

Issue : 2.0
Author code : WJWV
Date : 16 March 2004
LL3000U.DOC

LL3000

TELEPHONE EXTENSION SYSTEM

USERS MANUAL VER_2.0

16 March 2004

USERS MANUAL**TABLE OF CONTENTS.**

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1. PRODUCT DESCRIPTION

This product is designed to extend 30 analogue telephone lines from one location to another, across a fibre optic link. The lines can be either 2-wire telephone lines, or 4-wire audio E&M lines.

The system consists of two separate units on either end of the fibre. The Exchange Side is connected to a PABX or to exchange lines, and the Telephone Side is connected directly to the telephone instruments.

The units are compact, self-contained, and are 6U high, and can be mounted directly into a 19-inch rack. Each system consists of its respective modular power supplies, controller cards, and 4-channel line interface cards. There are 8 slot positions for line interface cards, and all can be populated to form a 30-channel link (only two channels are available in the last slot - position 8)

At the Exchange Side, up to 30 telephone lines are split up into voice and signalling channels, and then multiplexed together into a single PCM data stream, and finally transmitted over the fibre optic link.

At the Telephone Side, the combined PCM information is then decoded into the individual channels, and then reconstructed to resemble the original lines.

To the exchange or PABX, the system portrays standard telephone instrument characteristics, and to the telephone instrument, the system portrays standard exchange characteristics.

A fibre pair (two cores) are required for the system - one for transmit, and the other for receive. The fibre cable can be terminated directly onto the optic devices on the unit. The distance over which the system can operate, can be changed by selecting different fibre interfaces. The options are 3.3, 12 & 20km on multimode fibre; and 40, 60 or 80 km on singlemode fibre.

The total number of telephone lines that can be connected to the system is 30, and can be populated in multiples of 4.

Additional options are available. Contact the supplier for more detail on additional extras.

2. SYSTEM CONFIGURATION

2.1 System Model Numbers

2.1.1 Complete System

LL30YY OCP/V

LL30[yy] [o] [c] [p] / [v]

					-----	Version	}
					-----	Power Supply Option	}
					-----	Connector Option	}
					-----	Optic Option	}
					-----	YY = 23 for Exchange Side; YY = 24 for Telephone Side	}

(See tables above)

2.1.2 Sub Units.

L[s]30YY [s] = Code for spare sub parts.
 YY = 23 for Exchange Side; = 24 for Telephone Side

LA30YY__[p] Power Supply (Power Option - See table below)

LB30YY[o][c] Controller Card (Optic & Connector Option - See table)

LE3000 4-Channel Exchange Side Line Card
 LT3000 4-Channel Telephone Side Line Card
 LW3000 4-Channel 4-Wire Audio E&M Line Card

OPTIC1[o][c] Optic Card For LL3000 system (Optic & Connector Option - See table)

2.1.3 Optic option - [o]

Stock Code	Optic Option	Connector Option	Wavelength	Fibre Mode	Power Budget	Budget Distance
A	850sr	ST	850nm	Multi-mode	12dB	3,5km
B	1300mr	ST	1300nm	Multi-mode	12dB	12km
C	1300mrsm	ST or FC	1300nm	Multi-mode Single-mode	20dB 20dB	20km 40km
E	1300laser	ST or FC	1300nm	Single-mode	30dB	60km
H	1550laser	ST or FC	1550nm	Single-mode	20dB	80km
CU	Copper	BNC	N/A	N/A	N/A	N/A

2.1.4 Connector Option - [c]

2.1.5

Stock Code	Connector
A	SMA
B	ST
C	FC

2.1.6 Power Supply Option - [p]

2.1.7

Stock Code	Power Supply
A	220Vac
B	110Vac
E	220/110Vac

2.2 Product Stock Codes

LL30YY OCP/V

LL30[yy] [o] [c] [p] / [v]

					-----	Version	}		
					-----	Power Supply Option	}		
					-----	Connector Option	}	(See tables above)	
					-----	Optic Option	}		
-----						= 23 for Exchange Side;	= 24 for Telephone Side		

2.2.1 Product Without Optics i.e. Enclosure, Power Supply, & Controller Card.

LL3023__A.....	LL3023-xxxxxx-xxx-220Vac	} Exchange Side
LL3023__B.....	LL3023-xxxxxx-xxx-110Vac	} Exchange Side
LL3023__E.....	LL3023-xxxxxx-xxx-220/110Vac	} Exchange Side
LL3024__A.....	LL3024-xxxxxx-xxx-220Vac	} Telephone Side
LL3024__B.....	LL3024-xxxxxx-xxx-110Vac	} Telephone Side
LL3024__E.....	LL3024-xxxxxx-xxx-220/110Vac	} Telephone Side

