Spark nz

Specification PTC 225: 2003

Requirements for

Star Wiring Boxes and Small Office/Home Office (SOHO) Cabling Installations

DRAFT FOR PUBLIC COMMENT

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CONTENTS

RELATED DOCUMENTS

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AS 3815	A guide to coaxial cabling in single and multiple premises
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The grant of a Telepermit for any item of equipment normally indicates only that Telecom has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the product by Telecom, nor does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model.

The cabling system hardware covered by this PTC Specification is generally proprietary and NOT covered by Telecom's Standard Wiring Maintenance Service (under which Telecom replaces, free of charge to the customer, any wiring or BT socket type jackpoints which fail through normal use). Cable terminating hardware mounted within the panel and any RJ-series sockets used as jackpoints are regarded as "customer equipment connected to the fixed wiring".

In view of this, suppliers of SOHO wiring systems and hardware are to ensure that customers using their equipment are advised of the need to cancel their subscription to Telecom's wiring maintenance service.

Similarly, the number of types of hardware used for simpler "star wiring" connection points will also vary widely and it is not reasonable to expect either that Telecom contractors will carry spare components or be required to make repairs/replacements to such equipment under Telecom's Standard Wiring Maintenance Service.

Customers may continue to subscribe to this service for maintenance of wiring and standard 2-wire jackpoints connected to the Telecom network, but this service does not extend to star point hardware or to jackpoints of types other than the standard Telecom types using the "BT 6-way socket".

FOREWORD

This Specification was originally issued by Telecom in 1998 to define its general requirements for Small Office/Home Office (SOHO) cabling systems to be used in customer premises telecommunications wiring connected to the Telecom network. This edition extends the scope of this specification to cover a range of options from simple "star-wired" installations with 2-wire jackpoints, jumpered connections and associated connection hardware, through to SOHO systems with RJ 45 jackpoints and cross-patching facilities.

There is growing demand for the additional flexibility of the various types of star-wired systems covered by this Specification. The simpler systems can now be provided at little extra cost and it is recommended that customers who are building new homes should install them in preference to looped wiring. This is especially the case for customers intending to have broadband access to the Telecom network. Star wiring not only supports Home LAN installations, but also provides the advantage of easy re-allocation of services to jackpoints.

It must be stressed that although the more complex SOHO cabling systems are acceptable to Telecom, they do not represent Telecom standard practice for residential customers, for whom Telecom has previously specified its simpler and lower cost "2-wiring" system. "2-wiring", installed in the traditional "loop" mode, still meets the current needs of the great majority of Telecom's residential customers. It is also likely to meet many of their future network-based requirements, with additions, where necessary.

Nevertheless, "star wiring", using Cat 5 cable for improved performance, and simple jumpering facilities in order to minimise costs, is expected to provide improved support for future requirements at little extra cost. Telecom now recommends that residential and small business customers should install "star" wiring with Cat 5 cable and a centrally-located connection point, even when there is no immediate need for broadband services.

In preparing this Specification, Telecom recognises the rapid developments in telecommunications technologies and increasing customer demand for wideband data services, television, etc.

In accordance with Australia/New Zealand joint standards, AS/NZS 3080 and AS/NZS 3086, this Specification covers the use of "Category 5" cable and, preferably, Cat 5 rated components throughout the installation. This should ensure that the cabling is capable of supporting the wider range of Telecom services expected to become available over the next few years. Such cabling will also support many other LAN-based services likely to be needed in the modern home.

Many modern proprietary SOHO cabling systems include coaxial or fibre optic cabling, while some are based on screened cable and sockets. These cable types are primarily used for non-network services, such as the distribution of free-to-air television, video, etc. Because it is expected that all residential services provided over the Telecom network can be supported by correctly installed Cat 5 Unshielded Twisted Pair (UTP) cable, this specification does not cover these additional cable and hardware types.

This document covers a number of installation issues related to the use of SOHO and star wiring hardware. This has been included so that hardware suppliers, especially those overseas, are more aware of our local environment and cabling practices.

1 SCOPE

1.1   General

(1)   This specification defines Telecom's requirements for Star-wired and Small Office/Home Office (SOHO) cabling systems and components intended to be used mainly in residential customer premises telecommunications wiring connected to the Telecom network. In line with current New Zealand cabling industry practice, it covers the use of unshielded twisted pair (UTP) cable of at least Category 5 performance rating.

• *It is expected that a wide range of system designs will be covered by this Specification and that the resulting systems will be installed in both residential and business customers' premises. The use of these cabling systems impacts on Telecom's contractual terms with its customers, as explained in Section 2.*

(2)   Telepermitted components complying with this Specification and/or with AS/NZS 3080, when wired in accordance with Telecom Code of Practice PTC 103:2003 or AS/NZS 3086, may be installed in residential premises and be lawfully connected to the Telecom network.

• *Telecom's Standard Terms for Residential Customers require that such customers connect only Telepermitted equipment to the Telecom network.*

(3)   The installation of star wiring and SOHO systems connected to the Telecom network shall comply in general terms with either AS/NZS 3086, AS/NZS 3080, or with the relevant Telecom PTC Specifications and Codes of Practice.

• *It is recommended that this Specification be read in conjunction with AS/NZS 3086 and AS/NZS 3080 for SOHO systems, or PTC 103 for the simpler star wiring arrangements.*

(4)   All components used for the provision of services derived from the Telecom network shall be purpose-designed for telecommunications applications. No such components shall adversely affect the performance of services provided by the Telecom network.

