

Selecting “Master” thus means that the TA-PABX transmits with a fixed frequency and expects the attached equipment to lock onto this signal. This is most unusual and should only be regarded as a test option.

“Slave” means that the TA-PABX will lock onto and follow the received signal frequency from the attached equipment. Note that one and only one TA-PABX (if at all) should be set as

“Master” for brief test purposes. See also the discussion about timing in ATM networks.

“CBR clock mode” and “TA-PABX timing” are difficult to understand. Take your time and read the description carefully. Note that TA-PABX always recovers the timing from every received signal whatever the mode settings. The signal could otherwise not be received!

CBR clock mode	TA-PABX timing	Timing source for RX data
-----	-----	-----
don't care	don't care	Received signal from attached equipment

The mode settings are concerned with signals originating from the TA-PABX, that is with transmitted signals. The important question is where does the timing reference come from for signals produced by TA-PABX?

CBR clock mode	TA-PABX timing	Timing source for TX data
-----	-----	-----
async.	slave	Adaptive clock recovery from received ATM cells
async.	master	TA-PABX free-running
sync.	master	ATM network timing
sync	slave	- not allowed -

## Admin Status

This is a switch for test purposes to enable(up)/disable(down) the circuit emulation service.

## Partial Cell Fill

Is a technique not currently supported by TA-PABX

## Cell delay variation

Oh dear, this is also hard to follow. ATM networks do not have a fixed transmission time. From cell to cell the delay through the network can vary. This is called “cell delay variation” or CDV. In order that holes do not appear in the regenerated (from the ATM network) data stream, TA-PABX must buffer enough data to bridge gaps caused by CDV.

There is a snag however; voice channels must not suffer too much delay or echo will start to be a problem. For this reason, TA-PABXs buffer size is configurable and the user can set the expected CDV, which will automatically result in the appropriate, minimum buffer size. The units for CDV are



milliseconds e.g. the value of 4 corresponds to a delay of 4 milliseconds and a buffer size of 1024 bytes.

The “Maximum buffer size” field is not editable as the value is automatically calculated on the basis of the CDV entry.

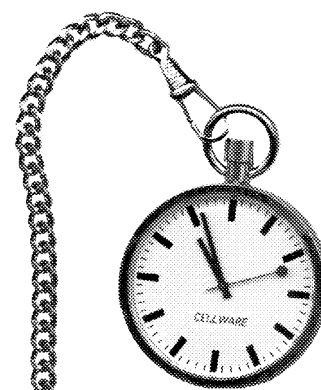


# CHOICE OF TIMING STRATEGY - WHO SUPPLIES THE CLOCK?

**When can the synchronous AAL1 mode be used?**

## Public ATM networks

The synchronous AAL1 mode of operation relies on the entire ATM network used operating synchronously, with one master clock. This will be the case when using a public ATM network, where it is common practice to use a "caesium clock" for an entire country. From this master clock the various hierarchical bit-rates are produced. At international boundaries very small discrepancies are allowed, typically meaning a one bit "slip" per week. This is known as a plesiochronous network. This should present no problem when using the synchronous AAL1 mode.



## Private ATM networks

Private ATM networks are designed to be easy to install and, as far as is possible, self configuring. This does tend to prohibit a synchronous network, where a master clock sets the beat. The technology is called ATM after all, the A standing for asynchronous. The private ATM line rates are defined to within 100 ppm (ATM Forum) but are not necessarily synchronous. In this case the asynchronous AAL1 mode must be used with adaptive clock recovery. (The SRTS mechanism requires a synchronous network.)

## Reference timing for AAL1 circuit emulation over ATM

Consider the differing precision allowed by the ITU (CCITT) and the ATM Forum for ATM interfaces.

CCITT G.703 STM-1	155.520 Mbit/s	±20 ppm
ATM Forum UNI v3.1 private UNI	155.520 Mbit/s	±100 ppm

The ATM Forum UNI v3.1 says -

"...The encoded line rate shall be 155.52 MBaud ±20ppm for ATM network equipment..."

and it also says -

"...In the absence of a valid clock derived from the received line signal, the transmitter at the ATM user device shall use a free-running transmit clock that operates at 155.52 MHz  $\pm 100$ ppm..."

This  $\pm 20$ ppm /  $\pm 100$ ppm rule seems to apply for all ATM Forum PMD specifications.

Now consider the precision found in ITU specifications.