2.2.2 Optic options.

LL3023AB[p].....	LL3000-850sr-ST-[p] / [v]	} Exchange Side
LL3023BB[p].....	LL3000-1300mr-ST-[p] / [v]	} Exchange Side
LL3023CB[p].....	LL3000-1300mrsm-ST-[p] / [v]	} Exchange Side
LL3023EB[p].....	LL3000-1300laser-ST-[p] / [v]	} Exchange Side
LL3023HB[p].....	LL3000-1550laser-ST-[p] / [v]	} Exchange Side
LL3024AB[p].....	LL3000-850sr-ST-[p] / [v]	} Telephone Side
LL3024BB[p].....	LL3000-1300mr-ST-[p] / [v]	} Telephone Side
LL3024CB[p].....	LL3000-1300mrsm-ST-[p] / [v]	} Telephone Side
LL3024EB[p].....	LL3000-1300laser-ST-[p] / [v]	} Telephone Side
LL3024HB[p].....	LL3000-1550laser-ST-[p] / [v]	} Telephone Side

2.2.3 Line Cards

LE3000	4-Channel Exchange Side Line Card
LT3000	4-Channel Telephone Side Line Card
LW3000	4-Channel 4-Wire Audio E&M Line Card

2.2.4 User manual

LL3000USER..... LL3000-USER MANUAL.

2.2.5 Spare Parts

L[s]30YY [s] = Code for spare sub parts.
 YY = 23 for Exchange Side; = 24 for Telephone Side

3. 3. OPERATORS INSTRUCTIONS

No operator intervention is required for the system.

4. PREPARATION FOR USE

4.1 Unpacking

After unpacking, 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 Exchange Side (master), and Telephone Side (slave) units, and install them in the correct locations. These units are 6U high, and fit directly into a 19" rack. No special instructions are necessary.

4.3 Connection

Ensure that all PCBs are installed in the correct slots, and that they are seated properly. See Annexure 'A' for the system card layout. It is important to connect the mains cable, and a proper Earth to the system before any lines are connected. This will ensure that the protection circuits against induced transients & surges are able to safely re-direct the induced energy on the lines to Earth. The unit is Earthed by connecting the Earth Tag on the back of the card frame to a secure and known good Earth point / mat, with a thick earth cable. The Exchange or Telephone lines are connected to the system via the RJ11 connectors, or the Phoenix screw terminals, on each line card. Connect the fibre optic cables, taking care not to contaminate the mating surface with fingerprints or dust. The fibre cables are connected directly onto the optic interface card at the back of the unit. Remember to cross the TX and RX fibres (i.e local TX to remote RX, and local RX to Remote TX).

4.4 Commissioning

Power may now be applied to the system. The Exchange Side should have the MASTER led on the front panel lit up. Once both sides of the system is powered, ensure that the OPTIC FAIL led's are extinguished on both sides. This will indicate that the system is now optically linked on both sides. Each channel can now be tested for full functionality.

4.5 4-Wire Cards.

The copper connection to these cards is also done via RJ11 connectors, or Phoenix screw terminals. These cards can co-exist in the same frame as the exchange and telephone line cards. However, the system software needs to be specially configured, according to the customer's requirements, to correctly initialise the 4-wire cards. This is achieved by replacing the system EPROM - one for the exchange side, and one for the telephone side, when the equipment is ordered. The 4-wire cards must be also be manually configured when installed. Links LK6 to LK13 must be inserted according to the illustration on the card. Link LK5 selects the negative 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. First line maintenance consists of isolating the faulty printed circuit board and replacing it with a known good spare card. It also includes testing of incoming and outgoing telephone lines. See Annexure 'A' for System card Layout. PCB repairs will only be done at the manufacturer's workshop. It is not expected that the technician do any repairs to the equipment at board level, other than the replacing of a fuse etc.

5.1 Instruments and tools required.

Multimeter.
Test handset.
Optic Power Meter.