(5)   For residential customers' SOHO installations, the main components (cross-connection facilities and cabinets) will generally be included as part of an overall system Telepermit in accordance with this specification.

• *For complete systems sold commercially and usually installed commercially, it is expected that the supplier or contractor concerned will manage ongoing maintenance and servicing of the system. In these cases, customers are to be advised NOT to subscribe to Telecom's wiring maintenance service.*

(6)   For residential customer's simple star-wired installations, which are likely to be maintained primarily by Telecom under its residential premises wiring maintenance service, any star point hardware used to terminate the wiring, but not provided as part of a complete system box, shall be subject to Telepermit.

(7)   In accordance with arrangements introduced in 1988 and published in Telecom Code of Practice PTC 105, cabling and associated components installed in commercial premises do not require Telepermit. Commercial customers and installers are, however, required to ensure that all connected cabling hardware is purpose-designed for telecommunications and that its use does not adversely impact on the performance of Telecom's network services.

•   *It is strongly recommended that cabling and hardware complying with AS/NZS 3080 be used for all new commercial premises cabling.*

(8)   In addition to the cross-connect hardware used for Telecom network services, SOHO cabinets may house any other cabling and cross-connect components, e.g., those for coaxial and fibre optic cable, which are not connected to the Telecom network. Such components are not subject to Telecom Telepermit requirements.

•   *These cables could typically support television, high speed LAN's, etc, which are totally independent of any connections to the Telecom network.*

(9)   Premises coaxial cabling used in conjunction with some network-based cable television distribution services is generally installed only by contractors trained and appointed by the network company concerned. In view of this, independent suppliers of coaxial cabling and hardware should confirm the acceptability of their products to the network or service operator concerned before offering them to that operator's customers.

(10)   For any Telepermit application to be successful, products shall comply with the mandatory requirements of this Specification and those of the related specifications and standards called up by this Specification.

(11)   As outlined in Specification PTC 100, where any conflict arises between the requirements of general Specifications and those of this product Specification, the requirements of this Specification shall take precedence.

(12)   Where other national standards or industry specifications are called up in this Specification, these are acceptable to Telecom. Other equivalent specifications may also be acceptable to Telecom. Where products complying with other specifications are proposed, details of those specifications are to be supplied to Telecom as part of the Telepermit application.

1.2   System architecture

(1)   Until now, Telecom's standard residential premises wiring practice has generally been based on 2-pair cabling "looped" from jackpoint to jackpoint, such that most are connected on a common cable run back to the network termination. This is referred to as "loop" or "daisy chain" wiring. In contrast, "star wiring" means that each jackpoint is individually cabled back to a common cross-connection point. This is also the basis of SOHO cabling systems.

(2)   Star wiring provides far more flexibility for connecting additional lines, for the connection of switching devices, and for individual control and allocation of specific services to each jackpoint. It also provides an access point for connecting any type of line break-in device, such as security or medical alarms.

(3)   In view of its increased performance and flexibility for future service requirements, 4-pair cable is now recommended for all premises wiring. In line with current industry practice, this should be of at least Cat. 5 rating.

• *In most homes, cable is installed for the life of the building, whereas terminating hardware is accessible and relatively easily changed. In view of this, it is recommended that high performance cable is always used, even though Telecom's standard 2-pair cable is adequate for today's needs.*

(4)   SOHO cabinets and Star Boxes should preferably be located on interior walls, especially if they are of a non-commercial design "customised" for the particular installation.

(5)   A central location should be chosen to minimise cable run lengths.

(6)   This edition of PTC 225 provides for a full range of star wiring options, any of which are suitable for new homes or small businesses, and for any extensive re-wiring of existing premises.

1.3   Marketing features

Some equipment features or characteristics are regarded as purely marketing issues and their requirements are therefore not necessarily dealt with in this specification. However, in cases where clarification is considered desirable, explanatory notes are provided.

1.4   Test and acceptance criteria

(1)   This Specification covers performance requirements in only general terms, as there is expected to be a wide range of proprietary designs, cabinet types and additional features. Compliance will usually be verified by means of compliance statements issued by the manufacturer.

(2)   Where there is any doubt about the level of compliance achieved, Telecom reserves the right to require verification by a recognised independent testing agency.

1.5   Format

(1)   Those aspects of this Specification which are regarded as mandatory are printed in plain type with each paragraph shaded, as shown.

(2)   All mandatory and other clauses which form part of this Specification are formally numbered.

(3)   Comments and recommendations which are added only as indications of the best means of compliance are shown in italics in smaller type. Each is in a smaller type and is preceded with a "•" symbol, but without numbering. For example:

• *UTP cable manufactured to comply with the Cat 5 requirements of AS/NZS 3080 (ISO/IEC 11801) or EIA/TIA 568A will generally be acceptable under this Specification.*

2. DEFINITIONS

BT Jackpoint: the standard Telecom New Zealand 6-way jackpoint, originally designed by British Telecom, and now developed into a "2-wire" version.

• *The matching 6-way plug is used on the great majority of CPE used in New Zealand, so retention of this style of jackpoint avoids the need for adapters or for re-terminating the CPE with an RJ 45-matching plug.*

• *BT jackpoints are available in a number of different formats, of which Telecom holds only a limited range. In the event that a jackpoint of some other design fails, it can only be replaced by one from the Telecom range under the terms of Telecom's Residential Wiring Maintenance service.*

Cabinet: the main housing of the cabling system, providing network and outlet terminations and their associated cross-connection facilities.

