MEGAPLEX-2000

Modular T1/E1 Multiplexer

FEATURES

- One of two T1 or E1 links, supporting 62 timeslots
- Optional fiber optic link
- Point-to-point or Drop & Insert with Bypass
- Optional redundancy for line interface, control circuitry and power supplies
- Up to 30 high speed data circuits, 100 RS-232 data circuits or 55 voice circuits, cascadable for additional circuits
- Accepts any combination of I/O modules
- Programmable cofigurations for Day/Night and disaster recovery
- Management System supports up to 16 Megaplex-2000 chassis
- Remote configuration via Supervisory Port or in-band control channel

DESCRIPTION

The Megaplex-2000 is a flexible time division multiplexer integrating data and voice onto T1 or E1 links. Its modular design supports optional redundant modules for backup to the link interfaces, common control card and power supplies. A wide range of plug in I/O modules are available for easy insertion in any combination. All modules can be easily added for upgrading to future system requirements. Management system control can support different data and voice configurations, with full control of up to 16 multiplexers.

SYSTEM CONFIGURATION

The Megaplex-2000 allows one or two active links to be configured in one of the following ways:

1) Non-redundant link, for non-critical or local applications.
2) Redundant links, for critical point-to-point applications. The two redundant modules can be connected to a separate link.
3) Dual links, supporting either drop & insert with bypass, or high capacity point-to-point applications where a single link is insufficient. Up to 62 timeslots can be used in a single chassis.

LINK INTERFACE

T1 Interface

The T1 interface complies with AT&T publication 62411 for both D4 and ESF framing formats. AMI and B8ZS line codes are supported. Multiplexing is DSO and DACs compatible.

E1 Interface

The E1 interface complies with CCITT Recommendations G.703, G.704 and G.732.

Fiber Optic Interface

The fiber optic interface can operate at a distance of up to 20 km (12 miles) without repeaters, making it ideal for local applications. Single-mode or multi-mode fiber for 840 nm or 1300 nm are both supported.

I/O CHANNELS

Up to ten I/O modules can be placed in a Megaplex-2000 chassis to support different data and voice requirements. These include:
V.24/RS-232 data channels operating from 1200 to 19200 bps
High speed data channels operating from 56 to 1984 kbps
Voice channels with direct interface to either a PABX or a telephone set
Sub-rate multiplexing
T1/E1 interfaces

For full specifications on the different I/O modules see accompanying inserts. Any combination of I/O modules is allowed. Cascading two Megaplex units increases the number of I/O slots.

REDUNDANCY

The Megaplex-2000 contains three system modules. These include:
The power supply module
The common logic module
The link module
Each module can be made independently redundant with a second module. All modules may be replaced while the unit is under power.

Redundant power supply modules employ load sharing at all times. If one fails, the other is capable of supplying power to the entire unit. DC power feed can backup the AC mains, and vice versa.

Redundant link modules provide additional protection. Both modules can be connected either to a single link via a 'Y' cable, or to two separate links. When operating over two links "priority bumping" offers utilization of the full bandwidth of two aggregates, with continued operation over the remaining link of the most important I/O channels in the event of failure.

The common logic module provides redundancy of the control logic and configuration databases. Upon replacement, the new module is automatically updated to the correct configuration without user intervention.

Front panel LEDs indicate the active card in a redundant pair. Redundancy flip is performed automatically in the event of a failure, and an alarm message is forwarded to the Management System.

BYPASS

Bypassing of voice or data channels from one link to the other is supported internally, with the presence of either an HS-3 or an HS-4 I/O module. The I/O function is independent of the bypass function.

MANAGEMENT

The Megaplex-2000 is controlled by a PC-based Management System connected to the V.24 Supervisory Port.

