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LL3000U.DOC

**PRODUCT LL3000**  
**TELEPHONE EXTENSION SYSTEM**  
**USERS MANUAL VER\_B**

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## 1. PRODUCT DESCRIPTION

The product is designed to extend several telephone lines from one location to another across a fibre optic link.

The system consists of two separate units. One unit is connected to telephone exchange lines and the other is connected directly to telephone instruments.

The units are compact self contained with their own power supply operating from 220 VAC. They can be mounted directly into a 19 inch rack. The height of the units are 6U.

At the exchange side the standard 2 wire telephone lines are split up into voice and signalling channels then combined with several other telephone lines and transmitted over a fibre optic link.

At the other side the combined information is split up into the individual pairs which resemble the original telephone lines.

These lines can be coupled directly to telephone instruments or extended some distance over copper pairs to the required positions.

To the exchange the system resembles a standard telephone instrument characteristics and to the telephone the system resembles the standard exchange characteristics.

Two fibre cores are required for the system. One for transmit and the other for receive. The fibre cable can be terminated directly on the unit. The distance over which the system can operate is limited only by the fibre interface used. The options are limited to 3 , 30 and 90 Kilometres.

The number of telephone lines that can be connected to the system are limited to a total of 30 and are supplied in multiples of 4.

Additional options are available such as 4 Wire E & M cards and many more contact the supplier for more detail on additional extras.

## 2. SYSTEM CONFIGURATION

Family Tree See Annexure 'B'.

### 2.1 System model numbers

#### 2.1.1 Complete system

LL3000-[xxxxxx]-[xxx]-[xxx]-[ver]  
 version.  
 Power option  
 Connector Option.  
 Optic option see table below.

#### 2.1.2 Sub unit.

LX3000[xxx]

A	OPTIC	= See optic and connector options below.
B	SUBRACK	= Complete subrack for unit fully wired.
C	PSUBASE	= Power supply for Exchange side.
See options		below.
D	PSUTELE	= Power supply for Telephone side.
See options		below.
F	CONTROL-EXCH	= Controller card for Exchange side.
G	CONTROL-TELE	= Controller card for telephone side.
E	4CHEXCH	= 4 Channel card Exchange side.
T	4CHTELE	= 4 Channel card Telephone side.
W	4WIRE	= 4 Channel 4Wire E&M card.
H	HDB3	= HDB3 interface for controller card.

**2.1.3** Optic option

Stock Code	Optic Option	Connector Option	Wavelength	Fibre Mode	Power Budget	Budget Distance
A	850sr	ST or SMA	850nm	Multi-mode	12dB	3,5km
B	1300mr	ST or SMA	1300nm	Multi-mode	12dB	12km
C	1300mrs m	ST or FC	1300nm	Multi-mode Single-mode	16dB 12dB	16km 16km
D	1300lr	ST or FC	1300nm	Multi-mode Single-mode	28dB 25dB	28km 50km
E	1300laser	ST or FC	1300nm	Multi-mode Single-mode	36dB 35dB	36km 70km

**2.1.4** Optic connector option

Stock Code	Connector
A	SMA
B	ST
C	FC
D	None

**2.1.5** Power supply option

Stock Code	Power Supply
A	220V AC
B	110V AC
C	48V DC
D	24V DC
E	220/110V AC

2.2 **Product stock codes.**

LL3000XXXX                      See tables above.

Version  
Power supply  
Optic connector  
Optic option

2.2.1 Product without optics. i.e. enclosure power supply and controller card.

LL3000XXA.....	LL3000-xxxxxxx-xxx-220-A
LL3000XXB.....	LL3000-xxxxxxx-xxx-110-A
LL3000XXC.....	LL3000-xxxxxxx-xxx-48-A

2.2.2 Optic options.

LL3000AAX.....	LL3000-850sr-SMA-xxx-A
LL3000ABX.....	LL3000-850sr-ST-xxx-A
LL3000BAX.....	LL3000-1300mr-SMA-xxx-A
LL3000BBX.....	LL3000-1300mr-ST-xxx-A
LL3000CBX.....	LL3000-1300mrsm-ST-xxx-A
LL3000CCX.....	LL3000-1300mrsm-FC-xxx-A
LL3000DBX.....	LL3000-1300lr-ST-xxx-A
LL3000DCX.....	LL3000-1300lr-FC-xxx-A
LL3000EBX.....	LL3000-1300laser-ST-xxx-A
LL3000ECX.....	LL3000-1300laser-FC-xxx-A

2.2.3 Line Cards

LE3000XXX.....	LL3000-4cha -EXCH
LT3000XXX.....	LL3000-4cha-TELE

2.2.4 User manual

LL3000USER.....	LL3000-USER MANUAL.
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2.2.5 Spare Parts

LX3000XXX.....	See tables above for sub units and options.
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### 3. OPERATORS INSTRUCTIONS

No operator intervention is required for the system.