Line rates specified in CCITT G.703

E1 G.703	2.048 Mbit/s	$\pm 50$ ppm
E2 G.703	8.448 Mbit/s	$\pm 30$ ppm
E3 G.703	34.368 Mbit/s	$\pm 20$ ppm
E4 G.703	139.264 Mbit/s	$\pm 15$ ppm

As an example, suppose that 2 PABX's with E1 trunk interfaces are to be connected via an AAL1 circuit emulation service over an ATM network. These will normally expect to "see" a 2.048 Mbit/s G.703 connection with a precision of  $\pm 50$  ppm. If they are attached to a private ATM network only, with a precision of  $\pm 100$  ppm they may not be able to synchronise properly to the "emulated" circuit.

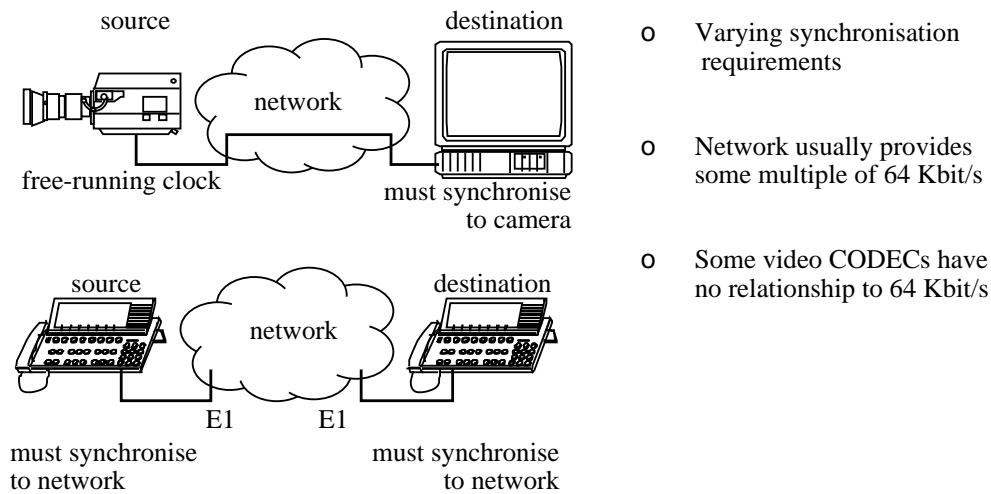
There are two solutions to this problem.

## **Synchronous transport**

The private ATM network could be synchronised to a public network, thus increasing the precision to 20 ppm.

## **Asynchronous transport**

The circuit emulation could take its timing from the PABX's. One PABX will start with a free-running frequency which will be carried over the network by the circuit emulation. The other PABX receiving this signal will lock onto this and return a synchronous signal.




---

Synchronisation of source and destination

## A simple rule

Use adaptive circuit emulation. It will always work and it's uncomplicated to configure.

## Clock recovery in asynchronous mode - adaptive and SRTS

Two clock recovery options are specified for transport asynchronous to the ATM network - "adaptive" and "synchronous residual time stamp", only the adaptive mode is currently supported and this is compatible to any 3rd party equipment which may use SRTS.

## What is SRTS?

This process (not currently supported) is defined in ITU Recommendation I.363. The ATM network clock is taken and divided by  $2^k$ , where  $k = 0, 1 \dots 11$ .  $k$  is chosen to produce a frequency near the service bit-rate (greater than but less than twice the rate). The difference between the service bit-rate and the network related frequency is produced and the 4 lsbs of this difference are transmitted using 4 CSI bits from 8 successive ATM cells. These 4 bits comprise the SRTS. Both transmitter and

receiver carry out this process and by comparing the locally produced SRTS with the received far-end SRTS, the local clock can be synchronised to the remote clock. Note that this process requires a synchronous network - see the discussion above about private ATM networks.

## **Adaptive clock recovery**

If the SRTS mechanism cannot be used then the adaptive option provides a catch-all fall-back solution. A certain number of received cells are buffered in the RX FIFO memory and the locally generated FIFO read clock is slowly varied so as to maintain the average "fill-level" in the FIFO.

## DELAY DUE TO AAL1

The total transmission delay varies with the exact mode of operation. Best delay performance will result from synchronous transport of high bandwidth applications, as the buffer size at the receiving end must only cope with the expected cell delay variation (CDV) over the particular ATM link used.

If the line rate is 155 Mbit/s, one ATM cell is transmitted every 2.7 microseconds. If a single switch buffers 10 cells, this will cause a delay of 27 microseconds for instance. If the same switch is running with 34 Mbit/s lines, the time for 10 cells increases to 124 microseconds. The total will thus vary depending upon the number and type of switches crossed on the route.

