

PARABEL Ltd is the developer and manufacturer of the following equipment types:

- Multiprotocol routers with E1 and V.35 ports
- Multiplexors and adapters for E1 access
- E1 over Ethernet equipment
- Equipment for Asterisk based VOIP gateways, call centers, PBX
- Industrial equipment

Acknowledgments
Asterisk is the trademark of Digium, Inc.

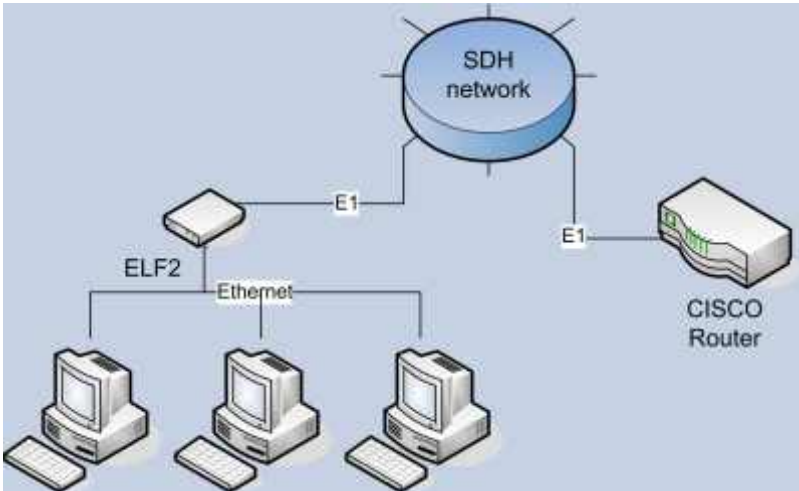


ELF2
Multiprotocol Linux
Router with E1 or V.35 ports

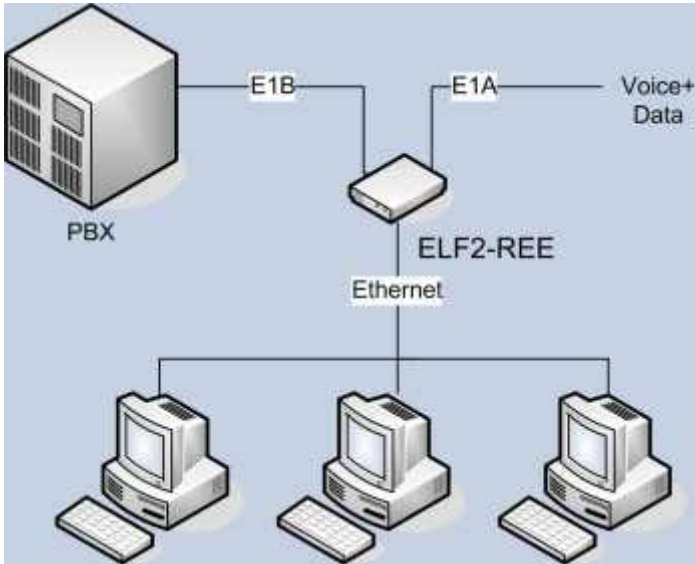
Order codes:

ELF-2RV	Ethernet 10/100, V35 DTE/DCE	IP router, bridge, firewall
ELF-2RE	Ethernet 10/100, E1 framed/unframed	IP router, bridge, firewall
ELF2-REE	Ethernet 10/100, 2xE1 framed/unframed/drop-insert	IP router, bridge, firewall

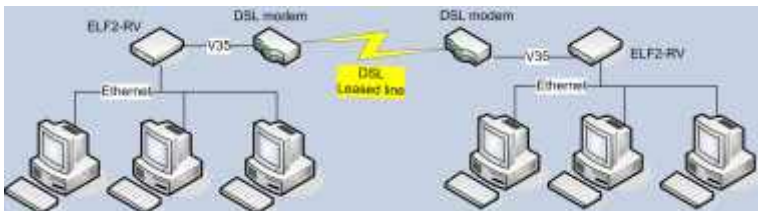
Application schemes



Connecting to Internet provider through the SDH network



Concurrent data and voice transmission through E1 (drop-insert mode)