### 4. PREPARATION FOR USE

#### 4.1 Unpacking

After unpacking the system is checked against the packing list. Each item is inspected for damage during transit.

#### 4.2 Installation

Once satisfied that the system is complete and not damaged, it can be installed in a 19" rack or suitable stand alone box. Identify the master and slave units. Install the master unit at the exchange side of the system. The slave unit is installed at the Telephone side. These units fit directly into a 19" rack and no special instructions are necessary.

#### 4.3 Connection

It is important to connect the mains cable and proper earth to the system before any lines are connected. This will ensure that no damage can occur to the line terminations due to lightning induced surges on the lines. Earthing of the unit is done through the mains cable however a additional earth can be connected directly to the frame. The exchange or telephone lines are connected to the 30 pair Krone tag block. The lines are in number order corresponding the line cards installed.

Connect the optical cables. These are connected at the back of the unit onto the optic interface card.

#### 4.4 Commissioning

Ensure that all PCBs are installed in the correct slots and are seated properly. See Annexure 'A' for the system card layout.

Power may now be applied to the system.

Once both sides of the system is switched on it should be checked by using each channel.

#### 4.5 4Wire Cards.

These cards can co-exist in the same frame as the exchange and line cards but can only be installed in position 7 or 8. Each card has 4 channels, However on position 8 only the first two channels can be activated. The connection to these cards are not standard according to the line usage thus all existing wiring must be removed and replaced according to Document AU605 (attached as an annexure.). In addition to correctly initialise these cards the software must be upgraded on the controller card. This is achieved by replacing the EPROM. Please note that there are two chips one for the exchange side and one for the telephone side. The 4wire cards must be configured when installed. Links LK6 to LK13 must be inserted according to the illustration on the card. Link LK5 selects the neg. potential on the optic isolator

input. At the exchange side only -8VDC is available and on the telephone side -48VDC is available. Thus the link is installed accordingly. Links LK1 to LK4 selects the earth potential on the various output signals. It is installed when required.

## 5. MAINTENANCE

Maintenance of this equipment is divided into two categories. First line maintenance and PCB repair. The later will be done by the supplier only. It is not expected that the technician do any repairs to the equipment at board level other than the replacing of a fuse etc. First line maintenance consist of isolating the faulty printed circuit board and replacing it. It also includes testing of incoming and outgoing telephone lines. See Annexure 'A' for System card Layout.

### 5.1 Instruments and tools required.

Multimeter.  
Test handset.  
Krone test lead.  
Krone cable insertion tool.

### 5.2 Fault diagnostics

The following steps should be taken to evaluate the situation when a system is reported faulty.

NOTE: No cards must be replaced with the power switched on as this could cause damage to the system.

If only one or two lines are faulty then locate the faulty line card and check the power indicating led's. If the leds are not lit then replace the fuses on that card. Should the system still not work it is possible that the fault is on the other side of the system thus to eliminate the problem replace the line card with a working card. Should the problem persist then proceed to the other side of the system and repeat the procedure. Note that the line cards on the master side are different to the slave side and can not be interchanged. The cards on the master side (ie exchange side) are fitted with line transformers and are numbered AU301. The slave side is AU302. Other possible causes for failure of some lines are poor connections on the tagblocks or card connectors. Using a standard handset the lines can be tested directly on the card frame connectors.

If all the lines are faulty then check the power supplies. All cards have indications to show if the power is present. Use a multi meter to check the voltages. Should there be a problem then first replace the fuses. If this does not solve the problem then

replace the power supply cards. If the power supplies are ok then check the micro controller card.

The watchdog led on the micro controller card will flash if there is something wrong with the logic on this card. Also check the master/slave led which must be lit at the master and extinguished at the slave unit. If this condition is not correct then reset the system by turning the power off and on again. Should this not help then replace the micro card.

Next check the lock and error leds. The lock led indicates the presents of a HDB3 data receive signal and the error led indicates an error in the optic receive channel. If the system is using the HDB3 copper interface then the lock led should be lit. if a optic interface is used then the error led should be extinguished.

If the error led is lit or flashing then the system is not in sync. This could be due to the optic connection being broken. If the system has not worked before then check if the optic fibres have not been reversed. Also ensure that a good connection is made with the optic interface. Note that the master clock is generated at the master. The slave unit is then phase lock looped to the master and only when this section is operative can the signal be transmitted back to the master and will the phase lock loop at the master fall in sync. Thus it is necessary to check the error signal on the slave unit micro controller card first before the master unit card can be declared faulty.

If the problem persist then replace the micro controller cards. Note that the only difference between the master and slave cards is the software. The software resides on a EPROM. Be sure to fit the correct EPROM to the correct side of the system. AS300Ex is used at the exchange side and AS300Tx is used at the telephone (slave) side. The 'x' indicates the version of software.

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**Annexure 'A'** System card layout.

**Annexure 'B'** family tree.