TELEDYNE
PARADISE DATACOM
A Teledyne Technologies Company

Evolution Series

PD55S & PD55SL
Modem Redundancy Switch

OVERVIEW

The Evolution Modem Redundancy Switch system offers a revolutionary approach to Modem Redundancy Protection by integrating the Backup Modem and 1:N Redundancy Controller into a single unit. The Backup Modem / Controller becomes a 3RU high 19 inch chassis, which incorporates the traffic and overhead interface connectors necessary to support the online Modem group. This low cost and compact 1:N scheme employs proven integrated 1:1 Redundancy technology pioneered by Paradise Datacom.

EASE OF OPERATION

An innovative new menu structure makes configuration a simple procedure. Advanced user interfaces support the display of text in different languages. Unique Web User Interface offers full remote control and in-depth performance analysis tools using Internet Explorer without special Monitor & control software.

FEATURES

- Modular design gives maximum flexibility
- Integrated Backup Modem and Redundancy Controller in 3RU
- Low Cost
- Scaleable up to 1 for 16 (Traffic protection only)
- Scaleable up to 1 for 8 (Traffic and Overhead protection)
- Backup Modem / Controller can be replaced without affecting traffic
- Supports priority traffic channel protection
- Supports mixed traffic interfaces including Ethernet
- Supports Manual and Automatic Redundancy Protection
- Redundant power supplies for maximum reliability
- Web User Interfaces Remote Control via Ethernet - simple to configure
- PD55S Supports an IF Modem group with PD10 and/or PD25 and/or PD55 Modems and optional Transponder Switching
- PD55SL supports an L-band Modem group with PD10L and/or PD25L and/or PD55L Modems

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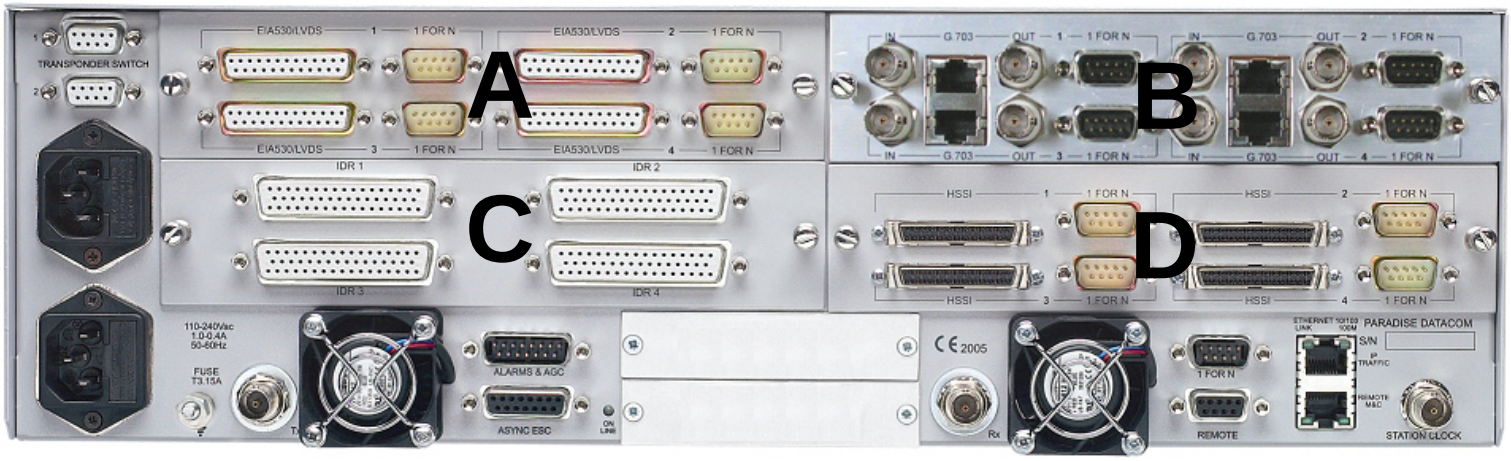
Instructions for selection of your Evolution Modem Redundancy Switch Options:

1 Select the Redundancy Switch interface options for interface positions A, B, C & D in accordance with the traffic interfaces used on the associated Traffic Modems, and overhead protection if required. Each Switch interface panel caters for up to 4 Modems with like physical interfaces.

