



LS

Power
HFC
Etherne



Leading Solution

LG Cable, LG Industrial Systems and LG-Nikko Copper, Gaon Cable, E1 and Yesco are starting with

a new name, Leading Solution, LS.

New Dream, New Start

To become a leader in the competitive global market, LG has been divided into three groups, electronics and chemicals for LG, energy and distribution for GS, Industrial electric \cdot electronics and material for LS based on their business specialties.

LS' main companies, such as LS cable, LS industrial systems, LS-Nikko copper, Gaon cable, E1 and Yesco, are ranked as No.1 in their respective industry. However, LS won't just sit back, satisfied with being the best in Korea. We will pave the way for becoming the world's best in industrial electric - electronics and material industry with the new CI, LS.

Your good partner LG Cable is making a fresh start as LS Cable

LS Cable is No. 1 cable maker in Korea and its business fields are telecommunication, electric power, components & materials and machinery. Also, LS Cable is creating new businesses particularly in component and materials industry. LS Cable makes its best to accomplish the vision, 'Your No.1 Creative Partner' and be one of the world leaders with high technology and best level of service.





As CATV service providers endeavor to keep up with the dynamic shift in customer needs and expectations, existing CATV networks, which belong to these service providers, have found the need to evolve as well. However, instead of building networks from scratch to support emerging customer needs and multiple services, such as high speed Internet. TV and VoIP. these service providers can easily optimize their network by adapting the LS-HFC solution to their networks. LS-HFC solution uses low frequency(2~32Mhz : 30Mhz) bandwidth consisting of CLC-M & CLC-S, which had not been utilized in HFC networks until now.

Breakthrough in CATV Data Transmission Speed

The LS-HFC solution, developed by LS Cable, is a world's first technology that supports broadband internet service over a coaxial network with low frequency. This system sets 200Mbps PHY as a maximum, and provides close to 100Mbps Ethernet speed to

Simple Network Topology

The strongest advantage of the LS-HFC solution is that it utilizes the existing HFC network without the need for an upstream frequency range used in conventional networks. With the frequency range of conventional HFC networks, LS-HFC has a transmission path using no active components. The provider no longer needs a heavy system in their headend, instead a much smaller unit – the CLC-M series can be positioned at the ONU location. To provide internet service within the network all that is required is an optical switch, a CLC-M series per group of several cells, and a CLC-S series modem which is equivalent to a cable modem.

Economical Investment

Financial investment is always a crucial point when the service provider decides to purchase a new system. Our LS-HFC solution for internet services requires only minor changes in the system. With the LS-HFC system, you don't need to invest a considerable amount of money for the initial investment; the system deploys simple, compact, low cost controllers (CLC-M series) that are installed deep inside the network.

Efficient Frequency Usage

impulse noise existing on the network. The LS-HFC system is designed to optimize the utilization of frequency resources by using that once noisy frequency. To make this possible, this system has adapted OFDM technology which can surpass this noise within the network. OFDM is a core technology of wireless communication and PLC(Power Line Communication). With the LS-HFC system, the service provider can reserve high frequency range bandwidth for future services, giving it the advantage needed to build upon new

Simple Network Maintenance

manage LS-HFC system with our web-based software NMS(Network Management System) that has been developed to control and monitor the system status remotely. The convenient GUI(Graphic User Interface) allows the operator a general view of the system while being able to quickly pinpoint problems or crucial areas.

The LS-HFC solution, developed by LS Cable Ltd, is an efficient network solution for service providers based on a CATV network, supporting new businesses and opens various new opportunities for the next generation telecommunications era. With this advanced technology, LS Cable will ensure competitiveness in the next-generation telecommunications market.

Allows a reduced total investment for the network, and the equipment.

CLC-M20 ONU Series

Product Introduction

CLC-M20 ONU Series is a combined 2 core element traditionally an ONU & LS-HFC solution. It allows the service provider a reduced total investment for the network, as well as the equipment, by eliminating OTx set on ONU and ORx set on the headend. Furthermore, the service provider can also reduce the cost of expense for internal accessories like PAD, EQ etc, by no longer needing to regulate upstream signals with reverse amplifiers. One CLC-M20 ONU Series can support up to 31, 62 subscribers by selecting models, which the service provider can determine by selecting module types.

