Syscomm
Strategic Network Solutions

Multi-Dwelling Unit Gigabit Broadband Developers Guide

Ultrafast Tenant Internet
for Maximum Value
and Maximum Yield

syscomm.co.uk

Contents

Syscomm Ltd   T | 024 777 12000
Electric Wharf   E | gigabit@syscomm.co.uk   Not for Distribution
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Revision control and Confidentiality

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Key Contact Information

By Email:

gigabit@syscomm.co.uk

By Post:

FAO Gigabit MDU Team
Syscomm Ltd
Boiler House
Electric Wharf
Coventry
CV1 4JU

By Phone:

024 7771 2000

Key Contacts:

Ricky Dattani – Sales Manager

Syscomm Ltd
Electric Wharf
Coventry CV1 4JU

T | 024 777 12000
E | gigabit@syscomm.co.uk
W | www.syscomm.co.uk

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Page 3

Syscomm Introduction

Established in 1984 Syscomm are a specialist network and communications provider, delivering strategic LAN, WAN and Cloud Computing technology to our customers across the UK. Our headquarters, Midlands Data Centre and support operations are based in our central location at Electric Wharf, Coventry and we operate five additional Data Centres around the UK. With a pro-active approach to the evolution of IT systems, Syscomm serve to provide solutions designed to strike a pragmatic balance between performance, availability, security and cost.

Syscomm Philosophy

Throughout our 33 years, Syscomm has remained a technology leader through the changing generations of IT. We deliver modern IT Services, focused around the innovative technologies that bring operational benefits. We believe that a stable, secure and flexible IT infrastructure is the fundamental foundation for successful IT application delivery, and our professional team develop best-practice IT architecture to sustain the higher-level services that allow our customers to innovate to achieve their own business and operational goals.

Ethos and Sustainability

We believe in fostering long-term relationships - with our customers, staff and partners - based on integrity and clarity in our advice, best-practice delivery of services with clear pricing.

We strive for excellence in the delivery of our services, believing that our own delivery should be wholly insourced to maintain the all-round knowledge required to maintain the standards our customers deserve.

Our near 100% customer retention is the proof-in-the-pudding and is consistently validated by the regular flow of customer recommendations we receive in recognition of our approach.

Syscomm Ltd
Electric Wharf
Coventry CV1 4JU

T   024 777 12000
E   gigabit@syscomm.co.uk
W   www.syscomm.co.uk

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Page 4

Syscomm's Multi-Dwelling Unit: Gigabit Broadband for Tenants

Syscomm is a front-runner in the delivery of Gigabit business and residential broadband services, providing fibre to the premises (FTTP) circuits to homes and business across the country. Our ultrafast Gigabit symmetrical services are 3x faster than even mainstream competitors fastest FTTP services, and 20x faster than UK average broadband speeds.

With our ability to deliver Internet Services instantly for tenants, we focus on delivering an excellent end-user experience with a service that far exceeds Customer expectations. We answer customer calls in seconds not hours with our reputation founded on quality.

Established in 1984 Syscomm is a specialist network and communications provider.

We believe in fostering long-term relationships - with our customers, staff and partners - based on integrity and clarity in our advice, services and pricing. We strive for excellence in the delivery of our services, believing that our own delivery should be wholly insourced to deliver an excellent Customer experience.

The purpose of this document is to outline Syscomm's design and implementation processes for the installation of a network infrastructure to support ultrafast Internet capability into modified, refurbished and new property developments for residential and / or commercial use.

The Syscomm implementation team are there to support the process from initial proposal through installation and activation, continuing with our ongoing maintenance and tenant support.

The fine details of each project will be unique, but the guiding principles are similar and are presented in this document. Our plans are tailored in discussion with stakeholders to suit bespoke site requirements, prior to integration into the building development schedule to enable efficient coordination of contractors and subcontractors throughout the program of works.