With asynchronous transport, the buffer dimensioning must also take account of the clock recovery mechanism. For these reasons the effective size of the 4096 bytes receive buffer (RX FIFO) is programmable from 0 to 2048 bytes. Choosing 2048 bytes means that the average fill level should be 2048 and the allowable variation due to CDV is from 0 to 4096 bytes or 0 to 87 cells, a delay from 0 to 16 ms. When configuring AAL1, the user is asked for a value in milliseconds and does not have to work out these conversions from bytes to cells to time.

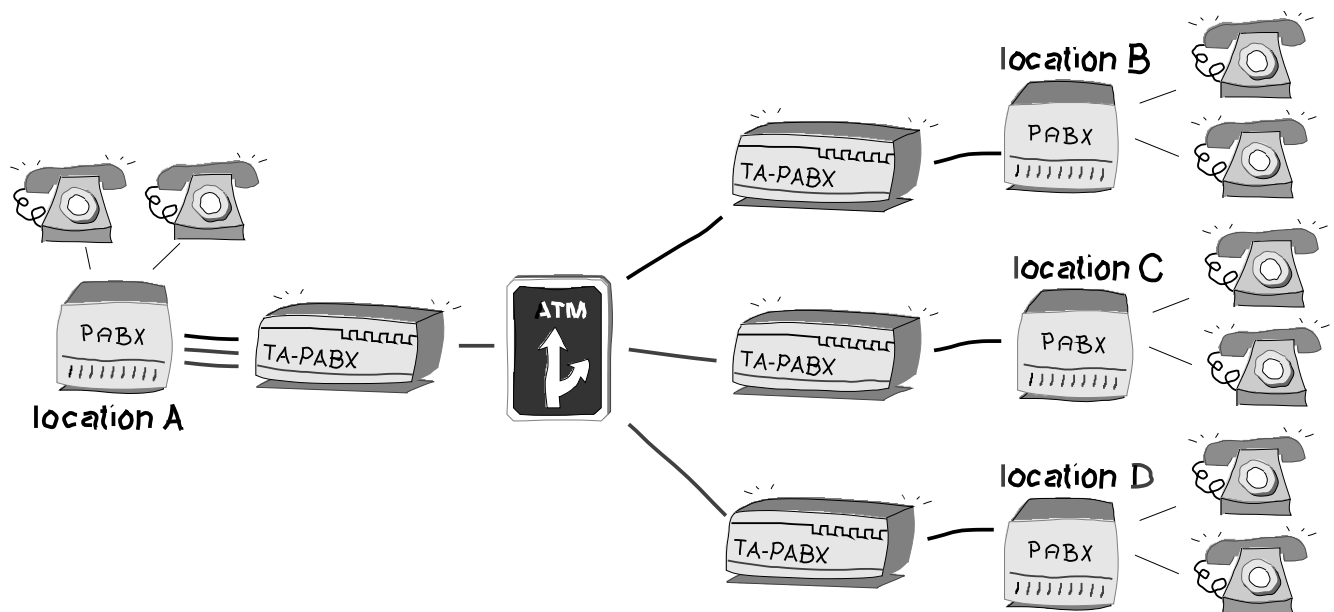
### E1 Delay

A basic parameter for delay, additional to those listed for the main board, is the time taken to fill one ATM cell. For non-structured transport, 47 bytes are available for payload. At 2 Mbit/s a byte is available roughly every 4 microseconds. The time to fill one cell is thus 184 microseconds. The time to process one received cell is roughly the same - 184 microseconds. (Note that as soon as a cell has been received, the first byte can be read out. The causes of delay at the receive side are different) Simply packing and receiving thus takes 367 microseconds or about a third of a millisecond.

Additionally, an average of typically 11 cells are held in a buffer at the receiving end, to cope with cell delay variation in the network. This introduces a fixed delay of about 2 ms. Note that

the effective size of this 4096 bytes buffer is software configurable from 0 to 2048 bytes. Choosing 2048 bytes means that the average fill level should be 2048 and the allowable variation due to CDV is from 0 to 4096 bytes or 0 to 87 cells, a delay from 0 to 16 ms. When configuring AAL1, the user is asked for a value in milliseconds and does not have to work out these conversions from bytes to cells to time.