Features and Benefits

- Broadband internet service providing by existing coaxial lines
- Strong tolerance characteristics against noise
- No extra broadband channel needed
- Independent internet line installation available without upstream amplifier module
- Reduce network maintenance cost
- Total support for digital service like IPTV, VoD and so on
- Cell by cell installation available
- Applicable for unidirectional line
- No need for head-end equipment such as ORx, RF combiner, etc
- Master card 1~2ea(option)+Media Converter 1ea(Ring Topology available)

Ordering Information

CLC-M20 ONU		Part Number	Q'ty	Description
1	Master card	CLC-M20VO-H0032	1/2	Master card, 31 subscribers
	M/C	CLC-FF-VO12AP		100 base Fx uplink 1 port, 2 down port
2		CLC-FG-VO12AP	1	1G base Fx uplink 1 port, 2 down port
		CLC-FG-VO22AP		1G base Fx uplink 2 port, 2 down port
3	Enclosure	CLC-EOU-(#)	1	1 M/C slot, (#): out port number : 1~4 (option)

System configuration





Specification

	Input Wa	avelength	$1290 \sim 1600 { m nm}$
Optical	Forward	Input Power	-3dBm ± 2dB
Farameters	Forward	Test Point	1mW(± 0.5dBm) / DC 1V
	Frequency	Forward	54 or 88 \sim 870MHz or 1GHz
	Bandwidth	Reverse	5 \sim 42 or 65MHz
	Flat	ness	1.5dB peak to valley
	Input Leve	el (Reverse)	20dBmV (Max 25dBmV)
	Output Lev	el (Forward)	46dBmV(Max)
RE	Return l	_oss(Min)	14dB
Parameterstt	Carrier-to-	-Noise Ratio	47dB Min. (Link Budget 12~15dB)
	Composite	Triple Beat	60dBc Min
	Composite S	Second Order	60dBc Min
	Cross M	lodulation	60dBc Min
	Power	Rating	15A Min
Environmental	ental Ambient Temperature		$-20 \sim 60^\circ C$
Parameters	Ambient	Humidity	5~95%RH
Mechanical	Dimensions(W×D×H)		508.2mm×196.5mm×200mm
Parameters	Parameters Weight		9.5kg Max
Power	Operatin	g Voltage	AC40 \sim 90V (AC38 \sim 130V)
Fower	Consump	tion Power	60W Max. AC on coax cable

Optimal for broadband internet service under an unidirectional network environment.

CLC-M20 Outdoor Series

Product Introduction

The CLC-M20 Outdoor Series is not using an internal up & down signal amplifying module but just passing the signal. It is suitable for providing only internet services. Should the service provider desire to carry broadcasting signals in the future, this can be done easily by adding downstream signal amplifying modules to the unit. One CLC-M20 Outdoor model is designed to handle up to 2 master cards and each of the master cards control the cells individually. This model is an optimal product for broadband internet service under an unidirectional network environment, without the need for any additional network configuration change.

Features and Benefits

- Broadband internet service providing by existing coaxial lines
- Strong tolerance characteristics against noise
- No extra broadband channel needed
- Independent internet line installation available without upstream amplifier module
- Reduce network maintenance cost
- Total support for digital service like IPTV, VoD and so on
- · Cell by cell installation available
- Applicable for unidirectional line
- No need for head-end equipment such as ORx, RF combiner, etc
- Master card 1~2ea(option)+Media Converter 1ea(Ring Topology available)

Ordering Information

CLC-M20 Outdoor		Part Number	Q'ty	Description
1	Master card	CLC-M20VO-H0032	1/2	Master card, 31 subscribers
2	M/C	CLC-FF-VO12AP		100 base Fx uplink 1 port, 2 down port
		CLC-FG-VO12AP	1	1G base Fx uplink 1 port, 2 down port
		CLC-FG-VO22AP		1G base Fx uplink 2 port, 2 down port
3	Enclosure	CLC-EOF-(#)	1	1 M/C slot, (#): out port number : 1~4 (option)