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 led's are not lit, then replace the fuses on that card. If the system still does not work, then replace the line card with a known working card. Should the problem persist, then proceed to the other side of the system, and repeat the above procedure. Note that the line cards on the Exchange side are different to that of the Telephone side, and cannot be interchanged. The cards on the Exchange side (master side) are numbered AU301. The Telephone side (slave side) cards are marked AU302. Other possible causes for failure of some lines are poor connections to the connectors on the cards. Using a standard handset, the lines can be tested directly on the card connectors. This will determine if the copper connection between the card and the telephone instrument is faulty or not.

If all the line cards show an unlit power led, then check the power supplies. All the different voltages 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 card. 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. Check that the MASTER led is lit at the Exchange side

(master), and extinguished at the Telephone side (Slave). If this condition is not correct, then reset the system by turning the power off, and on again.

Also check that the OPTIC FAIL led's are extinguished. These led's will only light up, or flicker, if the system is not in sync - indicating that there is a problem with the optic signal. This could be due to the optic connection being broken, or the fibre attenuation that has deteriorated over time and is now out of the equipment specification. Measure the Optic Receive Level by removing the Receive optic fibre and placing it in the Optic Power Meter. If it falls outside the minimum receive level as stated on the test certificate, then the problem could be fibre related, or the transmit level on the other side is not good. Measure the transmit optic level on the other side and see if it falls within the specification as stated on the test certificate. If it is good, then the fibre cable itself has a problem and will need to be tested by the installer. Check the opposite direction as well. 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, and that the mating surfaces are not contaminated. Make sure that the fibre patch leads between the equipment and the fibre patch panel are in good working condition.

If the system does not use optics, and is linked via the HDB3 Copper 2Meg interface, then the LOCK led's on the front panels should be lit. If it flickers, or is off, then there is a problem with the copper connection between the units, or the copper interface on the micro controller cards have been damaged.

Note that the system Master Clock is generated at the Exchange side (master). The Telephone side (slave) is Phase Lock Looped onto the master. Only when the link in this direction is operative, will the signal be transmitted back to the master, where it is Phase Lock Looped again. Then only can the master fall in sync. It is thus necessary to check the error signal on the slave unit micro controller card first, before the master unit card can be declared faulty.

If any of the above tests do not rectify the situation, then replace the micro controller cards. Note that the only difference between the master and slave cards, is the EPROM software. Ensure that correct EPROM is inserted in the correct side of the system. AS300Ex is used at the Exchange side, and AS300Tx is used at the Telephone side. The 'x' indicates the version of software.

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6. SPECIFICATIONS

6.1 Electrical characteristics

Supply voltage	220Vac / 110Vac +/- 10%
Supply current	200mA max

6.2 Telephone line characteristics

Exchange side

Line loop current	~ 24mA, depending on line resistance.
Ring detection min	34Vac @ 17Hz
Pulse dialling distortion	< 1%
Return loss per channel	> -20dB using SAPO impedance
Insertion loss max	< 3dB

Telephone side

Tel line operating voltage	48Vdc
Tel line ringing voltage	~65Vac @ 17Hz +/- 5% into 2k .
Line Loop current	24mA (or 30mA on request)
Signalling	16kHz (on request)
Audio response better than	0.5dB over 300Hz to 3.4 kHz
Max loop resistance of line	1300Ω for 24mA loop current

6.3 Logic

Data speed	2048kbps
PCM Conversion A-D and D-A	a-law according to CCITT G703
Data Coding on Optics	CMI (Code Mark Inversion)
Data Coding on Copper	HDB3

6.4 Optical interface power budget

A	850sr	850nm	Multi-mode	12dB
B	1300mr	1300nm	Multi-mode	12dB
C	1300mrsm	1300nm	Multi-mode Single-mode	20dB 20dB
E	1300laser	1300nm	Single-mode	30dB
H	1550laser	1550nm	Single-mode	20dB

Optional Copper interface BNC connection, HDB3 protocol.

6.5 Number of lines

30 max, (4 per line card)