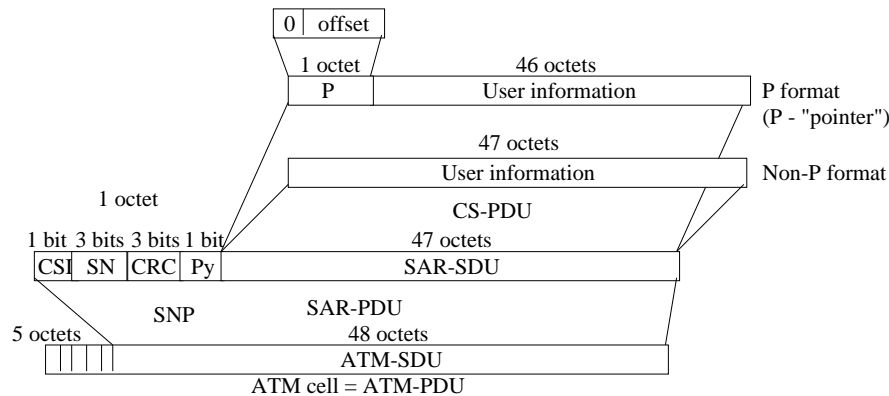
Note that, depending upon the topology of the PABX connections, some corporate networks will pass speech data through 2 pairs of TA-PABXs. The delay examples above must then be doubled.



Reusing the earlier example, you can see that to telephone from location B to C, it is necessary to go via location A. This then involves two pairs of TA-PABX.



# EVERYTHING YOU ALWAYS WANTED TO KNOW BUT WERE AFRAID TO ASK ABOUT AAL1



*AAL type 1 structure*

- P = octet offset of data block over 2 cells  
(= 0111 111 if not required)
- CS = Convergence Sublayer
- CSI = Convergence Sublayer Indication
- CRC = Cyclic Redundancy Check
- SN = Sequence Number
- (non-P; CSI = 0)
- P format; CSI = 1 only if SN = 0,2,4 or 6 )
- SNP = Sequence Number Protection
- P = Pointer
- Py = Parity (even, 1 bit)
- SAR = Segmentation And Reassembly
- SDU = Service Data Unit
- PDU = Protocol Data Unit

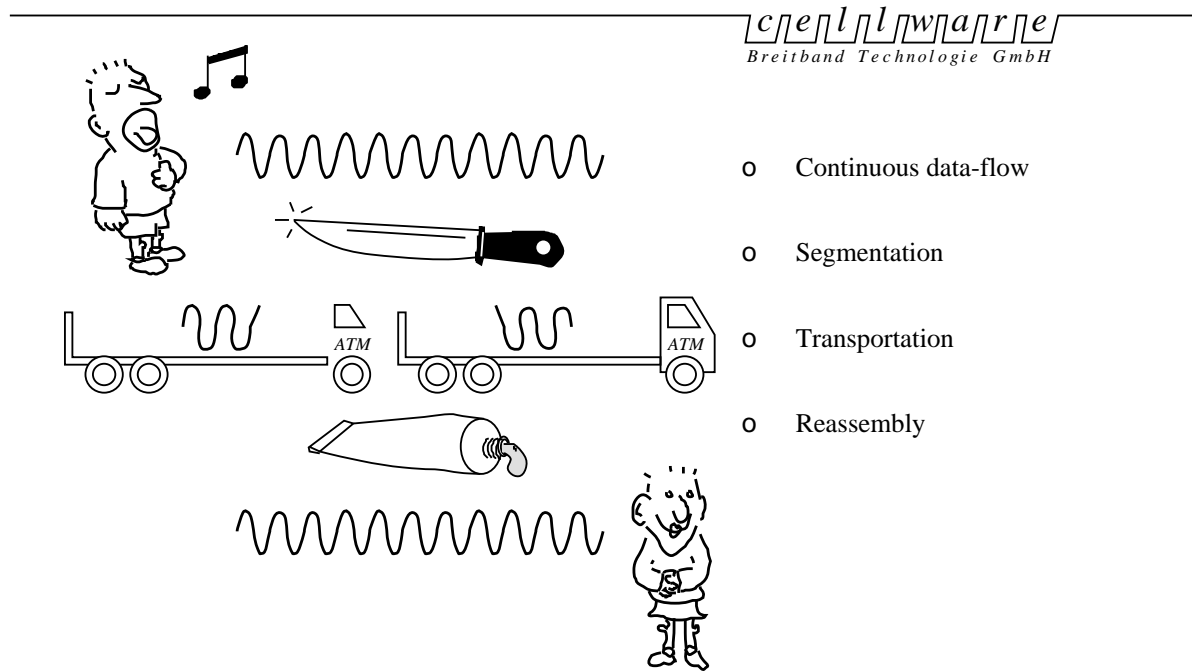
See ITU(CCITT) Recommendation I.363 for more detail.

## What is AAL1?

AAL1 is the abbreviation for Asynchronous Transfer Mode (ATM) Adaption Layer 1 and is a communications service intended for continuous data flowing from a source over an ATM network to a destination without interruption. Source and destination must thus use the same timing information, or the AAL1 service must carry it. AAL1 is partially specified in ITU-T recommendation I.361. The Deutsche Bundespost Telekom research centre (FTZ) has issued a document 1TR419 which

attempts to extend the ITU recommendation enough to guarantee interworking within the German B-ISDN pilot project.