2 Select whether the system is to be IF (PD55S) or L-band (PD55SL).

3 Select the features needed within the Backup Modem, ensuring that the Backup Modem includes all the features of every Traffic Modem within the Redundancy Group.

Rear view of PD55S IF Redundancy Switch



Please select your Backup Interface Options to include all modem interfaces within the group.

Interface Position A **hardware option**	Select 1 Option	SELECT YOUR OPTIONS HERE	4 x LVDS / EIA530 on D25 female supports serial LVDS, RS422, X.21, V.35
			4 x G.703 on BNC and RJ45 supports G.703 unbalanced and balanced
			4 x HSSI on HD50 50-way SCSI-2 connector
			4 x Ethernet on RJ45 supports 10/100BaseT Ethernet
Interface Position B **hardware option**	Select 1 Option		4 x LVDS / EIA530 on D25 female supports serial LVDS, RS422, X.21, V.35
			4 x G.703 on BNC and RJ45 supports G.703 unbalanced and balanced
			4 x HSSI on HD50 50-way SCSI-2 connector
			4 x Ethernet on RJ45 supports 10/100BaseT Ethernet
			Blanking Plate (position not used)
Interface Position C **hardware option**	Select 1 Option		4 x LVDS / EIA530 on D25 female supports serial LVDS, RS422, X.21, V.35
			4 x G.703 on BNC and RJ45 supports G.703 unbalanced and balanced
			4 x HSSI on HD50 50-way SCSI-2 connector
			4 x Ethernet on RJ45 supports 10/100BaseT
			4 x overhead protection for Modems connected to Interface Position A
			Blanking Plate (position not used)
Interface Position D **hardware option**	Select 1 Option		4 x LVDS / EIA530 on D25 female supports serial LVDS, RS422, X.21, V.35
			4 x G.703 on BNC and RJ45 supports G.703 unbalanced and balanced
			4 x HSSI on HD50 50-way SCSI-2 connector
			4 x Ethernet on RJ45 supports 10/100BaseT Ethernet
			4 x overhead protection for Modems connected to Interface Position B
			Blanking Plate (position not used)

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PD55S & PD55SL Modem Redundancy Switch

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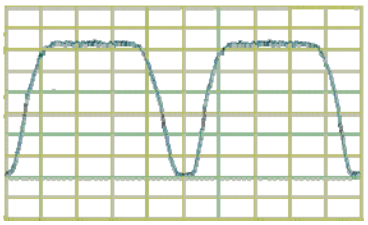
Fully configurable - only pay for what you need!