Networks integration with help of leased line

ELF-2 router features



- Linux kernel 2.4.x
- Linux environment for router control
- Replaces Cisco 800, 1700, 2600

WAN protocols:

Synchronous PPP
Cisco HDLC
Frame Relay
IP over PPP, CHDLC, FR
Remote bridging through WAN interfaces

Ethernet:

Supporting several IP addresses on one Interface
Possibility of remote address exchanging
Access point IEEE 802.1Q (VLAN)
802.1Q transparent bridge
Supporting up to 4094 VLAN on one interface

Bridging:

STP (IEEE 802.1D)
Local traffic filtering
VLAN transparency for WAN protocols
Transparent bridging of IP, IPX, NetBEUI
Through WAN interface
Cisco bridge compatibility
Bridge group supporting
Concurrent routing

IP accounting:

Iptables for traffic identification
Cisco-compatible netflow supporting

IP Routing:

Static routing: by IP destination,
By TOS field, by IP filter labels
RIPv1 (RFC1058)
RIPv2 (RFC1723)
RIP md5 Authentication
OSPF (RFC2328)
BGP4 (RFC1771)

QOS:

Packets queues with assigned priorities
Traffic restriction
Packets classification by protocol,
Port number, TOS

IP Filter:

Creation of the complex chains of rules
Packets classification by protocol,
Port number, TOS

NAT:

IP address conversion for
Source and destination
Conversion before and after routing
Masquerading

Auxiliary services:

ping
traceroute
NTP Client

Router management:

Console
Telnet
tftp Server and client

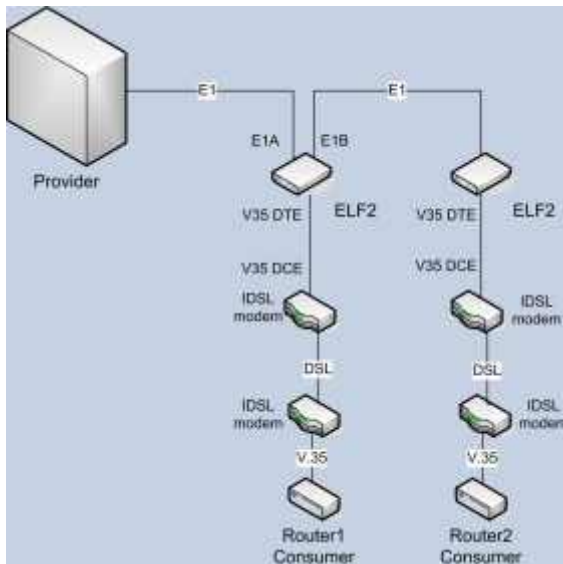


ELF2-MEEV
Multiplexer with E1 and V.35 ports

The main features:

- V.35 port, DTE and DCE modes
- Two E1 ports
- E1 modes: framed/unframed, master/slave, drop-insert
- Programmed timeslots for data transmission

Embedded slip buffer and DTE mode of the multiplexer enable to build fully synchronous networks without clock slipping. In particular, an example of the "last mile" realizing without intermediate routers is shown in the figure.