## Is AAL1 suitable for voice transmission?

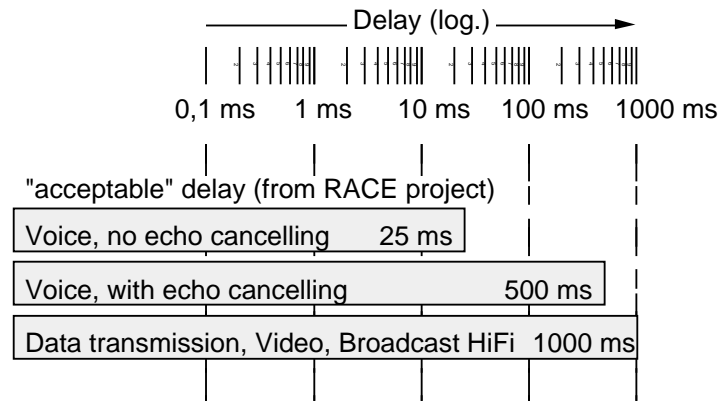


ATM adaption layer AAL1 basic principles

Speech data are suited for transmission using AAL1. A-law or  $\mu$ -law (telephone quality) encoded voice continuously generates one 8-bit sample every 125  $\mu$ s for example. This is constant bit rate (CBR) data, sometimes also described as constant bit rate oriented (CBO) data and is thus, in principle, suited to AAL1.

Delay may be a problem here. If 47 samples are collected before a cell is transmitted, this means a collection delay of  $47 \times 125 \mu\text{s} = 5.875$  milliseconds. The same amount of time is then required to unload a cell, making a minimum total delay of 11.75 ms.

If this delay is significantly added to by the network, then echo may start to become a problem.



If several signals can share an ATM cell, then this problem is reduced e.g. 30 voice channels (as in an S2M connection) would each suffer only one thirtieth of the delay, which can then be neglected.

## Can circuits (leased lines) be emulated using AAL1?

Yes! Existing applications which use leased lines expect source and destination to be completely synchronous and to cope with 100% loading. 100% loading corresponds to constant bit rate data which thus requires AAL1. All sorts of data are carried on leased lines, for example corporate telephony, where private branch exchanges are linked together. This is completely suitable for emulation via AAL1.

Packet-based data is also carried on leased lines, which may not always use 100% of the capacity. Strictly speaking packets of data would do better using AAL3/4, but for many existing installations it is simpler to say that if a leased line was O.K. before ATM, circuit emulation is O.K. with ATM.

## Is AAL1 suitable for video transmission?

Video images generate one two-dimensional array of data (a video frame) every 20 ms. This is very regular and thus theoretically requires AAL1. Video can unfortunately be a bit of a borderline case. Using inter and intra-frame coding (e.g. MPEG) to reduce the data volume, produces a packet of information every 20 ms. The use of interframe coding (and motion prediction) however results in a conceptual problem.

Interframe video coding and AAL1?

Interframe coding means comparing two (or more) video frames

in a video sequence. It will often be the case that there is little difference between successive frames. If a scene contains “talking heads” the background is basically unchanging and, as important as facial expression is, a smile does not produce much difference information. When a “cut” occurs, with a brand new image this will then produce a large burst of difference information. A video CODEC asked to compress such a video sequence then has two choices:

either - the video CODEC can maintain a constant image quality and produce a bursty (not constant bit-rate) stream of compressed data.

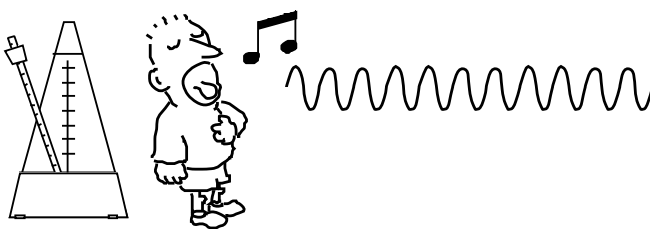
or - the video CODEC can maintain a constant bit-rate and produce a variable image quality. The first frame of a new scene would be low quality, but would be improved in successive frames.