• *For the purposes of this Specification, the term "cabinet" may also be applied to any cupboard or panel, which is part of a building, rather than supplied as a commercial product.*

Cord (Patch cord):   insulated wires consisting of stranded or tinsel metallic conductors, assembled into a sheath and terminated with appropriate connectors at both ends.

Disconnect Test Point (DTP):   a customer-accessible test facility which permits the cabling and equipment within the customer's premises to be isolated from the incoming network line, and which provides for the direct connection of CPE to that line for simple functional testing purposes.

• *Such a device permits the customer to determine whether a problem is caused by the customer's own wiring or equipment, or by some fault in the network. The customer can then call on the appropriate party (eg, Telecom, an alarm contractor, or the party responsible for cabling maintenance) to restore normal services.*

External Test Point (ETP):   the Telecom-provided test point, mounted on the outer wall of the premises, in which the network lead-in cable is jointed to the internal building cable, and which usually forms the network demarcation point.

Jumpering: semi-permanent connections at cross-connection points made by means of a pair of wires or a short length of cable without connectors.

Network Demarcation Point: the first termination of the network lead-in cable within commercial premises or the point at which the network lead-in cable enters the outer wall of an individual residence.

• *The residential Network Demarcation Point was originally defined (1987 - 1998) as the first termination of the network lead-in cable within the premises. However, in 1998, this was changed to "the point of entry into the building", as this is more easily recognised by customers now that Telecom has a large installed base of External Test Points (ETP's). The ETP box is usually mounted directly over the cable entry point in the outer wall of the premises.*

Outlet (Telecommunications Outlet): a generic term to describe any fixed connecting device at which the customer equipment may be plug-connected to the premises cabling.

• *More commonly termed a "jackpoint" or "socket" in New Zealand.*

Patching: cross-connections made by plug-ended cords.

RJ45: the term generally used in New Zealand to describe the 8-way modular socket originally designed for North America and subsequently adopted as an international standard under the IEC 60603-7 series of standards.

Socket: that component part of a telecommunications outlet or patching facility into which a plug is inserted.

• *For SOHO the socket will usually be the 8-way modular type (known in New Zealand as "RJ45"). For star wiring, the BT type (the standard Telecom 6-way socket, originally of British Telecom design), is more likely to be used, especially for POTS services.*

SOHO (Small Office Home Office) system: a cabling system designed for small premises, using RJ 45 jackpoints and providing terminations with RJ 45-based cross-patching facilities for telecommunications outlets within the premises and for lines and services from the public network, but with only one cross-connect point and no "backbone" cabling.

• *In general, backbone cabling is only associated with the larger installations to AS/NZS 3080.*

• *The term SOHO is used in this specification to clearly differentiate between a system designed in accordance with AS/NZS 3086 or AS/NZS 3080 (without backbone cabling), and a simple "star-wired" installation with hard-wired jumpering facilities and relatively few jackpoints (most of which may be the Telecom standard 6-way type).*

• *There will no doubt be intermediate designs covering some, but not all, SOHO facilities. The range of features to be provided is regarded as a marketing issue.*

Star Point Hardware: a generic term used to describe any termination hardware used for simple star-wired installations and usually housed within a box or cabinet.

• *In general, it is expected that smaller systems will be provided and offered for sale as a complete assembly within a purpose-designed commercially-supplied box. However, this does not preclude the provision of separate components, which can be mounted within a cupboard or panel provided by the customer. Such components are subject to the requirements of this specification and will be required to hold Telepermits when used in residential premises.*

3.   MAINTENANCE AND TEST FACILITIES

3.1   Network test facilities

(1)   Where a residential cabling system is not intended to be maintained by Telecom, provision shall be made for isolating the internal cabling from each Telecom line for testing purposes. This may be done by means of removable patch cords or by separate line test facilities within or external to a SOHO cabinet.

• *Ideally, the customer should be provided with easily usable facilities for isolating all cabling and CPE within the premises from each Telecom line. This ensures that a telephone or other CPE item can be plugged directly into that line termination to test for dial tone, correct call set-up and release, etc. This will allow the customer to carry out simple functional tests and so avoid the costs of unnecessary service calls.*

• *The customer is likely to be charged by the party called to service the installation if that party determines that its own equipment is not at fault. This applies to both Telecom and the nominated service organisation. As such, it is in the customer's best interests to attempt to isolate the cause of the fault.*

(2)   AS/NZS 3086 calls for the provision of a "Disconnect Test Point" (DTP) within the customer's premises, without defining the actual means of disconnection. The DTP provides for a customer to determine whether a fault is within the premises or in the network, by disconnecting the premises wiring and other hardware, plugging a telephone directly into a line to check for dial tone, and asking someone to make an incoming test call.   A DTP is to be provided in all SOHO installations.

• *A DTP is required because Telecom does not maintain RJ 45 jackpoints or terminating hardware under its Residential Wiring Maintenance Service. See (4) below.*

• *Having ascertained whether the fault is "inside" or "network-related", the customer can call the appropriate service organisation for assistance and may thereby avoid unnecessary service charges.*

• *An acceptable solution is to terminate each incoming line on a 2-wire jackpoint and to simply "plug-in" the wiring and CPE connected to that line.*

(3)   Equipment suppliers should note that Telecom now levies a charge should its service staff visit a customer's premises and find that a service fault is due to any customer-owned equipment, jackpoints or wiring not covered by its Residential Premises Wiring Maintenance Service. Any cross-connect hardware is regarded as "customer-owned equipment" and is not covered by this service.