Syscomm Ltd
Electric Wharf
Coventry CV1 4JU

T   024 777 12000
E   gigabit@syscomm.co.uk
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Page 5

Product Portfolio & End User Pricing

Syscomm typically offer four different packages to suit the needs for various tenants, providing greater choice for individual demands; from the casual Internet user through to a symmetric Gigabit service with enhanced business class SLA's for the home office or commercial user.

A Business Class option is offered both for Commercial and 'Work from Home' tenants, to ensure a high-quality Internet experience is maintained around-the-clock to support faultless delivery of Internet based business applications and video-conference streaming.

Our approach is to offer a menu of options, focussing on adding Service Quality above and beyond the fastest speeds of any mainstream Internet Service Provider (ISP).

Download (Up to)	15 Mbps	150 Mbps	300 Mbps	1000 Mbps
Upload (Up to)	1 Mbps	20 Mbps	300 Mbps	1000 Mbps
Residential/SOHO Grade Service				
Activation Charge (inc VAT)	£60.00			
Monthly Rental (inc VAT)	£20.00	£35.00	£45.00	£55.00
Basic Wireless Router	Included			
Telephone Line	None			
Term	18 months with 1-month term options for short-term tenants			
Business Class Bolt-on's				
Static IP Address(es)	1 IP: £5.00 4 IP's: £10.00 8 IP's: £15.00			
Business Class SLA	£15.00 pm			
24/7 Pro-active Monitoring & Alerting	£5.00 pm (requires static IP)			
VIP Traffic Prioritisation	£10.00			
4G Instant-On Backup Service	Optional (if required)			
Onsite Engineer for Installation/Configuration	Optional (if required)			
Business Platinum Plan Business Class Wireless Router and Firewall Draytek 2862ac Fully Managed Service Fully Managed Firewall Fully Managed VPN Service Includes: 24/7 Pro-active Monitoring & Alerting 1 Static IP Address VIP Traffic Prioritisation 8-hour Fix, Business SLA Prioritised Helpdesk Support	£40.00			

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Electric Wharf
Coventry CV1 4JU

T 024 777 12000
E gigabit@syscomm.co.uk
W www.syscomm.co.uk

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Page 6

Design Principals

The purpose of the design stage is to understand the development in terms of use, layout, timescales, stakeholders including contractors and any constraints that may impact the design and delivery of the Syscomm infrastructure. In the design stage Syscomm will meet with the development Project Managers, Mechanical and Electrical (M&E) designers, M&E contractors and any other relevant parties.

Syscomm will also require the following documentation from the developer to establish our network design:

- Site plans, to include all units and areas under consideration for broadband access

- Site Services infrastructure drawings indicating incoming and cross-site services including any duct work

- General Arrangement floor layouts with details of M&E containment for all floors of the buildings

- Riser detail including containment

- Schedule of proposed residential and commercial units

- An outline of the development project phases and timeline

- Subcontractor relationships where there could be a dependency upon them

- Contact details for the Developers nominated point of contact

The above will be used to build a Syscomm technical design, bespoke to the development. A Syscomm representative will provide this design to the Developer to formalise and agree the technical design.

Post technical design sign-off, and in line with timescales of the project and dependencies on subcontractors where applicable – Syscomm will issue the materials to the Developer/Contractor for installation.

Syscomm will maintain regular reporting to the Developer throughout the process and critical stages of the project.

For 3rd Party Installations

Once the first and second fix installation has been completed by the third party (including installation of cabinets), Syscomm will install network switches, provision services and connect to the fibre backhaul for final testing.

For Syscomm Led Installations

Syscomm will carry out all first fix activities in line with the Developers build programme. It is imperative that any amendments to the build programme are communicated to Syscomm at the earliest opportunity. Syscomm will then progress to second fix, followed by the installation of our network switches, provision of end users' services and connection to the fibre backhaul for final testing.

