P500

1:N Redundancy System

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General Description

The P500 1-FOR-8 redundancy system can operate with any Paradise Datacom Modem equipment. It provides automatic protection of traffic and all ESC circuits in the case of equipment failure, giving the best possible availability. The redundancy system is housed in the P520 Redundancy Chassis. This is an entirely passive device comprising of only the mechanical enclosure, cableforms, and a backplane into which the line replaceable items are fitted. Into this chassis from the front are fitted the P500 Redundancy Controller, which integrates both the operator interface and a status panel (upper panel), and two power supplies (behind lower access panel).

From the rear of the Redundancy Chassis interface modules are fitted for each modem in the system. This comprises one Backup Interface Module (BIM), and up to eight Traffic Interface Modules (TIMs) The TIMs provide the data interface and the traffic and ESC switching, and can be configured to provide the following electrical interfaces:

- RS422 DCE
- V.35 DCE
- X.21 DCE & DTE
- G.703 at 64 kbps co-directional
- G.703 at 1544 kbps
- G.703 at 2048 kbps (75Ω BNC and 120Ω)

With the exception of the 75Ω unbalanced G.703 which has BNC connectors, all other interfaces are provided on a 25 pin connector using the industry standard EIA 530 pinout. Note that whilst the interface selection is made individually on each TIM, because of switching system the same interface must be selected throughout the 1:N system.

In single transponder systems no further hardware is necessary to switch the IF signals, as the overriding hardware mute facility built into each modem is controlled by the switch. In multi transponder systems a P525 Transponder Switch is slaved to the Redundancy Controller. This unit which is just 40mm deep is normally fitted in the rear of the equipment rack and supports as many transponders as Modems available.

- **Normal traffic paths are maintained, error free, if the AC power fails**
- **The Redundancy Controller (top half of front panel) or one of the twin power supplies (behind access panel) can be replaced on-line and hit-free**
- **Traffic Interface Modules (TIMs) or the Backup Interface Module (BIM) can be replaced without interrupting traffic on other channels**
- **The only common element is the P520 Redundancy Chassis, which is completely passive**
- **All Traffic Interface Modules (TIMs), with cables still attached & carrying live traffic, can be completely removed from the Chassis without interrupting traffic on the normal traffic modems (eg for Chassis replacement)**

EN 60950 (Safety)
EN 55022 Class B (Emissions)
EN 55082 Part 1 (Immunity)

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ISO Approved Company

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Front Panel

Rear Panel

Summary of Specifications

Equipment type
1:N Redundancy Controller system, with N = 8 max. Bridging architecture.
80386 control processor

Dimensions and weight
6 U chassis - 534 mm deep, 45 lbs (20kgs)

Compatible modems
P200 or P200RS BPSK/QPSK Modem (32 - 512 kbps)
P230 D/I IBS/SMS Modem (64 - 512 kbps)
P460 Satellite Modem (4.8 - 2048 kbps)
(Modem types may not be mixed within a redundancy group)

Data interfaces using 25 pin 'D' type female connector, conforming to the EIA 530 standard
RS422 DCE
V.35 DCE
X.21 DCE and DTE
G.703 64 kbps co-directional
G.703 1.544 Mbps 100Ω balanced
G.703 2.048 Mbps 120Ω balanced

Using 75Ω BNC connectors
G.703 2.048 Mbps 75Ω unbalanced
(Interface types may not be mixed within a redundancy group)

Modem control interface
RS485 multi-drop, with 9 pin 'D' type female connector for station M & C bus, and 9 pin 'D' type male for local I:N bus.

Operating modes
Fully Automatic
Manual Backup or Bridge
Lockout facility (remove from group)
Programmable Hold off and Clear times, from 0 to 999 seconds, in 1 second increments
Programmable threshold for lockout if switching occurs too frequently

Signal source, backup modem
Any one of the 8 Traffic paths (Bridge Mode)

Switching conditions
Switch to Backup Modem following:
- Tx Traffic Fault and Unit Faults
- Rx Traffic Fault and Unit Faults
- Rx and Tx Traffic Faults and Unit Faults
- Unit Faults only
- Lockout (Don't switch)

IF switching
Distributed - each Modem has ON/OFF Carrier control, and all IF inputs/outputs are passively split/combined. Operation with more than one up/down converter requires a P525 Transponder Switch.

Maximum switching time
12 seconds
(with zero hold off and clear time)

Event log
Up to 500 events, time and date stamped (built-in real-time clock)

P500 front panel
Membrane keyboard
LCD display - 2 lines of 40 characters,
LED System Summary Status display showing, for all Modems:
- Unit Fault
- Rx Prompt
- Tx Prompt
- Deferred
- Standby State

Audible alarm sounder
Software controlled - can be programmed to activate on Unit Faults, Traffic Alarms, or both. Can be cleared either locally (P500 front panel) or remotely, via external contact closure.

