CableRAN™

Broadband Network for MDUs, hotels and buildings over the existing coaxial TV cable

Overview

TMT Coaxial Network's CableRAN™ system establishes a network within a building or community, enabling IP traffic over the coaxial cable already in place. It is an elegant plug-n-play high speed data distribution solution that coexists with TV channels, DOCSIS and DBS services.

CableRAN™ provides fast, reliable and cost effective distribution of broadband internet access over the existing coaxial cable. With CableRAN™, Cable operators, Telcos, MATV/SMATV providers and integrators can extend internet access to every TV outlet over any coax topology. There is no need for a CPE or modem nor infrastructure rewiring. Installation is quick, non-disruptive and truck-roll maintenance costs are close to zero.

CableRAN™ is a cost effective stand alone system that does not require further servers or routers. Up to 250 customers can be reached through one access point, enabling common costs to be divided between network users, including WAN connection and services such as – firewall, virus protection, parental control, near video on demand as well as billing.

CableRAN™ specifically meets the requirements of hotels, and multi-dwelling units (MDUs). It creates new opportunities for revenue generation wherever a TV coax connection exists and enables providers to service their clients' needs today and in the future.

Main System Components

Media Access Switch (MAS)

- Broadband Ethernet bridge/router
- Manages up to 250 users
- Superior speed of up to 60 Mbps with 100BaseT
- Creates VLANs between outlets for Home Network services
- Provides remote management via SNMP and HTTP

Intelligent Outlet (IO)

- 10/100BaseT, USB and wireless interfaces
- Easy plug-n play component
- Available as wall-plate or Outlet (DIY) format
- Unique MAC address for control, activation and monitoring
- Each IO supports up to 15 PCs

Possible Applications for Service Providers

### Advantages to Hospitality Industry
- Broadband access to every room via TV infrastructure without additional wires
- Quick and non-disruptive installation
- Reliable and fast wired connection for multiple users
- Infrastructure-like in-room interface without CPE or modem in room, reduces risks
- Self-contained, all you need for establishing a network

Advantages for MSOs
- Clear demarcation and concentration per property
- Overcomes poor cable infrastructure
- Reduced cable noise-cleans return path
- Near-zero maintenance costs
- Utilization of unused frequency spectrum
- Superior speed of up to 60 Mbps with 100BaseT
- Frequency reuse at building/curb level

Advantages for DBS Wireless and Fiber operators
- Divides dish and modem costs by 250
- Broadband upstream for unidirectional systems
- Always-on connection for telco return systems
- No phone line connection required near TV
- No need for modem in every home for Ethernet connection
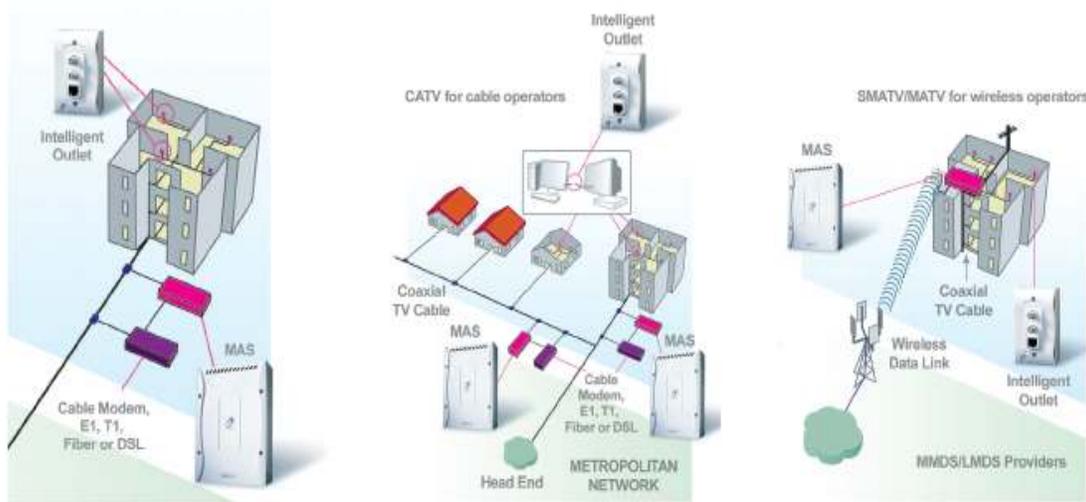
CableRAN™'s Significant Advantages