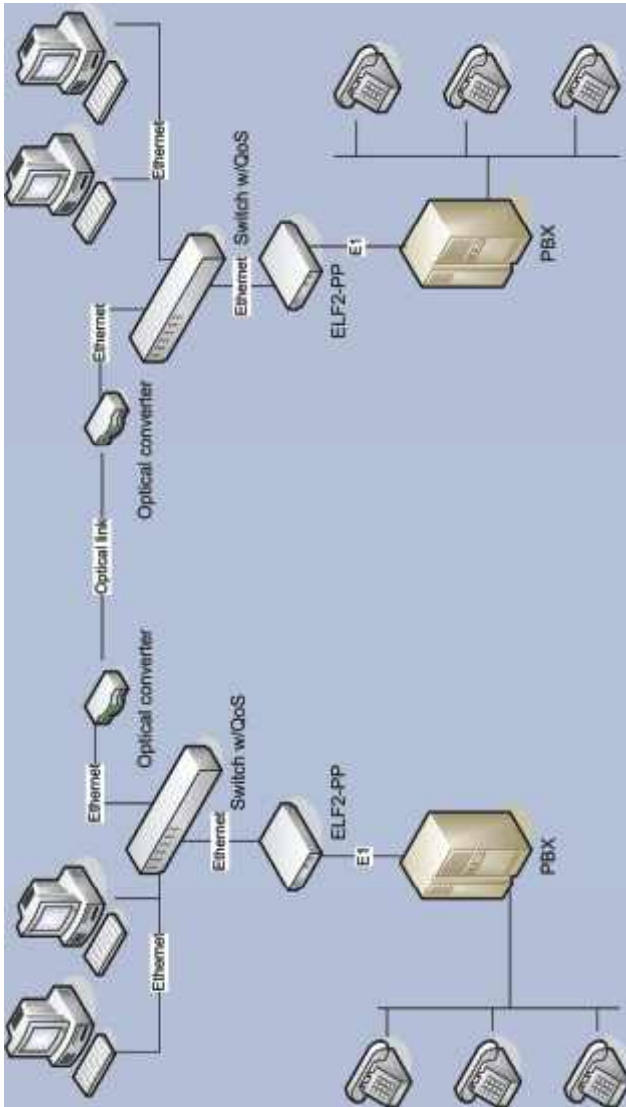
ELF2-PP
E1 over Ethernet equipment

A Pair of ELF-2PP devices organizes virtual E1 channel over a packet network. These devices offer the possibility of building multiservice networks (voice and data), based on the Ethernet backbone. Compared with VOIP, this solution is sometimes a more suitable alternative, by reasons of cost and installation simplicity.

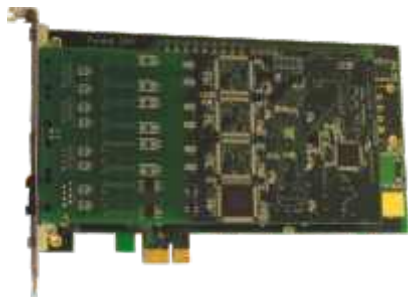
ELF2-PP needs the appropriate broadband channel with QoS.

The main features:

- CAS and CCS transparency
- E1 frame and superframe regeneration on remote side
- Ethernet jitter compensation
- UDP or raw Ethernet packets for data transfer
- adjustments of packet size and jitter buffer size



Building the multiservice network with help of ELF2-PP



QUASAR
The family of E1 PCI adapters for IP PBX Asterisk/CallWeaver

The Quasar family of adapters is intended for use in Asteriks/Linux servers. Depending on a factory variant, up to 8 E1 streams can be attached to the IPPBX. The adapter can be installed in PCI or PCI express slot of a server. Besides, there is the PMC version of adapter, which can be used in multichannel fail-safe CompactPCI servers with H.110 cross-bus. The software, supplied with the card, consists of the zaptel driver and the configuration utility for E1 channels.

The main features:

- 8 (4,2) E1 streams
- PCI, PCIe or PMC (IEEE P1386.1, H.110) variant
- Embedded TDM switch
- Opensource Linux driver for zaptel
- E1 configuration utility

Order codes

Quasar-8PCX	8 E1 lines, PCIe formfactor
Quasar-4PCX	4 E1 lines, PCIe formfactor
Quasar-2PCX	2 E1 lines, PCIe formfactor
Quasar-8PCI	8 E1 lines, PCI formfactor
Quasar-4PCI	4 E1 lines, PCI formfactor
Quasar-2PCI	2 E1 lines, PCI formfactor



QUASAR-mini
E1 PCI adapter for
IP PBX Asterisk/CallWeaver

Like Quasar family of adapters, Quasar-mini card is intended for using with IP PBX Asterisk or CallWeaver. The difference is a smaller number of channels and low cost. The single channel Quasar-mini has the lowest price in the given market segment. The software, supplied with the card, consists of the zaptel driver and the configuration utility for E1 channels.