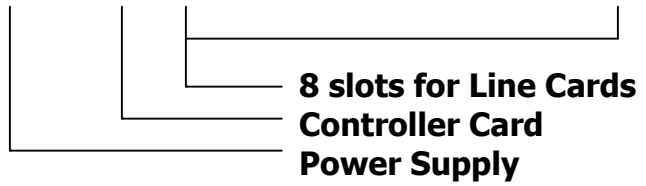
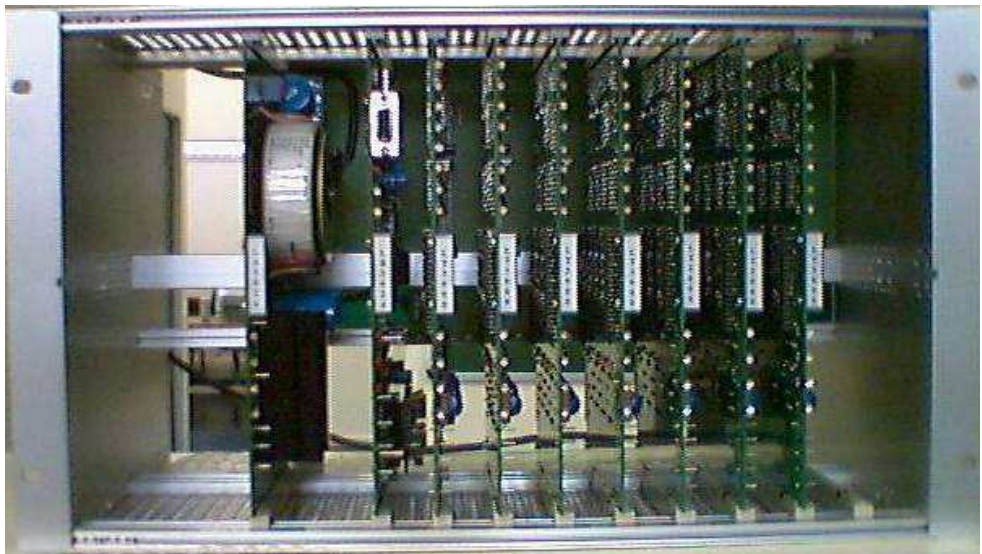
6.6 Mechanical Characteristics

Dimensions (H*W*D)	6U*19" card frame*220mm
Weight	5 kg fitted with one line card.

6.7 Environmental conditions

Ambient temperature	0°C - 50°C
Relative humidity	45% @ 25°C max.

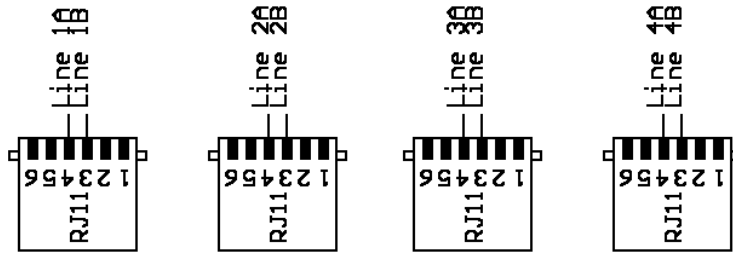
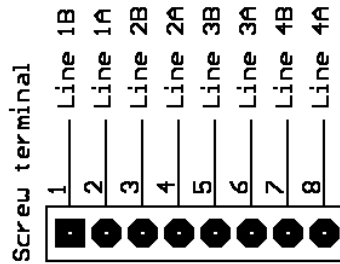
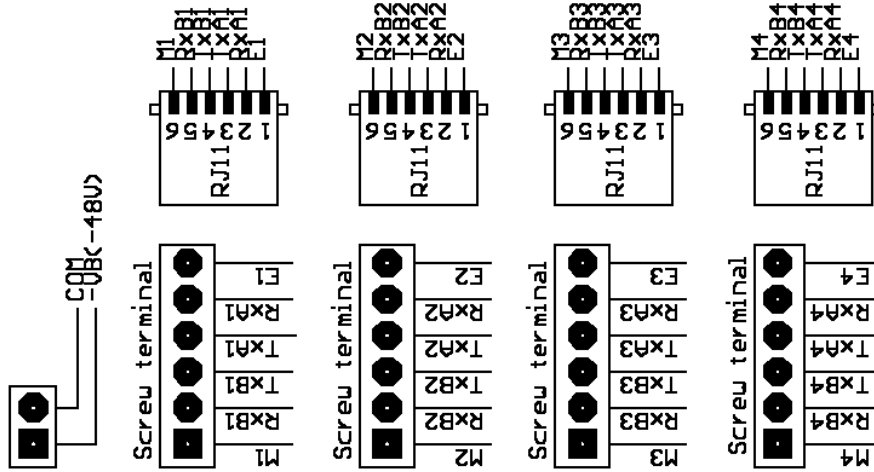
Annexure 'A' System card layout.



Annexure 'B' Connections

Telephone and Exchange cards

4W cards



ADD
REVISED BY: []

Title: Connection diagram for LL3000 series cards

Drawing Number: LL3000_conn

Note:

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