(4)   The wiring and jackpoints of a simple star-wired residential installation using BT jackpoints are covered by Telecom's Residential Premises Wiring Maintenance Service, so these components are likely to be maintained by Telecom, even though the star point hardware itself is excluded. In the circumstances, there is no need for a specific network Disconnect Test Point, as any problems related to the wiring will be dealt with by Telecom.

3.2   Warning notices

(1)   For SOHO installations (including the panel, its associated cabling and any RJ 45 jackpoints) NOT maintained by Telecom, a clear warning shall be prominently displayed on, in, or adjacent to the cabinet, to the effect that:-

This cabling installation is NOT covered by Telecom's wiring maintenance service.

In the event of service problems, the Disconnect Test Point should be used to determine whether or not the problem is due to the Telecom network. If the fault appears to be in the cabling and equipment within the premises, contact [*name and contact details of service organisation*] for assistance.

Only contact Telecom if the fault appears to be network-related.

• *Telecom's wiring maintenance service is subscribed to by the vast majority of Telecom's residential customers. Unless those customers for whom a SOHO system is being installed are advised to relinquish the service, they may continue to pay the monthly fee despite the fact that Telecom will not be able to maintain the cabling concerned.*

• *Since it will not be involved in carrying out any of the installation work, Telecom will not be aware of the customer's decision to use SOHO cabling. Failure to relinquish the Telecom service will not only result in continued and unnecessary cost for the customer, but also lead to potential difficulties if Telecom staff levy a charge for a service visit.*

(2)   For Star Box installations (using standard Telecom 2-wire jackpoints and either 2-pair or 4-pair cable, which **are** intended to be maintained by Telecom) a clear warning shall be prominently displayed on, in, or adjacent to the star box, to the effect that:-

Only the 2-wire jackpoints and associated premises wiring are covered by Telecom's wiring maintenance service.

In the event of failure of any other types of jackpoint or of any connection hardware used in this box, the faulty component may have to be disconnected and by-passed by the Telecom service person. It will then have to be replaced at the customer's cost.

3.3   RJ 45 wiring pin-out options

(1)   In view of the two options permitted by AS/NZS 3080 for RJ 45 socket termination, it is recommended that the supplier clearly states which option is used in a commercially-supplied wiring system.

• *A brief statement to this effect could be incorporated into the warning notice required under clause 3.2 above.*

4.   CABINET AND HARDWARE DESIGN

4.1   Capacity

(1)   The actual capacity of a SOHO panel or star point hardware in terms of the number and types of telecommunications outlets supported is not specified as a Telepermit requirement. This is a matter for the supplier to decide.

• *It is recommended that panels and hardware be expandable to cater for unforeseen requirements in terms of increased outlets or future services.*

(2)   A SOHO system, in compliance with AS/NZS 3086, would require capacity for up to 4 exchange lines and capacity for at least one outlet per room. However, this will not be rigidly applied for Telepermit purposes. The actual hardware capacity and any means of providing for future expansion are regarded as marketing features and overall requirements are a matter for each customer to decide.

• *Some international standards recommend at least one outlet (and preferably two outlets) per 10 square metres of floorspace. This is generally well above what would be installed in a New Zealand home, but a growing range of future services could well justify such a relatively generous basis of provision.*

(3)   Telecommunications wiring may, in some cases, have series-connected CPE intercepting one or more cable runs. For example, various types of line-grabbing devices (such as security and medical alarms) and ringing decoders are now in common use. Wiring terminals should be allocated for such functions.

• *For maximum flexibility and overall tidiness of the installation, it is generally preferable to mount, or at least connect, such devices within the SOHO cabinet. See Section 12.*

(3)   To meet future needs, some telecommunications wiring may be diverted from direct connection to the public network into Local Area Network wiring supporting services derived within the premises. It is recommended that cabinets provide accommodation for additional equipment, such as routers and their associated cable terminations.

(4)   Such equipment generally needs local powering. It is recommended that provision be made for a 230 V power outlet within the cabinet, with space for a multi-outlet power box and the associated plug-pack power supplies.

4.2   Overall dimensions

(1)   The dimensions of the cabinet should be such as to house all components, cross-connections, etc, such that there is easy access for terminations or cross-connections to be made and the minimum acceptable bending radius for the cable concerned (typically, no less than 4 times the diameter of the cable sheath) is maintained.

• *It is recommended that cabinets be made as large as practicable in order to provide for future and, as yet, unknown requirements. Typically, a cabinet or cupboard designed to fit into a wall and take up a full inter-stud width is recommended for all but the smallest (one or two-line) installations.*

(2)   Provided safety requirements are met in all cases, it is a matter for the supplier to decide whether to permit other equipment to be housed within a commercially-supplied system cabinet.

4.3   Cabinet materials

(1) The materials used, the appearance and overall dimensions of commercially supplied SOHO cabinets or star point boxes are regarded as marketing features and, other than for safety compliance, there are no specific Telecom requirements in these respects. The same applies for cabinets provided as an integral part of a building.

(2)   The design of, and materials used in, the actual cable termination hardware shall comply with the relevant safety regulations.

4.4   Components

(1)   UL or an equivalent industry-recognised approval, and/or a test report indicating full compliance with AS/NZS 3260, IEC 60950 or other acceptable safety standard, shall be provided for Telepermit application purposes.

(2)   The primary cable terminating components, such as connection strips, shall be marked with the name of the manufacturer, and the model or part number.

(3)   Preferably, these components shall also bear a UL or equivalent industry-recognised certification mark.