System configuration





	Frequency Range	2 MHz ~ 34 MHz
	Configurable Bandwidth	2MHz \sim 30MHz with power masking
	OFDM	1536 sub-carriers
Physical	Adaptive Bit-Loading	HURTO or variable QAM $(4 \sim 1024)$
Layer Characteristic	Channel Coding	Reed-Solomon FEC, 4D-TCM
	Power Spectral Density	-50dBm/Hz \sim -110dBm/Hz
	Transmission Power Step	1dB
	Dynamic Range	90dB Max.
	Minimum Required Received Power Level	-70dBm without any noise
Network F	Functions and Protocols	Master/slave MAC using advanced TDMA 802,1D Bridge and Spanning tree protocol 802,1Q VLAN OVLAN specified for LS-HFC
Netv	vork Management	SNMP, MIB-II, private MIB NMS supported auto-configuration and f/w upgrade by DHCP and TFTP
	Security	VLAN/OVLAN DES/3DES Encryption
	Interface	optical fiber connector coaxial connector
Environmental	Ambient Temperature	-20 ~ 60°C
Parameters	Ambient humidity	$5\sim95\%{ m RH}$
Mechanical	Dimension(W×D×H)	260×185×150
Parameters	Weight	3.5kg Max.
D	Operating voltage	$AC40 \sim 90V$

up to 200Mbps through the

coaxial cable

(AC38 ~ 130V)

15W Max. AC on coax cable





Consumption

Specification

Power

Data transfer rate

Designed for simple network installation in structures with limited space.

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CLC-M20 Indoor Series

Product Introduction

The CLC-M20 Indoor Series is used for systems in such structures as multi-dwelling units, hotels, office buildings etc. This model is designed for simple network installation in structures equipped with unidirectional network and limited installation space. The service provider can provide Internet to their customers with just 1 fiber by making ring topology. Otherwise, they can serve internet with just any kind of internet line if they don't have fiber network. With using this equipment, they will have an experience of innovative network management and simple maintenance.

Features and Benefits

- · Quick, easy installation
- MATV network usage available
- Broadband service available on the existing CATV network not having up-stream amplifiers – highly recommended for old structures difficult to deploy new cables in the interior
- Internet service without ONU on HFC network
- Low cost with high efficiency
- Master card 1ea+Media Converter 1ea (Option-Ring Topology available)

Ordering Information

CLC-M20 Indoor		Part Number	Q'ty	Description	
1	Master card	CLC-M20HI-H0032	1	Master card, 31 subscribers	
2	M/C	CLC-FG-HI12AP	0/1	1G base Fx uplink 2 port, 1 down port	
3	Enclosuro	CLC-EIF-1	1	1 M/C slot, 1 out port	
5	LIGOSUIE	CLC-EIU-1		1 out port	

System configuration



Specification

	Item	Specification
D	ata transfer rate	up to 200Mbps through the coaxial cable
-	Frequency Range	$2 \mathrm{MHz} \sim 34 \mathrm{MHz}$
	Configurable Bandwidth	2MHz ~ 30MHz with power masking
	OFDM	1536 sub-carriers
Physical	Adaptive Bit-Loading	HURTO or variable QAM (4 \sim 1024)
Characteristic	Channel Coding	Reed-Solomon FEC, 4D-TCM
	Power Spectral Density	-50dBm/Hz \sim -110dBm/Hz
	Transmission Power Step	1dB
	Dynamic Range	90dB Max.
	Minimum Required Received Power Level	-70dBm without any noise
Network I	Functions and Protocols	Master/slave MAC using advanced TDMA 802.1D Bridge and Spanning tree protocol 802.1Q VLAN OVLAN specified for LS-HFC
Netv	vork Management	SNMP, MIB-II, private MIB NMS supported auto-configuration and f/w upgrade by DHCP and TFTP
	Security	VLAN/OVLAN DES/3DES Encryption
	Interface	optical fiber connector coaxial connector
Environmental	Ambient Temperature	0 ~ 40°C
Parameters	Ambient humidity	35 ~ 85%RH
Mechanical	Dimension(W×D×H)	180×130×58
Parameters	Weight	0.8kg Max.
Power	Operating voltage	DC 5V
I OWEI	Consumption	15W Max. AC on coax cable



The Service Speed Limit function allows the creation of various service packages.