Syscomm Ltd
Electric Wharf
Coventry CV1 4JU

T | 024 777 12000
E | gigabit@syscomm.co.uk
W | www.syscomm.co.uk

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Page 7

Cabinet sizing based on Network Size

Typical Wall Mounted Cabinets

Cabinet Size in Rack Units	Cabinet Dimensions	Number of Network Points
9u	501mm (h) x 600mm (d) x 600mm (w)	24
12u	634mm (h) x 600mm (d) x 600mm (w	48
15u	768mm (h) x 600mm (d) x 600mm (w)	96
18u	900mm (h) x 600mm (d) x 600mm (w)	120
21u	1034mm (h) x 600mm (d) x 600mm (w)	168

Syscomm Ltd
Electric Wharf
Coventry CV1 4JU

T   024 777 12000
E   gigabit@syscomm.co.uk
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Page 8

Ducting and Chamber Access

The Syscomm incoming fibre backhaul from the Syscomm network into the building is an Ofcom regulated, typically Openreach installed product. Openreach are required by Ofcom to install the Syscomm fibre backhaul and run the fibre within their own ducting and containment into the primary comms cabinet. Syscomm cannot use any ducting or containment provided by Openreach, even within the building for our own internal cabling.

We can use developer provided containment, ducting or other cable management solutions. We will therefore wherever possible use development owned duct, chamber and other infrastructure to connect our services throughout the development. These are often the same routes and containment as CCTV, Access Control, HVAC etc

Syscomm Ltd
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Coventry CV1 4JU

T | 024 777 12000
E | gigabit@syscomm.co.uk
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Page 9

Gigabit Installation Overview

A fibre optic backhaul connection from the Syscomm external network will be delivered into a Primary Cabinet within the development, this incoming fibre will be terminated onto a fibre switch located within the Primary Cabinet. A third party working on behalf of Syscomm will deliver this backhaul circuit into the primary cabinet. All logistics will be managed by Syscomm and the relevant parties onsite. The fibre optic broadband connection serving the development will be routed through any existing communications ducts serving the development.

This Primary Cabinet will also provide the termination for horizontal Cat6 UTP cabling to units / apartments, with fibre optic backbone cabling implemented (where required) to other cabinets installed throughout the building / campus should copper cable lengths exceed 90m.

The Primary Cabinet will house the Syscomm active network equipment to provide broadband to each unit within the development. For convenience, other network services may be co-located alongside the Syscomm equipment to support Wi-Fi, Access Control, Telephone, or CCTV subject to agreement and calculation of space, power and cooling considerations. Syscomm can optionally provide monitoring and management connectivity for 3rd party building services or assist with the delivery of these network services where required.

Dependent on the scale and layout of the development additional network cabinets and switches may be deployed. These are interlinked by fibre optic spines routed on tray work within buildings and within developer owned cross site ductwork, chambers and containment running in and between buildings. These routes may be shared with other signal and control cabling such as CCTV, Access Control and Fire systems. Syscomm are unable to utilise any ducting, chambers or containment provided by another service provider. These locations will be strategically proposed in line with both network and development requirements.

In the case of new-build developments Syscomm will advise and agree the cabinet locations with the Developer. The Developer will then install the internal copper and fibre cables, and network cabinets on behalf of Syscomm. In the case of retro-fit installations, Syscomm will agree the locations of the equipment and may install these by arrangement with the developer. Each unit will have a UTP data cable terminated into a Syscomm branded faceplate – a Syscomm router will then be installed providing both wired and wireless connectivity.

Switches and Cabinets and Power

Typical cabinet sizes:

* 600mm (w) x 600mm (d), 12U, 15U, 18u and 21u cabinets

In proximity of each cabinet and provided from a nearby distribution board, a dedicated single radial 13A fused spur (non-switched) and 16mm clean earth is required. Power requirements are the responsibility of the Developer.

Syscomm Ltd
Electric Wharf
Coventry CV1 4JU

T   024 777 12000
E   gigabit@syscomm.co.uk
W   www.syscomm.co.uk

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Page 10

Cabling Infrastructure

Design and installation will follow industry best practice in adherence to current cabling standards

- ISO/IEC 11801 and their cross references.
- BS EN 50173 and their cross references.
- TIA/EIA-568 and their cross references.