4.5   Power supplies

(1)   Some parts of star wiring systems and associated cabling are expected to evolve into ethernet LAN's, with cables and outlets transferring from direct connection to the public network to indirect connection via a router. Unlike telephones, which are commonly line-powered, most data terminals require local power supplies. Current practice is to locate a 230 V outlet close to the terminal device. Recently ratified standards for "Power over Ethernet" (POE) will provide for powering these devices over the premises wiring, with suitable centralised power supplies located within the SOHO cabinet. It is expected that data terminal equipment will support this form of powering in the future and require at least one 230 V outlet within or adjacent to a wiring cabinet.

• *The relevant standard is IEEE 802.3af, which is soon expected to be adopted by ISO/IEC as an international standard.*

(2)   Where 230 V hardware and power supply units are fitted within a SOHO cabinet, these and any associated wiring connected shall comply with NZ Electricity Regulations.

(3)   Power supplies connected to devices or wiring, which is itself connected directly or indirectly to the Telecom network, shall comply with AS/NZS 60950.

4.6   Safety issues

(1)   Commercially supplied SOHO cabinets or star point boxes shall comply with the safety requirements of AS/NZS 60950.

(2)   Where a power outlet and 230 V cabling is to be installed within a commercially-supplied cabinet, the supplier shall ensure that any additional safety requirements, such as the segregation of services, can be provided for.

• *The installer is ultimately responsible for ensuring that safety requirements are complied with. However, equipment suppliers should be take these requirements into account in their cabinet design.*

 (3)   Any wiring conductively connected to a telecommunications network is deemed to be operating at TNV-3 and is subject to occasional over-voltages. Any exposed conductive surface accessible by a standard test finger shall be earthed as a protective measure.

(4)   Provision shall be made for the connection of a fixed wired earth conductor in any cabinets which are intended to house products with exposed conductive surfaces.

(5)   The installation of any premises wiring system and associated hardware shall meet the appropriate New Zealand electrical safety standards and AS/NZS 3000. This is regarded as the responsibility of the installer.

(6)   Cabling facilities may also be assembled from separate cabling hardware components mounted on flat panels or mounting boards, and fitted within cupboards or other enclosures customised for the specific installation. In such installations the installer is responsible for ensuring that all necessary fire protection measures are complied with.

• *This includes fire-proofing of any cable access-ways provided for additional cabling to ensure that these will not provide a path for the spread of fires between floors.*

5.   JUMPERING AND PATCHING FACILITIES

5.1   Options

(1)   Facilities shall be provided for cross-connecting outlets to incoming lines or services.

(2)   Unless a PABX is to be installed for telephone services, facilities shall also be provided for commoning telephone outlets where two or more are required to access the same line.

(3)   Whether patching cords or fixed jumpers for cross-connection purposes are used is a matter for the supplier to determine.

(4)   Cross-connection hardware shall display the manufacturer's name and part number, permanently marked on the product.

5.2   Electrical performance

(1)   Whatever the method of cross-connection provided, it shall be such that the d.c. resistance and any transmission performance degradation caused by the type of cross-connection shall not exceed the limits set by AS/NZS 3080.

(2)   Connection hardware shall be of a design, the performance of which has been formally confirmed by the Underwriters' Laboratories (UL) or some other industry-recognised certification body acceptable to Telecom, as compliant with the supplier's claims.

• *Category 5 performance is generally regarded as the current "industry standard" for SOHO in New Zealand.*

5.3   Corrosion resistance

(1)   Telecom experience has revealed that the environment in some residential installations can be quite corrosive, mainly as a result of dampness in combination with some form of chemical contamination.

• *Dampness problems have recently come to the fore with growing complaints about "damp house syndrome" and inadequate weather protection even in new homes. The corrosion of telecommunications jackpoints, due to dampness in combination with the constant d.c. line voltage, has been a common cause of service failures and a long-standing problem for Telecom.*

• *Other common causes are condensation in bedrooms due to sleepers and condensation in cooler rooms in the home, etc, especially for outlets on external walls.*

(2)   Cabinets and hardware shall be designed in such a way as to protect all parts, especially the electrical contacts, from dampness and condensation.

• *Timber framed walls are mostly used for residential construction in New Zealand. The wall cavities are often subject to drafts, which carry dust and moisture from outside air. New Zealand population centres are mostly close to the coast, the climate is windy, and the air is often salt-laden as a result. Any unenclosed outlet hardware which projects into the wall cavity can be subjected to a gradual build-up of dust deposits and other contamination, which may lead to early failure due to corrosion or subsequent bridging of contact springs. This has been a common problem with BT sockets, even though these have wider-spaced springs than the RJ-series sockets and adjacent springs do not have 50 V across them, as do the centre springs of the RJ-series. In view of these differences, it is expected that the RJ-series may be prone to worse corrosion problems in some residential environments. Gel-filling may be advisable in some circumstances.*

5.4 Protection of components

(1)   Commercially-supplied cabinets and boxes should provide reasonable protection against the ingress of dust and dirt by providing for cable holes to be sealed.

(2)   A suitable cover or door shall be provided on commercial cabinets such that internal components are protected from damage.

6. CABLE AND CORDAGE

6.1 Cable types

(1)   In accordance with internationally accepted standards and practices, 4-pair cable and patch cords, of "Category 5" or higher rating, are now almost universally used for new commercial cabling installations in New Zealand. Category 5 cable is now also recommended by Telecom for all new residential installations in preference to the 2-pair cable previously specified by Telecom and widely used in existing homes.