BIM/TIM Alarm relays
Four form 'C' contacts for each modem mirror the modem alarm relays which are utilised by the 1:N System. These are:
- Unit Fault
- Transmit Traffic Fault (prompt)
- Receive Traffic Fault (prompt)
- Deferred Alarm

BIM/TIM Connector type:
9 pin 'D' type male

Controller alarm relays
Three form 'C' contacts for system faults:
- Controller Unit Faults
- System Prompt Alarm
- System Deferred Alarm

Form 'C' contacts for Summary system indications:
- Any Modem Unit Fault
- Any Modem Transmit Traffic (Prompt)
- Any Modem Receive Traffic (Prompt)
- Any Modem Deferred

Can be cleared either locally or remotely, via external contact closure, and contact closures can be user configurable to operate following any change of state, or following a change from good to bad

Connector type: 15 pin 'D' type male

Auxiliary outputs
Auxiliary 1: Open-collector control signals for P525 Transponder Switch plus remote acknowledge input, and +5 and +12 volt fused outputs

Auxiliary 2: 1-of-8 Open-collector outputs, corresponding to Modem in standby, plus remote acknowledge input, and +5 and +12 volt fused outputs

Connector type: 15 pin 'D' type female

External over-ride of backup control feature
An external connector on the BIM permits the user to inhibit the P500 from controlling the Backup Modem, where it is desired to isolate it for off-line testing.

P550 BIM Connector type:
9 pin 'D' type female

Optional ESC features
For ESC switching each TIM is fitted with a P552 ESC switching daughter board. For IDR operation a P560 Backward Alarm Patch/External Interface is also fitted adjacent to the BIM. The following additional signals are then also switched:

IDR
Two ESC Audio circuits (600Ω) or 64 kbps Aux data in place of Audio (RS423/RS422).

ESC Data circuit; 8 kbps sync (RS422) or async (RS423/RS485).

All Backward Alarm circuits and corresponding Rx-Fail outputs.

IBS
Intelsat low rate ESC (RS423)
Paradise high rate ESC (RS423/RS485)

P551 TIM connector type:
25 pin 'D' type male

P560 Backward Alarm Patch connector type: 50 pin 'D' type female

RTI (Receive/transmit Inhibit feature)
When selected, a Traffic Modem may be configured so that it does not transmit a carrier until its demodulator is locked. An orange LED on the TIM indicates if this feature is enabled.

Connection to traffic and backup modems
Via 50 pin 'D' type male connector on BIM/TIM

Power supply
Two inputs each of 230 volts AC ± 10% Fused IEC connector, 60 watts maximum. For maximum reliability, the supplies should be independent.

Minimum configuration
Quantity 1 P500 Redundancy Controller
Quantity 1 P520 Redundancy Chassis
Quantity 1 P550 Backup Interface Module
Quantity 1 P551 Traffic Interface Module
Quantity 2 P540 PSU Module

EMC and safety
Meets the following:
EN 55022 CLASS B (Emissions)
EN 50082-1 (Immunity)
EN 60950 (Safety)

Environmental
Operating temperature range
0 to 40 deg C

P525 Transponder Switch Summary of Specifications

Equipment type
1:N IF Redundancy system, with N = 8 max
Transmit: 'Cascaded Baseball Switch' architecture
Receive: IF Bridging architecture

Dimensions and weight
3 U chassis - 40 mm deep,
9 lbs (4 kgs)

Number of ports
Transmit:
8 Traffic Modem inputs
1 Backup Modem input
8 Traffic Modem Outputs
1 Test Access Port

Receive:
8 Traffic Modem inputs
8 Traffic Modem outputs
1 Backup Modem output

Operating frequency range
52 - 176 MHz

Insertion loss
Transmit paths: 0.7 dB nominal
Receive paths: 3.5 dB nominal

Insertion loss matching,transmit backup modem port to any transmit traffic port
< ± 0.25 dB

Return loss, any port
> 18 dB

Control interface
9 pin 'D' type female connector, carrying 4 control lines and DC power

Supply requirement
+ 5 volts DC @ 120 mA max

EMC and safety
Meets the following:
EN 55022 CLASS B (Emissions)
EN 50082-1 (Immunity)
EN 60950 (Safety)

Environmental
Operating temperature range
0 to 40 deg C

Options
50Ω or 75Ω (specify at time of order)