Fibre and Un-shielded Twisted Pair (UTP) cables will be installed using suitable cable ways and routes already established in the development design for similar services.

All cable runs should be within trunking, conduit or secured onto data basket/tray. All tray work, bends, tees and crossovers shall be gusseted to allow for adequate bend radii of the installed cables. All trunking needs to be of sufficient capacity to allow for the minimum bend radii of the fibre and copper cabling. The acceptable minimum bend radius for the cables should be obtained from the manufacturer.

Minimum Cable Specifications:

Horizontal Cabling   Cat6 UTP 4 pair

Backbone Cabling Internal   OS2 (9/125) Fibre 4 pair

Backbone Cabling External   OS2 (9/125) Fibre 4 pair

All internal Fibre and Cat6 UTP cabling must conform to EuroClass Coca, S1b, d2 a2.

Fibre optic cable must be tested using calibrated OTDR equipment and results submitted to Syscomm. All UTP data cable cabling must be tested by industry standard calibrated equipment, (Fluke DTX1800 or equivalent). All results must be recorded and submitted to Syscomm for sign-off.

To prevent the potential of electro-magnetic interference in UTP data cabling degrading the performance of the Syscomm network services, electrical cabling should be placed a minimum of 300mm away from any UTP cables. Should mains power need to be run in the same trunking, compartmentalised trunking must be used, and the correct use and separation procedures adhered to. Fibre is not subject to electro-magnetic interference and can therefore can be installed next to electrical and other cabling.

All cabling (fibre and UTP) will be installed where possible by using any existing containment/trays or other cable management systems.

Maximum point-to-point distance for Syscomm Cat6 UTP copper is 90 meters, allowing for patching at either end within the 100m maximum length specification.

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Unit/Apartment Termination

The Syscomm service is installed within the unit in a single gang wall mounted 40mm deep backbox and terminated on a single outlet mounted in a Syscomm branded face plate.

Where the unit has its own UTP data cabling distribution within, the Syscomm service is to be located nearby the distribution (Patch Panel) typically found within the unit's utilities cupboard, with a mains power socket available within 1m of the termination point.

Where internal distribution cabling is not present within the unit, the Syscomm service is to be located adjacent to telephony and / or TV termination points, and with a mains power socket within 1m of the termination point.

Syscomm Incoming Fibre Backhaul

- The Syscomm incoming fibre backhaul into the development will feed the Primary Cabinet. This fibre backhaul will typically be fed into site via the incoming Openreach lead-in comms duct.

- The successful delivery of the Syscomm service in readiness for day-1 occupancy for tenants is imperative to the commercially viability of the project to Syscomm. The delivery of backhaul fibre is therefore a priority.

- It is suggested that the incoming Openreach lead-in comms duct is installed at the earliest possible opportunity from the site boundary to the point of entry into the building where Primary Cabinet is to be located. Openreach representatives will be best placed to advise the developer on routes and scheduling.

- The location of the Primary Cabinet should be agreed by the Developer and Syscomm at the earliest opportunity, and this space should be made ready as a priority in the development plan. The Primary Cabinet should be provisioned with utility or temporary power at an early stage of development, with sustained power available before first tenant occupancy.

- Syscomm also suggest that any containment route between the lead-in comms duct and mains comms cabinet is agreed and installed at the earliest opportunity.

- The incoming Syscomm fibre backhaul will be delivered by a third party on behalf of Syscomm. The third party is responsible for delivering this fibre backhaul circuit, and Syscomm will work with the third party and onsite management to facilitate access on the development.

Syscomm Ltd
Electric Wharf
Coventry CV1 4JU

T | 024 777 12000
E | gigabit@syscomm.co.uk
W | www.syscomm.co.uk

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Page 12

UTP cabling from cabinets to apartments/units

- UTP cables will run from their nominated cabinets and routed by the designated riser to the apartments/units. Where Syscomm are installing these cables, Syscomm will use developer provided containment/duct routes.