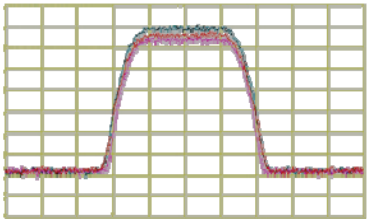
	User Options	Description
Integrated Backup Modem	✓	BPSK /QPSK/OQPSK, 4.8kbps to 10Mbps, 1bps variable rate, closed network modem. Ethernet 10/100 BaseT on RJ45 for M&C, unaccelerated Ethernet 10/100 BaseT on RJ45 via traffic or overhead (Ethernet Bridging) **Includes: Viterbi FEC, Rates 1/2, 3/4 & 7/8 with k=7** **Intelsat Reed-Solomon Outer Codec to IESS 308** **Advanced ESC: Variable rate Async channel for Closed Net plus ESC operation.** **AUPC: Automatic Uplink Power Control (operates through ESC channel)** **Remote Web Browser based monitoring tools (Spectrum Display, Constellation Monitor and link performance versus time) plus SMTP email client for status notification** **DHCP allowing IP address to be allocated dynamically via external DHCP network server** **Static Routing max 64 routes. Ethernet header compression at data rates up to 2Mbps** **IEEE 802.1p QoS supporting choice of strict priority queuing or fair weighting queuing, IEEE 802.1q VLAN support**
Either PD55S IF		IF frequency: 50-90 & 100-180MHz with 100Hz resolution **(hardware option)**
or PD55SL L-band		L-band: 950-1950MHz with 100Hz resolution, includes 4E-8 internal reference **(hardware option)**
Wideband L-band		Extends L-band coverage to 950-2050MHz in 100Hz steps **(PD55SL L-band base unit only)**
Adds Data Rates to 16,896kbps		Extends base operation to 16,896kbps
Adds Data Rates to 25Mbps	E	Extends 16,896kbps operation to 25Mbps - requires 16,896kbps option
Adds Data Rates to 55Mbps		Extends 25Mbps operation to 55Mbps - requires 16,896kbps & 25Mbps options
Dynamic Routing	R	Adds Dynamic Routing, supports RIP, OSPF and BGP, plus 64 static routes. Can be used with the base IP Traffic interface or IP traffic card.
IP Acceleration to 10Mbps		Point-to-Point and Point-to-Multipoint TCP/IP Acceleration to 10Mbps on base Ethernet port, subject to prevailing data rate limits - overcomes performance problems associated with TCP over satellite
Ethernet Brouting	E	Ethernet Brouting for Point-to-Multipoint operation when there is a non-satellite return path. Can be used with the base IP Traffic Interface or IP Traffic card
TCP Traffic Shaping	H	Supports allocation of CIR and BIR plus priority for IP Streams identified by IP Address, Diffserv Class, IEEE 802.1p priority tag or MPLS EXP field. Can be used with the base IP Traffic Interface or the IP Traffic card.
Position 2 **(hardware option)**		Blank Panel
	S	IP Traffic card providing TCP acceleration to 16,896kbps (P-P and P-MP), subject to prevailing data rate limits, also provides HTTP Acceleration by prefetching webpage inline objects to reduce webpage download time - requires either Blank Panel or EIA 530 in position 1
Position 2 IP Traffic card options		Adds TCP acceleration up to 25Mbps on IP Traffic card, subject to prevailing data rate limits - requires IP Traffic card in Position 2
	N	Adds TCP acceleration up to 55Mbps on IP Traffic card, subject to prevailing data rate limits - requires IP Traffic card in Position 2 and requires 25Mbps acceleration option
		Adds Robust Header Compression to RFC 3059 (IP/UDP/RTP) at throughput rates to 16,896kbps, subject to prevailing data rate limits - requires IP Traffic card in Position 2
Low Rate TPC 2nd Generation Turbo *10Mbps maximum* *Subject to prevailing data rate limits*	O	Rates 5/16, 21/44, 0.493, 2/3, 3/4, 0.789, 7/8 Paradise (low latency) in BPSK, QPSK, OQPSK Rate 7/8 in QPSK, OQPSK Rate 0.93 Paradise in QPSK, OQPSK Rates 3/4, 7/8, 0.93 in 8PSK - requires 8PSK option Rates 3/4, 7/8, 0.93 in 16QAM - requires 16QAM option