- Saves installation costs through use of existing coaxial TV infrastructure.
- Works on all TV networks including non upgraded: 300, 500, 680, and 750MHz networks, and also over unidirectional passive networks.
- Operates over poor infrastructure (coax, splitters, etc). Has dynamic range of 60db; wherever the TV operates, CableRAN™ can operate
- Lights-up the dark unused frequency spectrum, e.g. the 5-32 MHz and 42-54 MHz spectrum
- Co-exists with CATV, DOCSIS and DBS services
- Clear demarcation between building/MDU to Metropolitan Network; allowing filtering of ingress noise and eliminating the need for node splitting
- Enables complete control and set QoS to the outlet level, with clear utility demarcation points

Features	Benefits
Routing Features	
Configurable Bridge or Router functions	- Multi purpose solution, can be implemented with most broadband infrastructures
RIP, DNS, UPnP, Firewall, DHCP, PPPoE	- Provides routing capabilities and simplifies installations
Unique MAC Address per IO	- Remotely enable/disable, control, manage and monitor each Intelligent Outlet (IO)
Configurable VLANs	- Easily creates independent sub-networks within LAN/WAN and configures Home Network services
Enhanced Business Class Services	
Integrated Firewall	- Provides additional security to MAS subscribers - Preset 3 levels of firewall
Home Networking and LAN	- Single solution for broadband Access, LAN and Home Networking
Software Manageability	
Manageable through SNMP and HTTP	- Allows remote and local administration, management and control of devices, as well as fault detection and diagnosis of problems
Remote Program Load	- Allows remote and automatic upgrade of software and firmware versions for MAS and IO, thus reducing unnecessary truck rolls
Design Platform	
USB1.1, 100BaseT and 802.11g	- High speed, Plug'n Play and easy to use technology
Self Powered USB IO	- Requires no mains power connection. The preferred solution for residential services

Media Access Switch (MAS)

The **MAS** is a broadband Ethernet software configurable bridge/router that establishes a network within a building or community. A single **MAS** enables MSOs, Telcos or other service providers to easily extend their broadband internet coverage for up to 250 users and create additional services such as Home Networks or VOD.

The **MAS** is a LINUX platform that provides Firewall, Quality of Service, DHCP, NAT, and many more features. It has two 100baseT interfaces for broadband feed and local control and a female F-connector to connect to the coax.

Intelligent Outlet (IO)

The CableRAN™ **IO** delivers broadband Internet access through a plug-n-play outlet, that requires no modems or other CPE and is MAC addressable for easy remote activation and control. The **IO** saves the costs of adding modem hardware, and reduces maintenance costs to virtually zero. The system's high performance presents no interference with TV channels or other interactive services. Multiple **IO**s throughout the residence can provide Home Networking or a Subnet to the customer.

Available Models – 10/100BaseT with fixed channel or Agile outlets, USB1.1, and 802.11g

Management Software

RANager – SNMP-based remote management system is included with CableRAN™. It enables the operator to: set the RF parameters, add/remove IOs, create VLANs among several outlets (Home Networking), define QoS level per each outlet, upgrade the IOs software and monitor the system. The program is based on the SNMPv3 protocol and can serve as an interface to a billing system.

The HTTP management interface controls the IP parameters and their definition and enables setting the CableRAN™ system to a bridge or a router mode. The software also enables remote resetting of the system and operation of a 3 level firewall built in the system.

ORDERING Information: part numbers

MAS	Catalogue No.	Description
USA	MAS1100-IAA03TEU	2X10/100 BaseT, DS 40-80 MHz Plug format: USA
Europe	MAS1100-IAA03TEE	2X10/100 BaseT, DS 40-80 MHz Plug format: Europe

IO-

Data Interface Options	A-USB1.1 T-100BaseT
Physical Type	O-Outlet W-Walplate
Size	U

Frequency Range	00 DS: Agile 01 DS: 64-76Mhz 02 DS: 40-48Mhz 03 DS: 48-56Mhz
Power	B: USB Powered U: External Power USA E: External Power Europe
Color	01: Off-white

Example: IO-AOU03B01
IO USB, Outlet, USA, DS 48-56MHz, USB Powered, Off-white Color

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CableRAN™ System – Coaxial Access Networking Solution

Networking Features
Software configurable Bridge or Router with rich features including: DHCP client and server, NAT, Reverse NAT, PPPoE, RIP, DNS, DNS proxy, UPnP, Firewall, VLAN capabilities for Sub-Networks and unique MAC address per outlet.