CLC-S20 Series

Product Introduction

CLC-S20 is a modem for end-users, the subscribers of the service providers. It has powerful tolerance against lighting and an induced current. Its service speed limit function which can control from 512k to 20Mbps allows the service provider to create various service packages. Regarding the appearance, the subscriber can easily install it on tables or walls by selecting the type. Moreover, CLC-S20S series will make boardband home networking possible in where is no extra space to install UTP cable anymore.

Features and Benefits

- Stylish design
- Sturdy exterior
- Blue LED adapted
- 100Mbps Ethernet speed supported
- Speed limit function
- VoD, VoIP service available

Ordering Information

CLC-S20		Part Number	Q'ty	Description
1	CLC S20 modem	CLC-S20AH-WB	1	CLC subscriber modem for access network
		CLC-S20SH-WB		CLC subscriber modem for home network

System configuration



Specification

	Item	Specification
Da	ata transfer rate	up to 200Mbps through the coaxial cable
	Frequency Range	$2 \mathrm{MHz} \sim 34 \mathrm{MHz}$
	Configurable Bandwidth	2MHz \sim 30MHz with power masking
	OFDM	1536 subcarriers
Physical	Adaptive Bit-Loading	HURTO or variable QAM (4 \sim 1024)
Characteristic	Channel Coding	Reed-Solomon FEC, 4D-TCM
	Power Spectral Density	-50dBm/Hz \sim -110dBm/Hz
	Transmission Power Step	1dB
	Dynamic Range	90dB Max.
_	Minimum Required Received Power Level	-70dBm without any noise
Network F	Functions and Protocols	Master/slave MAC using advanced TDMA 802.1D Bridge and Spanning tree protocol 802.1Q VLAN OVLAN specified for LS-HFC
Netv	vork Management	SNMP, MIB-II, private MIB NMS supported auto-configuration and f/w upgrade by DHCP and TFTP
	Security	VLAN/OVLAN DES/3DES Encryption
	Interface	optical fiber connector coaxial connector
Environmental	Ambient Temperature	0 ~ 40°C
Parameters	Ambient humidity	35 ~ 85%RH
Mechanical	Dimension(W×D×H)	67×120×36
Parameters	Weight	0.1kg Max.
Power	Operating voltage	DC 5V
	Consumption	4.5W Max. with external adapter





Product Introduction

The CLC-NMS manages all the CLC M20 series and CLC S20 series models in a system providing SNMP and Telnet function to control the CLC system. In addition, CLC-NMS has an internal DHCP server that manages IP addresses, as well as an internal TFTP/FTP server manages speed control for each CLC S series, to reset frequency usage, and upgrade firmware of CLC equipment. When an event is occurs, CLC-NMS sends an automatically generated alert email to its manager by SMTP server function protocol. Moreover, this web-based program permits remote access to this program and allows external CLC system control.



LS-HFC NMS Operating Specifications

		Minimum Specifications	Recommended Specifications		
	CUP	2.0 GHz or more	2.33 GHz or more		
Hardwara	RAM	1 GB or more	2 GB or more		
nardware	HDD	100 GB or more	250 GB or more		
	Device	CD Drive(48X speed or	more), NIC910/100Mbps), VGA(built-in)		
	OS	Windows Server 2003, MS SQL, IIS			
Coffwore	Program	MS Excel 2003			
Soltware	MIB	MIB II, private MIB			
	Protocol	SNMP, Telnet, DHCF	P, TFTP, FTP, RADIUS, NT		

The Global Network of LS Cable reaching all over the world

LS Cable compete with global top corporations with high profit value products and doing area marketing to create distinctive market value.









LS-HFC Solution

19th Fl. ASEM Tower, 159 Samsung-dong Gangnam-gu, Seoul 135-798 Korea Tel. +82-2-2189-9265 E-mail.sammy66@lscable.com

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