APPLICATION

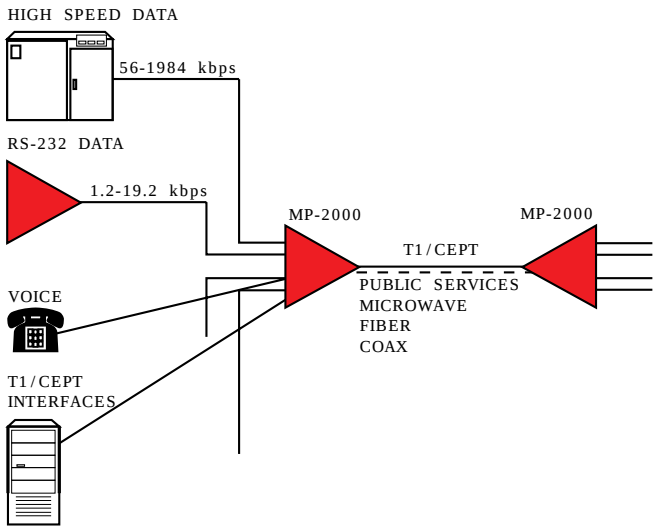

FIGURE A

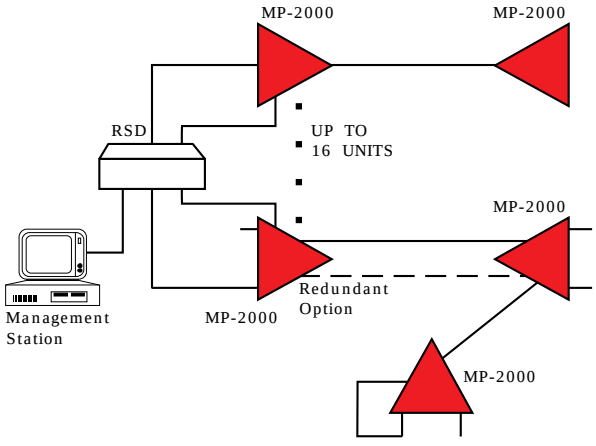

FIGURE B

The flexibility of the MEGAPLEX-2000 (MP-2000) is illustrated in Figure A. Voice and data at different speeds and interfaces are supported in a single chassis and are multip0lexed onto a T1 or E1 link in point-to-point configuration. The link may be optionally redundant. Several point-to-point configurations can all be controlled via a single manager, with some configurations supporting bypass to further remote locations as shown in Figure B.

All parameters are soft-programmable for one or two independent (day/night) configurations (databases). Alarm status and system configurations are available through the Management System at all times. Control of up to 16 Megaplex-2000 chassis is from a single PC, via a sharing device, as illustrated in Figure B.

All configurations are saved in non-volatile memory. Flipping from active to standby database is activated either on a routine basis (day/night), or manually. The Management System disk can be used to save additional configurations. Each configuration may contain “priority bumping” bandwidth assignment for disaster recovery in case of link failure.

Programming and set-up of a remote Megaplex-2000 is accomplished in one of three ways:
Through the Supervisory Port of the remote unit over a modem link
Through one of the low-speed sub-channels within the aggregate.
Over a full in-band timeslot, when using one of the following methods:
1) Using one free, unused timeslot.
2) Communicating with the remote site for a short duration only, if the full bandwidth is used. This method is limited to use with simple systems, for reconfiguring and for alarm acquisition. It eliminates the need for a dedicated PC.

ALARMS

Each Megaplex-2000 stores its alarm information in memory on the common logic module. Alarms are automatically read by the Management System from any node and are held in memory as well as in a disk file. Up to 256 alarms can be stored in a queue, to be read by the management system. Statistics pertaining to the ESF standard on T1 models are calculated and stored in tables for up to 24 hours.

TIMING OPTIONS

Link Timing

Link transmit timing can be derived from one of four sources:
- Link receive clock
- Station clock
- Internal crystal oscillator
- External channel clock, from an HS-2, HS-3 or HS-4 module

Any clock source can be set as a fallback in the event of primary clock source failure. If both clock sources fail, the Megaplex-2000 reverts to internal timing, ensuring continuous operation.

Channel Timing

All data channels support several timing modes for connection to different equipment. They can provide all timing signals when connected to a DTE, or they can buffer and retime incoming data when connected to an external modem. The high speed data channels can accept both receive and transmit clocks for connection to digital data networks, such as a Kilostream or DDS.

DIAGNOSTICS

The Megaplex-2000 incorporates test features for easy maintenance and rapid fault detection. Upon power up, all system and I/O modules undergo self testing. All problems are reported to the Management System.

Local and remote loops may be performed on each channel and on the link. An auxilliary test port connects test equipment to any high speed channel for interruptive testing or non-interruptive monitoring. An internal test pattern generator, available on some I/O modules, allows on-line testing of individual channels without external test equipment.