Security
a. Physical Layer: TMT MAC
b. Filtering: Filtered RF to IP conversion
c. Switching: VLAN
d. Encryption*
e. Firewall: 3 levels of security
f. Secure Telnet, HTTPS

Network Management: RANager™
SNMP inband/outband connections
HTTP and HTTPS management interfaces
Telnet and Secure Telnet interfaces

Management Features
Add, remove, enable/disable IO
Define IP parameters
Traffic counters
Auto alarms
Basic diagnostics
Control of RF parameters (up/down)
Definition of VLANs between IOs
RF and IP performance monitoring
4 predefined levels of QoS

Standards Compliance
ADSL, DOCSIS and EURO DOCSIS compatible
WAN Connection
VLAN 802.1q
Downstream PHY layer: enhanced ITU J.83
USB 1.1, 10BaseT, 100BaseT, 802.11g
Certification: UL, CE, FCC, ICES
Safety (IO) : UL 1950

Environmental Specifications
Operating Temp.: 32 to 104 °F (0 to 40 °C)
Storage Temp.: -40 to 158 °F (-40 to 70 °C)
Relative Humidity: 5 to 95% non-condensing
Altitude: 0 - 10,000 ft

CableRAN™ MAS

Supports up to 64, 128, 192, 250 Intelligent Outlets (IO)
Full Duplex data traffic
One downstream plus one upstream channels

Interfaces
WAN: One 10/100BaseT
Local: One 10/100BaseT
Coax: Female F-connector

Dimensions
Length: 22.3 cm
Width: 16 cm
Height: 5 cm (1.9")
Weight: 1.7 Kg (3.7 lb)
Packing Size: 34.7 x 21.4 x 7.7 cm

Electrical Specifications
Power Consumption: 15 watts
Input Voltage: 100- 240 VAC
Input Frequency: 50-60 Hz

CableRAN™ Intelligent Outlet (IO)

Interfaces
Coax (TV, IN): Two Female F-Connectors
USB 1.1 (full speed): B Type Receptacle
Or Ethernet: RJ 45
Available in outlet and wall plate version

Ethernet Outlet Features
Every IO supports up to 15 Ethernet devices

RF Specifications
Coax Impedance: 75 Ohm

Electrical Specifications
USB: Self Powered by USB up to 2.5 W
Ethernet: External power adapter 100- 240 VAC, 50-60 Hz

Dimensions
Length: 11.4 cm (4 15/32")
Width: 7cm (2 3/4")
Height: 4.2 cm (1 3/4") wall mount
Depth: 2 cm (25/32") wall plate*
Weight: USB: 160gr, Ethernet: 350gr (including power adapter)
Packing Size: USB: 13.5 x 8 x 4.5 cm
Ethernet: 17.2 x 15.8 x 5.4 cm

System Physical Layer

Speed: Up to 60 Mbps

Symbol Rate (MSym/s)	Channel Bandwidth (MHz)	QAM 64 Bit Rate (Mbps)	QAM 256* Bit Rate (Mbps)
Down Stream			
1	1.15	6	8
1.5	1.725	9	12
3	3.45	18	24
4	4.6	24	32
5	5.75	30	40
6	6.9	36	48
Upstream		QPSK Bit Rate (Mbps)	QAM16* Bit Rate (Mbps)
0.75*	0.9375	1.5	3
1.5	1.875	3	6
3	3.750	6	12

Upstream (IO to MAS)
Modulation Type: QPSK, 16QAM*
Frequency Range: 5-30 MHz full agility
IO Transmission Level: automatic and widely adjustable. Up to 48dBmV (up to 58dBmV optional)
Receive Level: -10 to +15dBmV adjustable