• *While "Category 3" cable (for frequencies up to 16 MHz) has been accepted in the past, this is now regarded as obsolescent and Category 5 is effectively the "industry standard".*

• *Both classes of cable provide a significantly higher transmission performance than the 3-pair 0.4 mm cable previously specified by Telecom for general premises wiring applications.*

• *Category 5 cable is expected to support all projected new services for some years.*

• *See PTC 222 and/or AS/NZS 3080 for cable performance specifications.*

(2)   Standard Cat 5 cable is intended only for use within a building. For the purposes of this specification, non-plenum cable is satisfactory. There is no requirement for the cable insulant and sheathing to be halogen-free, or for the cable to have any specific "Reduced Flame Propagation" or "Reduced Fire Hazard" classification. These are regarded as "marketing features".

• *PVC-sheathed power and lighting cable is almost universally used in New Zealand homes. As such, there is little justification for the relatively small amount of telecommunications cable in such installations to be halogen-free or to have special fire-ratings.*

(3)   For the avoidance of doubt, shielded cables are not required. However, their use is acceptable as part of any proprietary system designed to use screening for all components in order to carry high frequency signals and reduce susceptibility to radio interference.

(4)   Where cable passes between buildings, cable designed for the particular application shall be used.

(5)   Telecom's standard 2-pair cable may be used for star-wired installations, but this is NOT recommended.

•   *4-pair cable provides a higher level of flexibility and performance at little extra cost. Many current telecommunications industry standards are being developed on the assumption that   4-pair cable will be available.*

6.2   Cable marking

(1)   All 4-pair cables used in a SOHO or star-wired installation shall be marked, in English, with the registered name or trademark of the manufacturer or local supplier, the part number or other identification of that particular cable type, and an industry-recognised certification mark. .

•   *For contractual purposes, all cable used in residential premises is required to hold a Telepermit. Telecom will accept that cable, fully-certified to Cat 5 or higher performance and marked accordingly, is now regarded as directly equivalent to cable which holds a Telepermit.*

(2)   These markings shall be provided at intervals of not more than 2 metres.

•   *Marking allows identification of the performance Category, especially in those cases where performance is critical.*

(2)   Any 2-pair cable used shall comply with Telecom requirements and hold a Telepermit in the PTC 222-series.

6.3   Patch cords

(1)   Patch cords shall be purpose-designed for the related SOHO system, such that cross-connections may be easily accomplished.

(2)   All patch cords used in a SOHO installation shall be marked, in English, with the registered name or trademark of the manufacturer or local supplier, the performance rating, and the part number or other identification of that particular cable type.

6.4   Jumpering

(1)   Jumper cables or wire pairs used for semi-permanent cross-connections, such as commoning outlets for direct connection of exchange lines, shall be consistent with the performance requirements of the system concerned.

(2)   Jumpers in simple star-wired installations based on the use of Telecom's standard 2-wire jackpoints will typically be single pairs of the appropriate colours taken from a short length of cable. High bit-rate performance is not critical for these jackpoints.

(3)   Where Cat 5 performance is required, it is important that pair twist is maintained over the full length of the jumper between each termination.

•   *In any event, maintaining wire twist between the terminations is good installation practice.*

7. TELECOMMUNICATIONS OUTLETS

7.1   Outlet types

(1)   Telecom's standard socket for residential applications is the 6-way modular socket designed by British Telecom. This is now available in a range of different wall plate designs. The majority of Customer Premises Equipment (CPE) used in New Zealand is fitted with the matching BT-type plug.

(2)   Modern commercial building cabling is based on the use of the North American 8-way modular socket, commonly known in New Zealand and Australia as the "RJ45".

(3)   SOHO cabling is essentially a sub-set of the commercial building cabling system and also uses the 8-way modular socket. This is likely to be the most suitable option in commercial premises, even though some CPE may require the use of RJ45/BT adapters to facilitate connection of standard CPE to the RJ45 socket.

(4)   Where star wiring or SOHO is installed in a home, the customer may initially choose to use Telepermitted 2-wire sockets for some or all outlets, especially where there is no initial requirement for high speed data services. This is acceptable to Telecom. The BT socket is not rated to Category 5, but it will support current Telecom network services and such sockets can continue to be used until such time as full Category 5 performance is required for new services.

• *This practice does NOT comply with AS/NZS 3086, but it is acceptable to Telecom as a cost effective means of connecting current types of CPE, the majority of which are fitted with BT plugs.*

• *Use of BT sockets not only avoids any need for adapter plugs or cord sets, but also supports any 3-wire connected CPE (which has no internal ringing capacitor).*

• *The primary benefit of star wiring and SOHO is to provide the opportunity for high performance cable to be installed during the pre-wiring of a new building in such a way that any outlet can be designated for a specific service. Once the cable is in place, it can be relatively easily split from other cabling and be re-terminated with RJ45 or other types of sockets, if and when the need arises.*

7.2   Outlet requirements

(1)   RJ45 8-way modular sockets supplied for telecommunications outlets shall be manufactured by a reputable supplier.

(2)   Evidence of compliance with performance requirements appropriate to their intended application shall be provided for Telepermit purposes.

• It is expected that the performance rating of RJ 45 jackpoints will be consistent with that of the other installation hardware. Nevertheless, RJ 45 jackpoints rated lower than Cat 5 can also be replaced as and when the need arises. Not mandating the use of cat 5 or better jackpoints provides for the use of gel-filled RJ 45 sockets, which may prove essential in some installations subject to frequent failure of unprotected RJ 45 sockets.

(3)   Where Telecom's BT-style socket outlets are to be installed, these shall be Telepermitted and shall be the Telecom "2-wire" type to ensure that the cabling remains balanced to earth. 3-wire sockets shall not be used.