For demanding video applications where quality has top priority, the bursty, compressed video might be better suited by AAL3/4 or 5 for transmission...(see CELL-AAL3/4,5-VME owners manual)

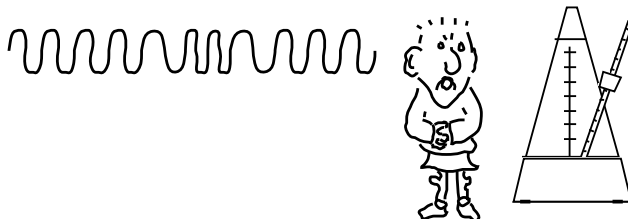
Timing information at the receive end

---

*cellwäre*  
Breitband Technologie GmbH



- ☐ Constant bit-rate service
- ☐ CBR / CBO
- ☐ Transfer timing information
- ☐ Who sets the beat?




---

AAL1 and time

Reconstructed video (half) frames are displayed every 20 ms. Strictly speaking, the reconstructed video should be synchronous to the original video. However, the screen buffer used at the receiving end in the decompression process can reduce the demands on the timing to the point where AAL1 may not be required. Once again there is a choice:

either - AAL3/4 or 5 is used and the receiver frame buffer is used to cope with non-synchronous operation. This will result in a quality reduction, particularly when there is movement in the image sequence.

or - AAL1 is used which transmits the timing information with the video data, however compressed. This will maintain the image quality.

Maximum quality transmission

Is achievable, using AAL1.

If the video CODECs used are capable of transmitting timing information “in-band”, together with the compressed data, then AAL3/4 or AAL5 can also provide maximum quality of service. With a repetition rate of 20 ms, the absence of video frame sequence numbers cannot be regarded as a problem. Note that the MPEG standard does include the transmission of timing information.

A simple case

When video is not compressed, then a sample (pixel) is typically produced every 74 ns, which puts it firmly in the AAL1 arena.

## **Is traffic shaping required for AAL1?**

For an ATM network to be utilised as fully as possible, it is important to try and avoid bursty ATM traffic. For this reason, the concept of traffic shaping has been developed, for the controlled transmission of ATM cells for packet-based traffic - using AAL3/4 or AAL5.

AAL1 is by its nature “non-bursty” as it is designed for continuous bit rate traffic. The specification for AAL1 thus does not include traffic shaping.



# TROUBLESHOOTING

You think that the CELL-ACE, TA-PABX or TA-VIDEO is not working properly

Connect a VT100 terminal and open the CELL-SCREEN environment. See “The CELL-SCREEN environment”.

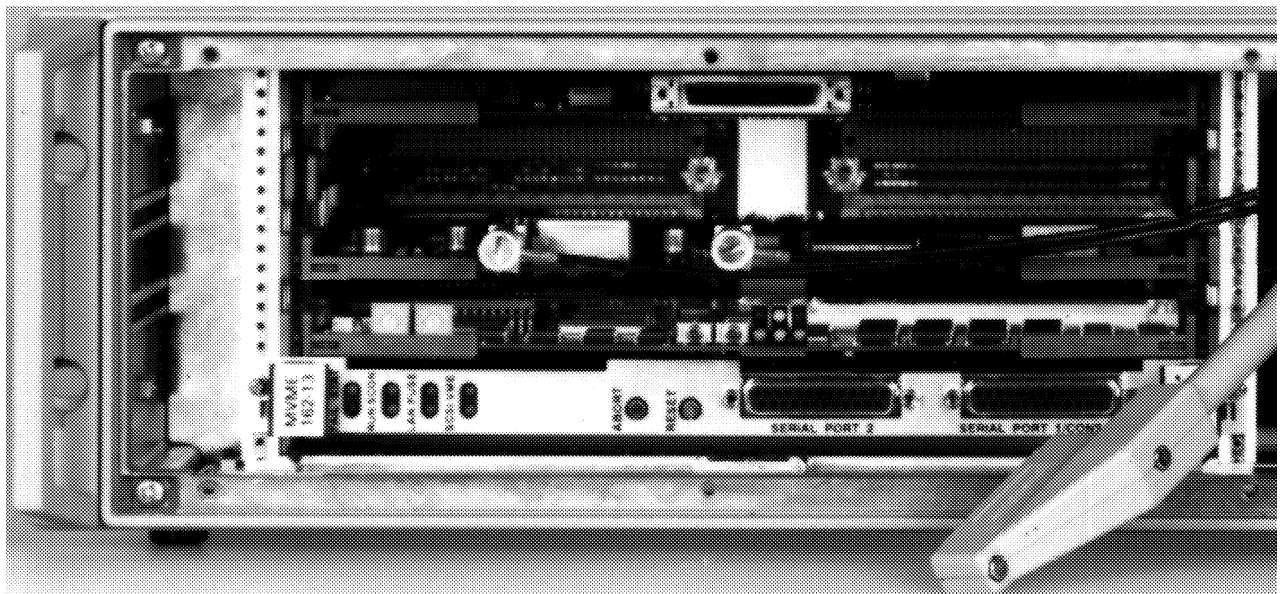
You think that a cable is not working

Are you sure that the input and output cables are not swapped? You can test a single cable by using it to loop input and output together. Does your cable have the correct characteristic impedance ? Are you using monomode optical fibre where monomode is required? Are you using multimode optical fibre where multimode is required?