Distance between MAS and IOs:
Coax: Up to 5000m
Twisted Pair: 50m (cat.3 – PTP)*

Downstream (MAS to IO)
Modulation Type: 64/256QAM*
Frequency Range:
  IO: 40-48, 48-56, 64-76 Mhz
  Agile IO: 48-860 MHz
MAS Transmission Level: 50dBmV Max
IO Receive Range: -10 to +40dBmV

Attenuation between MAS to IO:
Typical: 0-50dB
Maximum: 58dB

This specification is subject to changes without prior notice
The tolerance of db and dbmV levels are ± 3db typ.
*Contact TMT for latest update - Rev 1.1

HomeRAN-HD™

Home Multimedia Network Over Existing TV Coax Cable

HomeRAN-HD™ Outlet   HomeRAN-HD™ Gateway

The HomeRAN-HD™ system is the easy and reliable way to distribute Multimedia IPTV and to create a multimedia home network for diverse applications. HomeRAN-HD™ uses the physical coaxial TV infrastructure already in place and requires no extra wiring, complex installations or major costs. With innovative simplicity HomeRAN-HD™ leads the way into the convergence market.

How It Works

The HomeRAN-HD™ system consists of two elements; HomeRAN-HD™ Gateway, and HomeRAN-HD™ Outlets distributed throughout the home.
- The HomeRAN-HD™ Gateway is a bridge that serves as an Ethernet to RF converter and manages up to 16 HomeRAN-HD™ Outlets.
- The HomeRAN-HD™ Outlets convert RF back to Ethernet, USB or Wireless ports and replace or complement regular TV outlets. Each HomeRAN-HD™ Outlet provides both RF-TV and network interfaces.

HomeRAN-HD™ Gateway and Outlets can be placed anywhere on the coaxial TV network and do not interfere with existing CATV or satellite signals.

Applications:

IPTV: HomeRAN-HD™ creates a bi-directional multimedia network to distribute IPTV video streams to several TV sets without additional wires. IP video streams reach the home via DSL or fiber broadband connections. The HomeRAN-HD™ Gateway, connected to the DSL/fiber modem via a standard 10/100BaseT connection, streams the IP video over the existing coax to HomeRAN-HD™ Outlets. An IP Set Top Box connected to a HomeRAN-HD™ Outlet converts the IP video stream to a common TV format and displays it on the TV set.

Multi-Room-DVR: HomeRAN-HD™ creates a bi-directional Ethernet network over the coax to network DVRs and STBs. The HomeRAN-HD™ Gateway is connected to a DVR via a standard 10/100BaseT connection. The Gateway converts Ethernet video streams from the DVR to RF signals and transmits them over the existing coax to the HomeRAN-HD™ Outlets. Set Top Boxes or additional DVRs connected to HomeRAN-HD™ Outlets convert the video streams back to common TV format.

The HomeRAN-HD™ system is based on TMT's patented Data over Coax (DoC) silicon technology that allows IP networks to coexist with CATV and satellite on the same coax infrastructure.

Main Features:

- Up to 116Mbps
- Advanced RF capabilities with low bandwidth consumption and automatic RF control
- Supports all coax topologies (star, tree, daisy-chain, etc.)
- DiY – Do it Yourself solution
- Built-in local and remote management via HTTP/SNMP
- Hybrid coax wireless option