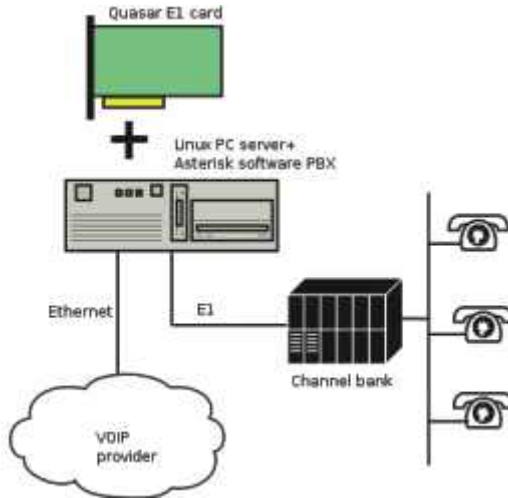
The main features:

- 2 (1) E1 ports
- PCI formfactor
- Embedded TDM switch
- Opensource Linux driver for zaptel
- E1 configuration utility

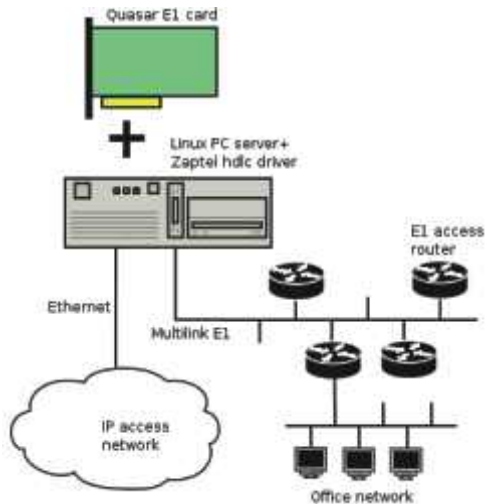
Order codes

Quasar-ME	1 E1 port, PCI formfactor
Quasar-MEE	2 E1 ports, PCI formfactor

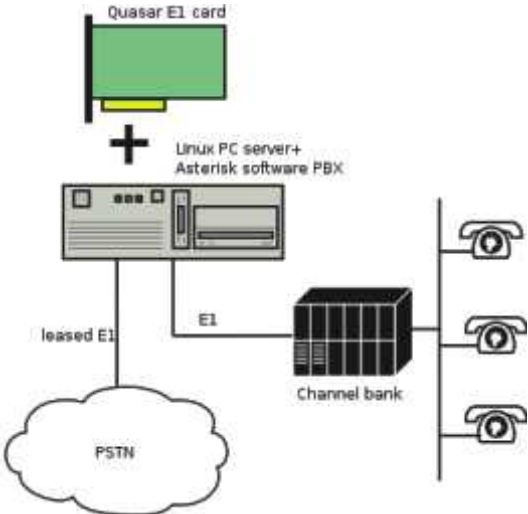
Corporate VOIP gateway



Access server for E1 data transmission



Office PBX with the leased E1 attachment



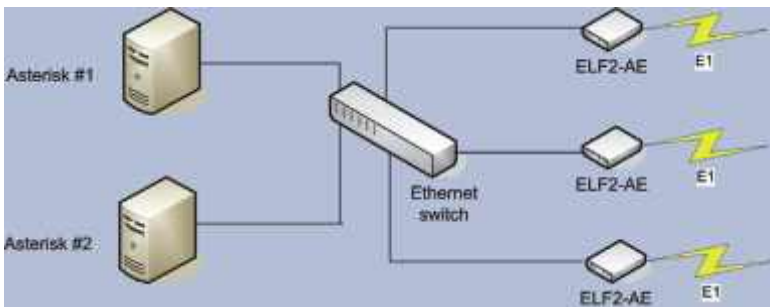


ELF2-AE
Remote E1 interface for
Asterisk/CallWeaver PBX

ELF2-AE is a stand-alone device, processing E1 channel to Ethernet packets. It can be used for connection of Asterisk/CallWeaver to E1 channels. ELF2-AE realizes TDMoX protocol, supported in the zaptel driver, and from Asterisk point of view does not differ from a traditional E1 PCI adapter, installed in the server.