- The UTP cable will terminate into a Syscomm branded RJ45 faceplate.

- The suggested location of the faceplate is the living room/TV area – if there is no internal data network within the unit.

- If the unit has an internal data network, the RJ45 termination point should be located next to the collective termination point of the internal data network (usually within a service cupboard).

- The Syscomm point of service / demarcation will be the Cat6 RJ45 termination point within the property.

- To supply an Internet service, a router supporting both wired and wireless connectivity will be installed in the location next to the RJ45 faceplate. The router requires a standard 3-pin plug socket and power supply within 1m of the RJ45 termination.

Syscomm Ltd
Electric Wharf
Coventry CV1 4JU

T 024 777 12000
E gigabit@syscomm.co.uk
W www.syscomm.co.uk

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Page 13

High-level Delivery Schedule

Construction

- Primary Cabinet location confirmed
- Primary Telecommunications incoming service duct
  - Route qualified
  - Construction completes
- Cross Site service duct(s)
  - Route qualified
  - Construction completes

First Fix

- Preparation of Primary Cabinet location
- Installation of Primary Telecommunications external fibre
- Preparation of Secondary Cabinet location(s)
- Confirm Horizontal & Backbone cable routes
- Confirm Horizontal & Backbone cable tray provision
- Completion of Primary Cabinet mounting, with power and earth cabling
- Completion of Secondary Cabinet(s) mounting, with power and earth cabling
- Laying of Backbone fibre cabling
- Laying of Horizontal UTP cabling

Second Fix

- Cabinet dressing and cable terminations
- Install Fibre Tray & Fusion splice Backbone fibres
- Terminate Horizontal UTP data cables into the patch panels
- Terminate Horizontal UTP data cables into the unit faceplates
- Complete Power, Earth & PDU connections.
- Bring Cabinet(s) live with sustained power

Commissioning

- Test Backbone fibre cable installation
  - Label all termination points
  - Issue test results and cross reference connection chart(s)
- Test Horizontal UTP cable installation
  - Label all termination points
  - Issue test results and cross reference connection chart(s)

Ready for Service

- Install Switches into Cabinet(s)
- Configure Primary Fibre Backhaul Link
- Patch subscribed network outlets
- Configure tenant Internet Services and test end to end
- Tenants to occupy building

Syscomm Ltd
Electric Wharf
Coventry CV1 4JU

T   024 777 12000
E   gigabit@syscomm.co.uk
W   www.syscomm.co.uk

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Page 14

First Fix, Second Fix and Commissioning

Syscomm's contractors will deliver a fibre connection from our network directly into the Primary Cabinet at an early date in the construction schedule. It is important that the cabinet is mounted, and the environment prepared in advance, it being secure, clean, dry and dust free.

Cross-site ducting in developments with multiple buildings is also an early priority in the plan to help ensure adjoining tray work can be correctly aligned and ready for backbone cross-site fibre installation.

All optical fibre system components (cable, connectors, pigtail assemblies and patch leads) shall be supplied by Syscomm via a recognised optical fibre manufacturer.

First Fix

Installation will follow industry best practice in adherence to current cabling standards ISO/IEC 11801 / BS EN 50173 and TIA/EIA-568 and their cross references.

The installation of system components has a tremendous effect on the final performance and availability of the network, and it is therefore essential to ensure that the performance of the entire network is not diminished through improper installation.

Care must be taken to ensure cables are not stretched or abraded during installation by exceeding the manufactures pulling tension recommendations. The UTP cable between the unit / apartment outlet and network cabinet patch panel shall be a single, uninterrupted, four pair, 100-ohm Cat 6 UTP cable no longer than 90 metres.

Where cables pass through the walls and floors of the building construction they shall be suitably protected against damage. This would involve an appropriate type of sleeve in the form of metalwork with plastic or rubber grommets. Where fire-break walls are breached they should be re-instated with a suitable fire-retardant material.