• Telecom's earlier 3-wire system is inherently unbalanced to earth. As such, its data performance is inferior to that of the more recent 2-wire system. Use of a high performance cable in conjunction with 3-wire terminations is not consistent with good installation practice.

• Telepermitted 2-wire jackpoints are available in numerous faceplate designs and design formats. These bear Telepermit labels in the PTC 223-series.

7.3   Marking and labelling

(1)   All jackpoints shall be clearly marked with the manufacturer's name or other identification mark.

(2)   Where an RJ 45 jackpoint has a certified rating, this should be marked on the item.

(3)   For RJ 45 jackpoints in particular, it is recommended that wire colours be marked on the terminals to minimise the risk of incorrect terminations. In such cases, whether it is a 568A or 568B termination shall be indicated.

• See also the recommendation of clause 3.3, that the chosen option be shown in the Warning Notice required for RJ 45 jackpoint installations.

(4)   Where telecommunications outlets are provided as a part of an overall system installation kit, provision should be made for these to be clearly marked with a suitable designation or label, such that each can be easily identified and associated with its jumpering or patching facilities in the main cabinet.

(5)   Preferably, the marking system should identify the function or service allocated to a particular outlet.

7.4   Outlet provision

It is recommended that the number of outlets be provided in accordance with AS/NZS 3086. However, this is a matter for the customer to decide. It is not regarded as a Telepermit issue.

• The standard recommends at least one cable run and one outlet per room.

8.   OTHER SERVICES

8.1   Non-interference

The provision of LAN services, fibre optic or coaxial cable terminations and related cross-connection facilities within a SOHO cabinet shall not cause interference to, or degradation of, any Telecom network-based service provided to the customer.

• *Suppliers may choose to house such distribution hardware within a common cabinet or simply fit a matching cabinet close to the SOHO cabinet to house such other services. For example, TV distribution may require amplifiers and a power supply within the cabinet. These items take up relatively large amounts of space and it may be preferable to have a separate purpose-designed cabinet.*

8.2   Marketing features

The provision of facilities for other services which do not connect directly or indirectly to the Telecom network is a marketing issue. There are no specific Telecom requirements other than non-interference.

9.   PRODUCT INSTALLATION, SUPPORT AND MAINTENANCE

9.1   Product support

(1)   Where only the supplier or an authorised agent are permitted to install or repair a SOHO system, the supplier shall provide suitable training and a certification system for installation and maintenance staff as evidence that these persons have the ability to install and maintain the products concerned in the manner intended by the supplier.

(2)   The supplier shall ensure that end-users are advised of any restrictions applying to repairs, additions and changes to an installed system and provide the contact details of local parties accredited to carry out this work

(3)   Where any person is permitted to install a commercial system, all necessary instructions and restrictions shall be included in the product user manual supplied with the system.

(4)   In accordance with the Consumer Guarantees Act, the supplier is to ensure that spare components are made available for repairs or extensions to a SOHO or star-wired installation for a reasonable period following its commissioning.

9.2   Installation instructions

(1)   Installation instructions shall be provided by the supplier, covering such matters as compliance with the Telecom Code of Practice for Residential-type premises wiring, PTC 103, selecting the optimum location for the

system cabinet, the use of any special tools, and any other matters specific to the system concerned.

- *PTC 103 is available free of charge on www.telepermit.co.nz/ptc103.html*

(2)   Full and detailed installation instructions are particularly important where continuing performance certification is dependent on system extensions being made only with components of a specific make or model, especially where screened cabling and jackpoints are to be used. Any such component or installation requirements shall be clearly indicated in the user manual provided with the system.

(3)   Installation instructions shall clearly indicate the need for all telecommunications outlets to be clearly marked with a suitable designation such that they can be easily identified and associated with their jumpering or patching facilities in the main cabinet.

(4)   For all installations using 4-pair connections, the T568A pair assignment is the preferred option (ref AS/NZS 3080, Fig. ZA.2). Some types of RJ 45 connector incorporate cross-overs between the terminals and the contact pins. The appropriate wire colour for the T568A option should be clearly shown for each terminal.

(5)   Telecom has no objections to the use of the 568B option. If this is to be used, the appropriate wire colour for this option should be clearly shown for each terminal.

(6)   Installation instructions shall clearly indicate the need for consistent use of either T568A or T568B throughout the installation.

9.3   Installation practices for additional services

(1) To avoid any confusion for installers and maintenance personnel, or disputes over warranty exclusions, it is recommended that system suppliers clearly specify the connections for line-grabbing devices, switching systems, decoders, etc, to ensure that these are connected correctly.

9.4   Installation testing

At the completion of any installation work, the wiring and terminations shall be tested to ensure compliance with the referenced Standards and manufacturer's claimed performance specifications.

- *Telecom's wiring maintenance service covers repairs due to normal usage, but not repairs to wiring incorrectly installed. Where Telecom staff are called upon to sort out poorly installed wiring or wiring and hardware not covered by this service, a visit and labour charge will generally be incurred.*

9.5   Installation marking and labelling

(1)   All jumpering terminations or patching outlets shall be clearly marked with a suitable designation such that they can be easily identified and easily associated with specific telecommunications outlets for cabling management and recording purposes.

(2)   Preferably, the marking system should identify the function or service allocated to a particular outlet.

9.6   Cabling and cross-connect records

(1)   Provision shall be made for a suitable record chart or booklet to be held in a SOHO cabinet or Star Box.