ON light goes off

Excess temperatures will result in the power supply shutting down, to prevent permanent damage. As the equipment cools down, power will be re-established and the system will automatically restart. Should this type of power cycling be observed, check that the ventilation is not obstructed and that the filters are not blocked.

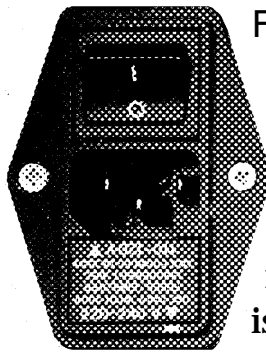
## Board swapping



Should the need arise to exchange a board, it will be necessary to remove the power. Make a note where the cables are attached if you choose to remove any.

The position of the boards is fixed. So fit the replacement board in the same slot as the old board was removed from. If exchanging a CELLWARE manufactured board, ensure that the two hexadecimal switches near the front of the new board are set to the same value as on the old board. (This sets the VMEbus base address).

Note that the front panel is an integral part of the electromagnetic screening and that all screws must be refitted to maintain effective performance.



#### Fuse

Should for any reason a fuse need changing, these are located within the IEC connector block. Note that the fuse receptacle has 2 positions labelled 110 and 220 V respectively. This is not a voltage switch and should be replaced in the same orientation as delivered. The fuse type is 3.15A slow-blow, either 5x20mm or 1/4" x 1 1/4".

#### Overheating

Should the ventilation to or from the box be obstructed, it can happen, that the internal temperature limit of 65°C is exceeded. If this happens, a thermal switch will cut in, removing all power to the unit, but leaving the fans running. Should this occur, remove the power, clear the obstruction and allow the unit to cool down. In this case, no fuse needs changing.



# SERVICE AND MAINTENANCE

## Technical support

If you are still encountering problems, contact our technical support staff between 10:00 am and 6:00 pm, Central European Time.

You will get best support, if you send us a fax or e-mail describing your problem and mentioning the serial numbers of your products e.g. from the label at the rear of the equipment,



together with the title and version number of any CELLWARE software concerned.

Note the value of screen-dumps. If you can send us a statistics screen from CellScreen for instance, it helps our team a lot, to quickly locate your problem.

Telephone

national: (030) - 46 7082 - 0

international: (++49) - 30 - 46 7082 - 0

Fax

national: (030) - 46 307 - 658

international: (++49) - 30 - 46 307 - 658

Electronic mail

support@cellware.de

## Repairs and guarantee

Each CELLWARE product is run through a battery of functional tests to protect our users against failures in the field. We pride ourselves on delivering reliable products to you and each item is supplied with a guarantee. However, in the unlikely event that you have a defective unit, you will need to return this to us for repair or replacement.

## Technical support

Do get in touch with our technical support before shipping back for repair. It may just be “finger trouble” and some support may clear up the problem.

## Repairs

Please try to use the original packaging when returning products to us. Address the package to:

Cellware GmbH

(Service Department)  
Gustav-Meyer-Allee 25  
13355 Berlin  
Germany

# PACKAGING AND THE ENVIRONMENT

Just a short word about packaging. CELLWARE does its best to look after the environment. Equipment damaged during transport wastes energy and time, so we use a reasonable amount of packaging to protect the equipment. The carton is made from corrugated cardboard and we use a minimum amount of expanded polyethylene (PE) as a shock absorber, between the hardware and the carton. The PE foam is manufactured without the use of polyfluorocarbons (ozone-killers) and it contains no softeners, no chlorine, no sulphur or silicon - no halogens, no cadmium or lead or other stabilisers, no heavy metals at all. It behaves neutrally in land-fill and if burnt, water and carbon-dioxide are produced. PE can in fact be 100% recycled into new PE products.