The compression of the pairs from the over-tightening of cable ties may change the position of the cable pairs and affect performance and must be avoided.

Sharp bends in copper and fibre data cable will damage the insulating material and cause losses in transmission. The internal radius of every cable bend shall be such as not to cause damage to the cable nor impair the characteristics and be in accordance with manufacturers guidelines.

Where network cables run in parallel with mains or high voltage cables in risers and ceiling voids, they must have a separation distance of at least 300mm.

Where data cables cross power cables, they should only do so at 90 degrees.

A minimum separation of 160 mm shall be observed between telecommunications UTP data cables and fluorescent or neon lamps.

In dado trunking power and data cables must be kept in different compartments of the dado.

Where there is restricted access on cable routes removable panels installed adjacent to the cable tray/basket will allow for future access.

Syscomm Ltd
Electric Wharf
Coventry CV1 4JU

T 024 777 12000
E gigabit@syscomm.co.uk
W www.syscomm.co.uk

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Page 15

Each cable run should have at least 1.5 metre of spare cable at the cabinet end and 15 centimetres at the outlet end to allow for terminations. Each fibre optic cable run should have at least 5 metres of excess cable at each end prior to termination to facilitate the termination process.

Cables to be match numbered at both ends to enable identification of each cable at both ends to ensure sequential numbering of sockets by location.

Second Fix

All cables shall be installed with sufficient slack to enable the re-termination of the outlets a minimum of twice and a scope for movement of patch panels within cabinets. For larger floor standing cabinets this should be one cable turn at the bottom of the cabinet.

Cables entering floor standing network cabinets should be secured on vertical cable tray at intervals of not greater than 500mm, using Velcro cable ties being tied and loomed neatly during termination so as not to obstruct the installation of further patch panels and equipment into the cabinet space.

UTP Cables to be terminated in numbered sequence onto patch panels to ensure ease of identification at the unit end in forming a clockwise rotation pattern by physical location.

At the outlet (unit) termination a turn of cable should remain in the backbox following termination. The termination should be secured by a cable tie tightened to comfortably hold but not constrain the outer sheath of the cable on the outlet module.

On vertical and horizontal cable trays cables should be properly dressed and secured using Velcro cable ties not over tightened. To assist with strain relief on vertical runs, cables shall be dressed and tied from the bottom up at intervals of not greater than 1 metre.

Any cables that are damaged or kinked, or which do not confirm to Cat6 standard once installed and tested must have the entire cable replaced between the cabinet and the outlet socket at the installer's expense. These must then be retested to show certification with Cat6 standards.

Each fibre optic cable run should have at least 5 metres of excess cable at each end prior to termination to facilitate the termination process. Each fibre optic cable run should have 1 to 2 metres of cable coiled in or above the cabinet after termination, to allow for future relocation of the patch panel within the cabinet. The minimum bend radius of the cable must be adhered to. All cables must be securely fixed and not left hanging loose and installed so as not to obstruct the installation of further patch panels and equipment into the cabinet space.

All optical fibre components (supplied by a recognised manufacturer) shall comprise matching connector and pigtail assemblies, fusion spliced to matching optical fibre cable cores.

Optical fibres shall be mounted in 1U rack mount fibre trays and terminated with LC duplex pigtails.

The cables shall be clearly labelled at both ends, as outlined in the documentation and/or drawings.

Syscomm Ltd
Electric Wharf
Coventry CV1 4JU

T 024 777 12000
E gigabit@syscomm.co.uk
W www.syscomm.co.uk

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Page 16

Commissioning

All structured cabling systems and their installation must comply with the following standard as applicable:

- BS EN 50173
- BS EN 50174
- BS EN 50310
- BS EN 50346
- IEC/ISO 11801
- BS6701
- BS7671
- TSB67

Compliance Testing of Telecommunications Cabling System Channels

Both optical fibre and UTP cabling shall include all parameters required to show that the installed Telecommunications Cabling System is in compliance with the performance requirements of the BS EN 50173 standard up to and including Class E 100-ohm UTP Channels and Optical Fibre Channel classes OF-300 to OF-2000 inclusive.