HomeRAN-HD™
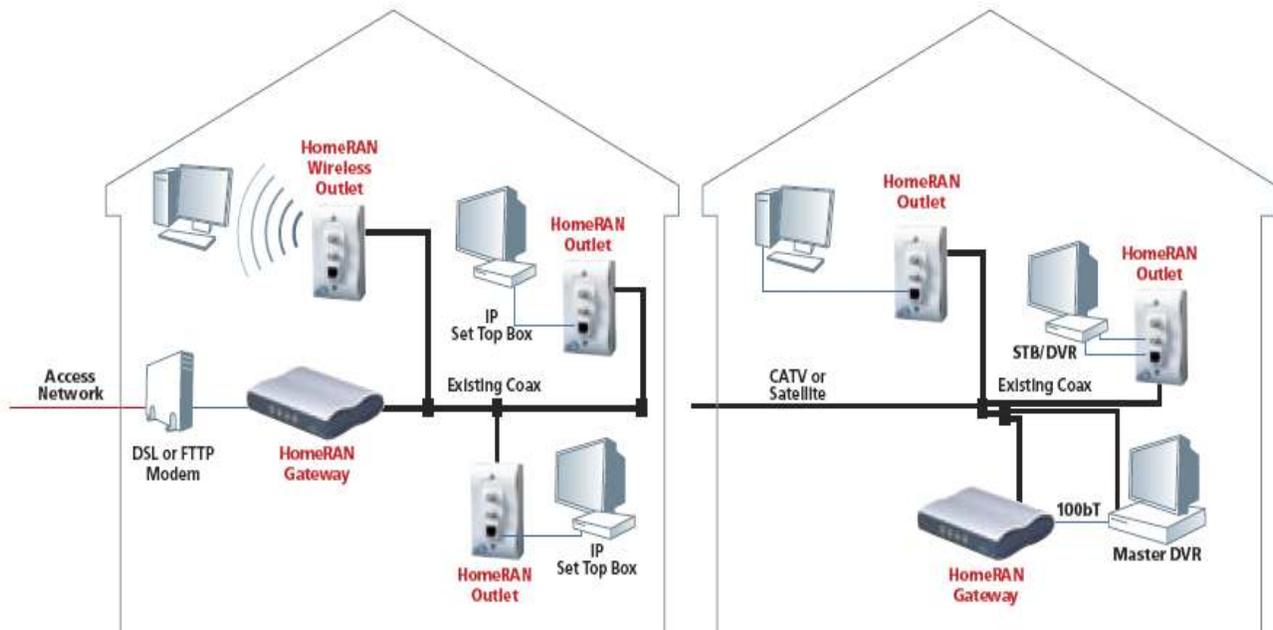
IPTV Distribution Over Existing Coax

Multi-Room-DVR Distribution Over Existing Coax

HomeRAN-HD™ Specifications

Speed Rate
Up to 116Mbps

Architecture
HomeRAN-HD™ Gateway manages up to 16
HomeRAN-HD™ Outlets

Video Streaming Features
Support of Unicast, Multicast
IGMP join/leave
Standard Definition and High Definition streams
MPEG2, MPEG4, VC1

Networking Features
Bridge Functionality
VLAN tagging according to 802.1q *

Management
Web Management for user configuration
SNMP remote management
Outlet automatic registration
RANager element management system
Auto RF setup

Security
Physical layer – TMT MAC
Filtering: Filtered RF to IP conversion
SNMPv3
HTTPS, TelnetS

RF Specifications
FDM – Dual Channel (D and U channels)
GW to IO - D Channel
IO to GW – U Channel

Frequency Ranges
U: 12-20 MHz (4-12 MHz Optional)
D: 40- 54 MHz (24-54 MHz Optional)

Channel Width
U: 3.75, 6.25 MHz
D: 6, 9.6, 12, 14 MHz

Modulation Type
 U: QPSK, QAM 16
 D: QAM 16,64,256
Max distance between Gateway to Outlet -
400m (1,300 ft)

Gateway Interfaces and Indications
WAN Port: 10/100baseT
Local Port: 10/100baseT
Coax Port: Female F–connector
Reset Button – restores factory defaults
Power Adaptor

Indication LEDs
Power – On/Off
LAN – Active/Traffic
WAN – Active/Traffic
COAX – Active/Traffic

HomeRAN-HD™ Outlet Types
10/100baseT
Wireless 802.11g*

HomeRAN-HD™ Gateway Dimensions
Length: 13.5cm (5.31")
Width: 11cm (4.33")
Height: 3.5cm (1.37")

HomeRAN-HD™ Outlet Dimensions
Length: 11.4 cm (4 15/32")
Width: 7cm (2 3/4")
Height: 4.2 cm (1 3/4") wall mount
Depth: 2 cm (25/32") wall plate*
Weight: USB: 160gr, Ethernet: 350gr
(including power adapter)
Packing Size: USB: 13.5 x 8 x 4.5 cm
Ethernet: 17.2x15.8x5.4 cm

Environmental Specifications
Operating Temp:
 32° to 104°F (0° to 40°C)
 -15° to 65°C Optional
Non-Operating Temp:
 -40° to 158°F (-40° to 70°C)
Relative Humidity:
 5 to 95% non-condensing

Certification
UL, FCC, CE, ICES
Safety UL 1950