SPECIFICATIONS

Multiplexer Aggregate

One or two links

Multiplexing Technique

Time Division, Byte Interleaved

Bit Rate and Interface

ML-1: T1, 1.544 Mbps
4-wire, balanced, 100 Ohm
Bipolar AMI
S4 and ESF, AT&T and ANSI compatible
Zero suppression:
Transparent, B7 or B8ZS
ML-2: E1, 2.048 Mbps
4-wire, balanced, 120 Ohm
4-wire, unbalanced, 75 Ohm
Bipolar HDB3
Compatible with CCITT G.703, G.704, G.732, G.736, G.823
ML-F: 2.048 Mbps
(See accompanying insert for details)

Timing

Receive Timing recovered from Received Data
Selectable Transmit Timing:
- Loopback from Receive Timing
- Internal, accuracy +/-32 ppm
- External from channel operating at n x 64 kbps
- Station clock from 1.544 or 2.048 Mbps bipolar signal

Equipment Nest

16-slot card cage:
2 Power Supply Slots
2 Common Logic Slots
2 Link Slots
10 Slots for I/O modules

Power

115 or 230 VAC, or -48 VDC
40 W max (for fully loaded unit)

Physical

Height:	7.0 in	/ 17.8 cm	(4U)
Width: 17.3	in	/ 44.0	cm
(with brackets:	19.0	in	/48.3cm)
Depth:	12.8 in	/ 32.5 cm	
Weight:	Non redundant:	9.3kg	
Fully redundant:	11.4	kg	

Environment

Temperature:
Operating 0-45oC(32-113oF)
Storage -20-70oC (0-160oF)
Humidity: Up to 90%, non-condensing

I/O Modules

See accompanying inserts

MANAGEMENT

Hardware Requirements

PC XT or AT with a serial port,
2 floppy disks or 1 floppy and 1 hard disk,
640K RAM required

Software Requirements

Supplied on 5.25", 360K diskettes.
If a different type of diskette is required, specify as follows when ordering:
System diskette = 3.5"
System diskette = 1.2M, 5.25"

Configuration

Local:
Through Management System
Remote:
Through Management System or via control channel over link
Maximum:
Eight point-to-point links and/or stand-alone Megaplex-2000 units supported through a single Management System

DIAGNOSTICS

Link Tests

Local link loopback
Remote link loopback
Local link loop towards remote Megaplex-2000

Channel Tests

Refer to individual data sheets

Alarms

Time and data stamped
Last 256 alarms stored on CL-1 module
Last 1024 alarms stored on PC and on alarm file
Readable by Management System
ESF alarm statistics (T1 models)

ORDERING

The Megaplex-2000 is comprised of a Basic Unit (chassis, system modules and cables) and I/O modules. When ordering, specify the Basic unit required, plus all additional I/O modules (see individual I/O module inserts).

BASIC UNITS
MP-2000/#/*
Non redundant, T1/E1 multiplexer
Includes: 1 power supply, 1 CL-1 module and 1 ML module

MP-2000/#/R/*
Fully redundant, T1/E1 multiplexer
Includes: 2 power supplies, 2 CL-1 modules and 2 ML modules

A partially redundant Basic Unit can be configured by adding individual system modules.

INDIVIDUAL SYSTEM MODULES

MN-2000	Chassis
MP-2000M-PS/*	Power supply
MP-2000M-ML/#	Link
MP-2000M-CL-1	Common Logic

Specify Link Interface
T for T1 (1.544 Mbps) link
E for E1 (2.048 Mbps) link
Fi for Fiber Interface
(i = 1, 2 ..., 5. See ML-F insert for fiber interface type)

* Specify
115 for 115 VAC
230 for 230 VAC
48 for -48 VDC

CABLES
(Note: Link, Power and SP cables are delivered with the Basic Unit)

CBL-MP-21	Y cable for Link
CBL-MP-22	Station Clock
CBL-MP-23	SP cross cable
CBL-MP-24	Link cable
CBL-MP-25	SP cable
CBL-MP-26	V.35 Test cable
CBL-MP-27	RS-422 Test cable
CBL-MP-28	Coax cable

* Specifications are subject to change without notification