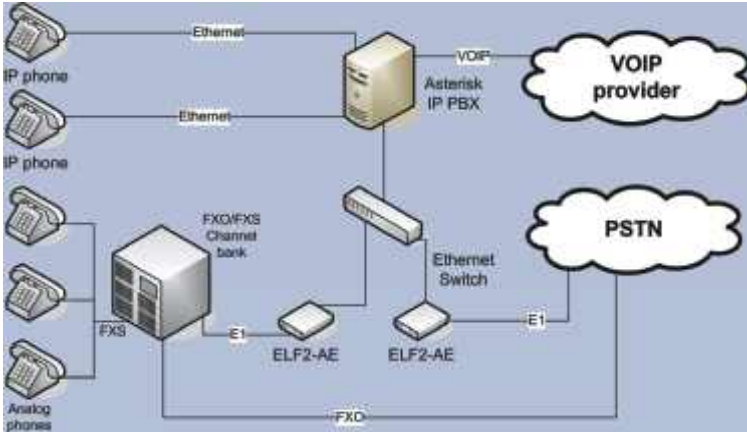
ELF2-AE enables to connect Asterisk to the phone channels banks, E1 providers, and to transfer HDLC data packets through E1 channels. This external adapter has several advantages compared with PCI adapters:

- the new E1 port attaching is possible without server rebooting
- when building Asterisk servers with backup, the main and reserved servers can use the common pool of remote interfaces. This approach reduces the whole system price.