# ABBREVIATIONS

AAL	ATM Adaption Layer
AIS	Alarm Indication Signal
AM	Address Modifier
AMI	Alternate Mark Inversion
ANSI	American National Standards Institution
APS	Automatic Protection Switching
ASCII	American Standard Code for Information Interchange
ATM	Asynchronous Transfer Mode
BER	Bit Error Ratio
BIP	Bit Interleaved Parity
B-ISDN	Broadband Integrated Services Digital Network
BITS	Building Integrated Timing System
BOM	Beginning Of Message
CAS	Channel Associated Signalling
CATV	Community Aerial TeleVision
CBDS	Connectionless Broadband Data Service
CBO	Constant Bitrate Oriented
CBR	Constant Bit Rate
CCITT	International Telegraph and Telephone Consultative Committee. (now called ITU - International Telecommunications Union)
CDV	Cell Delay Variation
CES	Circuit Emulation Service
CLNAP	ConnectionLess Network Access Protocol
CLP	Cell Loss Priority
CMI	Coded Mark Inversion
CODEC	COder / DECoder
COM	Continuation Of Message
CPI	Common Part Indicator
CPCS	Common Part Convergence Sub-layer
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
CSI	Convergence Sublayer Indication
DA	Destination Address
DCE	Data Communications Equipment
DIN	Deutsches Institut fuer Normung (German standards institute)
DMA	Direct Memory Access
DQDB	Dual Queue Distributed Bus
DSU	Digital Service Unit
DS3	Digital Service level 3
DTE	Data Terminal Equipment
DXI	Data eXchange Interface
EEPROM	Electrically Erasable Programmable Read Only Memory
EOM	End Of Message
ES	Errored Seconds
ESF	Extended Super Frame
ETSI	European Telecommunications Institute
FEBE	Far End Block Error
FEC	Forward Error Correction
FERF	Far End Received Failure
FIFO	First In First Out
GFC	Generic Flow Control
GmbH	Gesellschaft mit begrenzter Haftung - German for limited company
HDB3	High Density Binary 3
HEC	Header Error Correction
hex.	hexadecimal
HSSI	High Speed Serial Interface
I	Input
IACK	Interrupt Acknowledge
IE	Information Element
IETF	Internet Engineering Task Force
ILMI	Interim Local Management Interface
IP	Internet Protocol
IRQ	Interrupt ReQuest

ISO	International Standards Organisation
IT	Information Type
ITU	International Telecommunications Union (previously known as CCITT)
LCA	Logic Cell Array
LED	Light Emitting Diode
LI	Length Indication
LIF	Line InterFace
LOC	Loss Of Cell synchronisation
LOF	Loss Of Frame
LOS	Loss Of Signal
LSB	Least Significant Bit
LMI	Local Management Interface
MIB	Management Information Base
MID	Multiplex IDentifier
MPEG	Motion Picture Experts Group
MSB	Most Significant Bit
nc	not connected
nm	Nanometre
NNI	Network to Network Interface
NRZ	Non Return to Zero
NVOD	Near Video On Demand
O	Output
OAM	Operations Administration and Maintenance
OSI	Open Systems Interconnection
PABX	Private Automatic Branch Exchange
PCR	Peak Cell Rate
PDH	Plesiochronous Digital Hierarchy
PDU	Protocol Data Unit
PLCP	Physical Layer Convergence Protocol
PLL	Phase Locked Loop
ppm	Parts Per Million
POH	Path Overhead
POTS	Plain Old Telephone service
PTI	Payload Type Indication
PVC	Permanent Virtual Circuit
QOS	Quality Of Service
R	Read
R/W	Read/Write
RAM	Random Access Memory
ROM	Read Only Memory
RX	Receive
SAR	Segmentation And Reassembly
SCSI	Small Computers Standard Interface
SDH	Synchronous Digital Hierarchy
SDT	Structured Data Transfer
SDU	Service Data Unit
SES	Severely Errored Seconds
SF	Super Frame
SIG	SMDS Interest Group
SIP	SMDS Interface Protocol
SLIP	Serial Line over IP
SMD	Surface Mounted Device
SMDS	Switched Multimegabit Data Service
SN	Sequence Number
SNMP	Simple Network Management Protocol
SNP	Sequence Number Protection
SONET	Switched Optical NETwork
SOT	SDH Overhead Terminator
SRTS	Synchronous Residual Time Stamp
SSM	Single Segment Message
ST	Segment Type
STM-1	Synchronous Transport Module level 1
STS-1	Synchronous Transport Signal level 1
SVC	Switched Virtual Circuit
TA-LAN	Terminal Adapter Local Area Networks
TCP	Transmission Control Protocol
TTY	Teletype
TX	Transmit

UDT	Unstructured Data Transfer
UI	Unit Interval
UNI	User to Network Interface
UPC	Usage Parameter Control
VCI	Virtual Channel Indication
VCXO	Voltage Controlled Crystal Oscillator
VME	Versa Modules Europe
VOD	Video On Demand
VP	Virtual Path
VPI	Virtual Path Indication
W	Write





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