High Rate TPC 2nd Generation Turbo *Extension to 55Mbps, requires Low Rate TPC* *Subject to prevailing data rate limits*	P	Rates 5/16, 21/44, 0.493, 2/3, 3/4, 0.789, 7/8 Paradise (low latency) in BPSK, QPSK, OQPSK Rate 7/8 in QPSK, OQPSK Rate 0.93 Paradise in QPSK, OQPSK Rates 3/4, 7/8, 0.93 in 8PSK - requires 8PSK option Rates 3/4, 7/8, 0.93 in 16QAM - requires 16QAM option
Sequential FEC *2,048kbps max*	T	Rates 1/2, 3/4, 7/8 in BPSK, QPSK, OQPSK
FastLink Low Latency LDPC subject to prevailing data rate limits		FastLink LDPC ready **(hardware option)** - requires additional FastLink LDPC software features below
		FastLink LDPC up to 1Mbps, supports BPSK and QPSK, also supports 8PSK - requires 8PSK option, Fastlink 8QAM - requires Fastlink 8QAM option, FastLink 16APSK - requires FastLink 16APSK option, FastLink 32APSK - requires FastLink 32APSK option, FastLink 64QAM - requires FastLink 64QAM option, and 16QAM - requires 16QAM option. **Must have FastLink LDPC ready option.**
		FastLink LDPC extension to 2.5Mbps - requires Fastlink LDPC to 1Mbps
		FastLink LDPC extension to 5Mbps - requires Fastlink LDPC to 1Mbps and extension to 2.5Mbps
		FastLink LDPC extension to 10Mbps - requires Fastlink LDPC to 1Mbps plus extension to 2.5Mbps and extension to 5Mbps
		FastLink LDPC extension to 25Mbps - requires Fastlink LDPC to 1Mbps plus extension to 2.5Mbps, extension to 5Mbps and extension to 10Mbps
		FastLink LDPC extension to 55Mbps - requires Fastlink LDPC to 1Mbps plus extension to 2.5Mbps, extension to 5Mbps, extension to 10Mbps and extension to 25Mbps
FastLink 8QAM		FastLink 8QAM requires FastLink LDPC
FastLink 16APSK		FastLink 16APSK - requires FastLink LDPC
FastLink 32APSK		FastLink 32APSK - requires FastLink LDPC
FastLink 64QAM		FastLink 64QAM - requires FastLink LDPC
8PSK (Includes TCM)		Rate 2/3 8PSK Pragmatic TCM to IESS 310. 8PSK Turbo available - requires 2nd Generation Turbo FEC option
16QAM		16QAM - requires either 2nd Generation Turbo FEC option or LDPC option
IBS / SMS		Satellite framing to IESS 309 with low rate Intelsat ESC (to IESS 403) & High Rate IBS/SMS ESC
Audio Channels		P1348 Emulation mode for IBS 64kbps carrier (2xaudio) or 128kbps (2xaudio + 64kbps data) - requires IBS/SMS & IDR options
Drop / Insert		T1/E1 linear order Drop/Insert. Drop/Insert can operate with any interface, although G.703 is typically used. (Requires G.703 option if used in G.703 mode)
Extended D/I		Independent timeslot re-ordering on Tx & Rx. Signaling (E1 CAS & T1 RBS). Rx Partial Insert for multi-destinational working, Timeslot ID maintenance for N=1 to 31 with IBS / SMS or Closed Net plus ESC - requires Drop / Insert option
G.703 Clock Extension		Provides a stable G.703 E1 or T1 reference clock over satellite when traffic is NOT E1 or T1
Advanced AUX		Variable rate synchronous Aux channel for IBS / SMS - requires IBS / SMS option. IDR 32/64kbps in place of one/both audio ADPCM ESC channels - requires IDR option
Custom		Custom RS Outer Codec values of n, k and interleaver depth, custom IBS / SMS modes, allocation of overhead between ESC and Aux channels in IBS / SMS, custom backward alarms in IBS / SMS, and Closed Net plus ESC
EZ BERT - PRBS Tester		Internal Bit Error Rate Tester (BERT) can run through main data channel, or ESC/Aux channels, or output/input via the terrestrial interface
OM-73		OM-73 Scrambling, symbol mapping and Viterbi compatibility