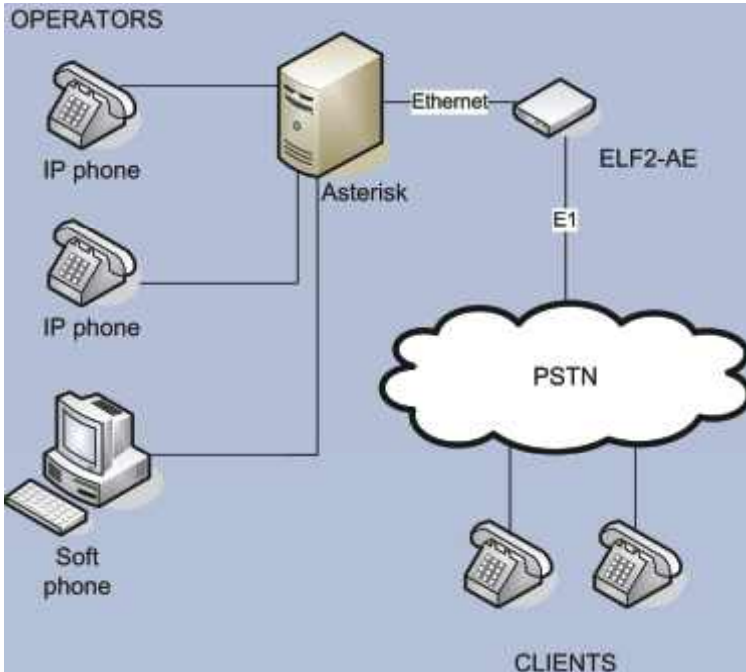


Application scheme

IP PBX



Call center arranging





ASTEROID

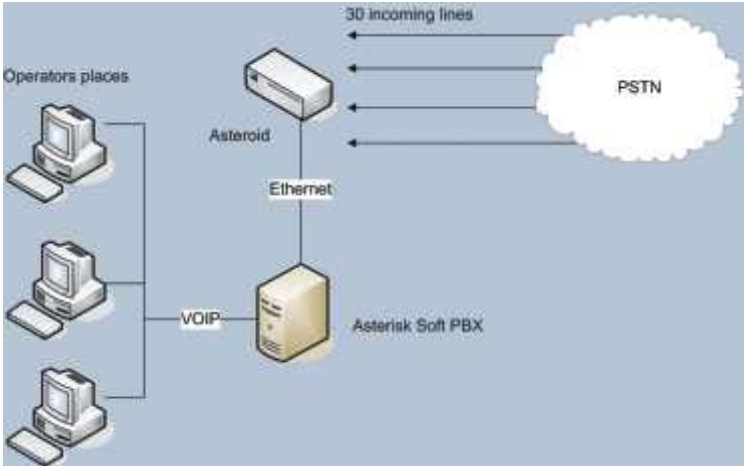
**FXO/FXS channels bank
(up to 30 lines)**

The Asteroid can be used for attaching up to 30 phone lines to the traditional PBX or to the Asterisk/CallWeaver PBX. Connection to the traditional PBX can be accomplished via the E1 port. Connection to the Asterisk/CallWeaver can be accomplished via the E1 port also or via the Ethernet port utilizing the TDMoE protocol. Several schemes of the channel bank applications are depicted on the following pages.

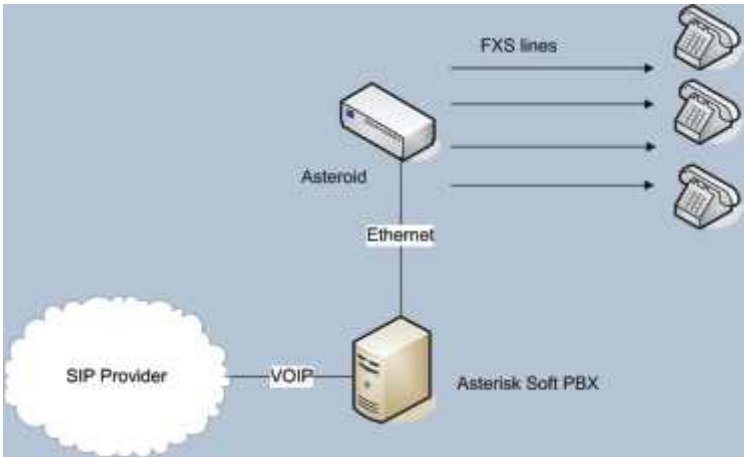
Ordering codes

Asteroid-0L4S-DC	30 FXS ports, Ethernet port, -36..-72V DC
Asteroid-4L0S-DC	30 FXO ports, Ethernet port, -36..-72V DC
Asteroid-1L3S-DC	8 FXO ports, 22 FXS ports, Ethernet port, -36..-72V DC
Asteroid-0L4S-AC	30 FXS ports, Ethernet port, 220 V AC
Asteroid-4L0S-AC	30 FXO ports, Ethernet port, 220 V AC
Asteroid-1L3S-AC	8 FXO ports, 22 FXS ports, Ethernet port, 220 V AC
Asteroid-0L4S-DC-E1	30 FXS ports, Ethernet port, -36..-72V DC, E1 port
Asteroid-4L0S-DC-E1	30 FXO ports, Ethernet port, -36..-72V DC, E1 port
Asteroid-1L3S-DC-E1	8 FXO ports, 22 FXS ports, Ethernet port, -36..-72V DC, E1 port
Asteroid-0L4S-AC-E1	30 FXS ports, Ethernet port, 220 V AC, E1 port
Asteroid-4L0S-AC-E1	30 FXO ports, Ethernet port, 220 V AC, E1 port
Asteroid-1L3S-AC-E1	8 FXO ports, 22 FXS ports, Ethernet port, 220 V AC, E1 port

Call center arranging



IP PBX



PBX extension