Optical attenuation measurements shall be taken in both directions using an Optical Power Meter and compatible Light Source for all optical fibres, at 1310nm and 1550nm for single mode optical fibres.

OTDR tests shall be performed for all optical fibres, in both directions, at wavelengths of 1310nm and 1550nm for single mode optical fibre. The length of the launch lead shall be documented if it is shown on the OTDR trace.

The labelling schema for the outlet faceplates will be of the form of 3 hyphen-separated numbers in a layout of (XX-) YY- ZZZ where:

- XX is an alphabetic code identifying the building designation (campus developments only) where the network cabinet and outlet socket are installed.

- YY is a single alphabetic code identifying the cabinet designation (A, B, C, D, etc) and a single number to denote its location floor level. (0, 1, 2, 3, etc).

- ZZZ is a 3-digit number starting from 001 rising sequentially indicating the network outlet number.

- The fields must be separated by hyphens, not slashes or any other punctuation.

- The outlet sockets must be labelled sequentially around the installation.

The cables shall be clearly labelled at both ends, as outlined in the documentation and/or drawings.

Syscomm Ltd
Electric Wharf
Coventry CV1 4JU

T 024 777 12000
E gigabit@syscomm.co.uk
W www.syscomm.co.uk

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Page 17

Installation Responsibilities – Developer and Syscomm
Developer/Contractor tasks and responsibilities

- Provision and installation of any containment required to route Syscomm incoming fibre backhaul from the site telecommunications duct entry to the primary comms cabinet location via lead-in ducts.

- Installation of Syscomm Cabinets in the required and agreed locations between Syscomm and the Developer.

- Installation of Syscomm fibre optic spines between Cabinets

- Installation of UTP cable from the allocated cabinet location to each of the units/apartments using existing building infrastructure, containment, trays, ducts or other cable management systems.

- Termination and test of UTP cables within each apartment/unit

- Termination and test of UTP and Fibre cables to each cabinet patch panel at agreed cabinet locations.

- Fusion splice and OTDR test fibre optic spine cables at both ends

- Identify and label all cables stating both A and B end locations in line with proposed documentation and/or drawings.

- Installation and provision of and in proximity to each cabinet a dedicated single radial 13A fused spur (non-switched) and 16mm clean earth provided from a nearby distribution board. Installed and tested to European and British installation and safety standards.

- Supply and installation of a 3-pin 13amp socket with 1m of the in unit/apartment UTP termination.

- Installation of Syscomm router within the units/apartments.

- Provide a minimum of 10 days' notice to Syscomm to: provide materials, installation and/or testing, attend on-site and notice of tenant occupancy.

Syscomm Ltd
Electric Wharf
Coventry CV1 4JU

T 024 777 12000
E gigabit@syscomm.co.uk
W www.syscomm.co.uk

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Page 18

Syscomm tasks and responsibilities

- Installation and provision of Syscomm incoming backhaul from the external network to the Primary Cabinet

- Verify contractor/developer cabling tests and standard certification

- Verify contractor/developer labelling and provide as installed drawings to the Developer.

- Installation and provision of Syscomm Switches within the agreed cabinet locations.

- Connection of fibre network to the Switches by provision and installation of fibre patch cables.

- Connection of the Units/Apartments to the Switches by provision and installation of copper patch cables.

- Provision of any cabling UTP and/or fibre, Switches, Cabinets and Routers

Syscomm Ltd	T	024 777 12000		
Electric Wharf	E	gigabit@syscomm.co.uk	Not for Distribution	
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Gigabit Broadband

Increasing Values
Accelerating Sales
Maximising Yield

Next Generation Gigabit Internet Access:
20x Faster than the UK average

Syscomm
Boiler House,
Electric Wharf,
Coventry CV1 4JU

0247 77 12 000
info@syscomm.co.uk

syscomm.co.uk