Configuration options continue on next page.

Paired Carrier Operation

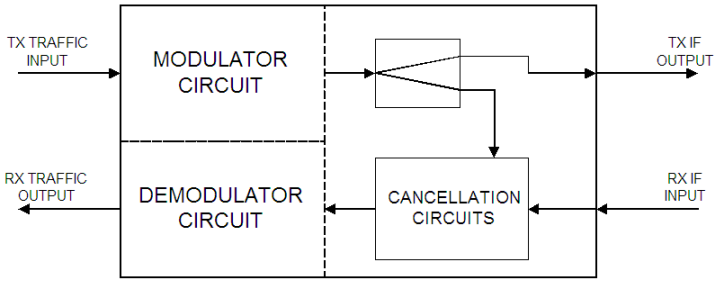


Paired Carrier Disabled



Paired Carrier Enabled
Can save 50% on space segment

PAIRED CARRIER MODEM SCHEMATIC



Paired Carrier technology allows both the uplink and downlink signals to occupy the same space segment. An adaptive self-interference cancellation technique removes the uplink signal components generated by the local terminal from the received signal off satellite, allowing demodulation of the far end signal.

Paired Carrier	
Parameter	**EVOLUTION Series Modem**
Paired Carrier	Transmit and receive carriers are overlaid on top of each other in the same space segment. Echo cancellation techniques are used in the demodulator to cancel the transmit carrier and extract the wanted receive carrier signal .
Paired Carrier data rate options	512kbps, 1024kbps, 2.5Mbps, 5Mbps, 10Mbps, 15Mbps, 20Mbps, 25Mbps, 40Mbps, 50Mbps and 55Mbps traffic rate

	User Options	Description
FSK Control (L-band only) **hardware option**		Controls and monitors single-box Paradise BUCs from the Modem
FSK Control on IF **hardware option**	S	Allows monitor & control of a compatible Transceiver from the Modem, via the Tx IFL.
Adaptive Signal Predistorter		Use with 16QAM to relax HPA backoff by up to 1.6dB. Compensates for HPA non-linearities in ground segment and/or transponder. Requires 16QAM option.
Paired Carrier (carrier re-use) subject to prevailing modem data rate limits. Minimum occupied band-width limit of 150kHz, and maximum occupied bandwidth limit of 36MHz	N	P3603 - Paired Carrier Ready, allows carriers to be overlapped thereby reducing the required satellite bandwidth. (hardware option) - requires additional cumulative software options below depending upon data rate required
	O	Paired Carrier up to 512kbps traffic rate - requires Paired Carrier Ready option
		Extends Paired Carrier up to 1024kbps traffic rate - requires 512kbps option
	P	Extends Paired Carrier up to 2.5Mbps traffic rate - requires 1024kbps option
	T	Extends Paired Carrier up to 5Mbps traffic rate - requires 2.5Mbps option
	I	Extends Paired Carrier up to 10Mbps traffic rate - requires 5Mbps option
	O	Extends Paired Carrier up to 15Mbps traffic rate - requires 10Mbps option
	N	Extends Paired Carrier up to 20Mbps traffic rate - requires 15Mbps option
	S	Extends Paired Carrier up to 25Mbps traffic rate - requires 20Mbps option
		Extends Paired Carrier up to 40Mbps traffic rate - requires 25Mbps option
		Extends Paired Carrier up to 50Mbps traffic rate - requires 40Mbps option
		Extends Paired Carrier up to 55Mbps traffic rate - requires 50Mbps option
		Temporary activation of Paired Carrier for 90 days on the Backup Modem - only decrements when Backup is online. Requires Paired Carrier Ready hardware to be installed.
Ruggedisation		Adds extra ruggedisation for hostile environments
Transponder Switch 1:8 (IF only) **hardware option**	S	IF Transponder switching up to 1:8 - 1 x P525 please specify 70MHz or 140MHz band at time of order
Transponder Switch 1:16 (IF only) **hardware option**	E	IF Transponder switching up to 1:16 - 2 x P525 please specify 70MHz or 140MHz band at time of order
Transponder Switch (IF only) **control cable**	L	D9 control cable to connect the Switch to the Transponder Switch - 1 required per P525 Transponder Switch
P3402 L-band Polarisation Switch **hardware option**	E	Can be used as a Polarisation Switch or Antenna Switch
P3092 Polarisation Switch **control cable**	C	D9 control cable to connect the Switch to the Polarisation Switch - 1 required per P3402 Polarisation Switch
	T	