• *The overall system design should be such that a service person can clearly identify the connections for maintenance and fault clearance purposes. Failure to make provision for such records is likely to increase fault location costs.*

• *This applies even where the patching or cross-connect arrangements may clearly identifiable by inspection, as it is possible that the basic cross-connections will be managed by the customer in some cases.*

(2)   The record chart shall provide for the maximum number of trunks and telecommunications outlets that can be accommodated within the cabinet or box.

(3)   A record chart along the lines of the "Typical Administration Record" shown in AS/NZS 3086, is recommended. The record should show the physical location and identity of each outlet in the premises, line allocations, etc. This should be adapted to cover home installations, as necessary.

• *The AS/NZS 3086 chart is based on the use of multi-line telephones, which are not common in New Zealand. In this country, many larger SOHO installations are more likely to use a small PABX system or exchange-based "CENTREX" type services. As such, exchange lines will not always be directly terminated on the outlets (other than those used as back-up during switch or power failure situations.*

(4)   Users should be advised to keep the record chart up-to-date by making the appropriate amendments whenever alterations are carried out.

• *It is recommended that the servicing organisation also keep summary records of the installation so that they can "talk" the customer through a simple test procedure.*

9.7   User Manuals

(1)   For SOHO systems and star-wiring boxes intended to be "managed" by the end user, a suitable user manual shall be provided. This should cover the basic operation of the unit, especially any procedures that must be followed in order to ensure reliable connections and ease of operation.

(2)   The user manual shall:-

      a.   clearly address all safety issues

      b.   include a drawing or sketch of the connections to show the user the terminals on which specific lines or services are to be   connected.

• *User manuals may incorporate the Installation Instructions referred to in clause 9.2, as a single document. This is left to the supplier to decide.*

(3)   The user manual may incorporate the requirements of clause 4.7, if the supplier chooses to do so. It may also repeat the relevant warning of clause 3.2.

(4)   In view of the potential confusion that can be caused by the two RJ 45 pin-out options, it is recommended that User Manuals state which option is to be applied throughout the installation.

• *Using both options within the same installation could be a significant cause of service problems in SOHO systems, which are more likely to have end-users or other non-specialist contractors making additions or changes.*

10   TELEPERMIT APPLICATION REQUIREMENTS

10.1   Information to be submitted

(1)   Applicants for Telepermit shall complete and sign a Telepermit Application Form and submit this, along with:-

(a)   a general description of their overall product, including photographs of the interior and exterior of any cabinet or housing, and the materials used in its construction; and

(b)   a list of all UTP (or STP) cable terminating hardware components giving, for each such item, details of the manufacturer and model number, the product performance rating, and a general description of its function; and

(c)   a description of the Disconnect Test Point hardware that will be provided (for SOHO and RJ 45-based systems only); and

(d)   a copy of the proposed Installation Instructions and User Manual, covering the requirements of this specification; and

(e)   a copy of the sales literature used to market the product; and

(f)   a clause by clause statement of whether or not the product submitted for Telepermit complies with the mandatory requirements of this specification, together with an explanation where any aspect is not compliant.

• *Application forms are available from the Telecom Access Standards website www.telepermit.co.nz*

• *With some designs, there may be good reason not to comply with a particular clause, such as where an alternative method is provided to meet the same objective. In such cases, Telecom may be willing to grant a relaxation of its requirements.*

(2)   For each main component, a copy of the manufacturer's certification and, preferably, independent certification, by such bodies as UL, are to be submitted to Telecom, along with a copy of the manufacturer's formally published product data sheets as evidence of compliance with this specification.

• *Cable termination and patching components will normally be tested as part of the manufacturing process by the manufacturer, and/or by an independent testing authority, who will certify that the requirements of the relevant product specifications and standards called up by this specification are being complied with.*

(3)   Suppliers shall clearly state in any sales literature the level of performance provided by their equipment.

10.2   Additional supporting evidence

Where such information is likely to support an application for a Telepermit, the applicant is invited to provide details of additional tests carried out as part of the normal manufacturing process.

10.3   Telecom confirmation

(1)   Telecom reserves the right to request and assess samples of the hardware covered by a Telepermit application in order to confirm to its own satisfaction that the specification has been complied with.

(2)   In addition, Telecom reserves the right to test samples obtained on the local market to ensure that the product is consistent with the test results and assurances given by the Telepermit applicant. Such tests may be carried out by a third party.

10.4   Telepermit grant conditions

(1)   Telecom reserves the right to set conditions on the grant of a Telepermit where it considers there is a need to restrict the use of a product in some way or require that the supplier advises the customer of matters affecting the performance of the product in relation to Telecom's services.

10.5   Ongoing compliance

(1)   Telecom may, at its discretion, require the manufacturer to regularly submit copies of test results or arrange for periodic verification of the test information by an independent testing laboratory.

(2)   Telecom reserves the right to decline to grant a Telepermit where it considers there is inadequate evidence of the supplier's ability to ensure continuing compliance with this Specification.

(3)   Telecom reserves the right to cancel a Telepermit where it considers there is evidence that product offered for sale in New Zealand does not comply with this Specification or the conditions applicable to the grant of that Telepermit.

APPENDIX A   SERIES-CONNECTED CUSTOMER PREMISES EQUIPMENT

A1.1   Line grabbers

Line grabbing is commonly used for security and medical alarm systems, emergency callers, etc. This involves intercepting an exchange line on the customer's side of the Disconnect Test Point and any ADSL Splitter, such that all outlets other than that serving the grabbing device are isolated from the line. The associated cabling to such a device will generally be installed by a third party, such as an alarm contractor. Although such cabling is not regarded as part of the SOHO system for Telepermit purposes, provision should be made for its correct connection within a SOHO or star-wired box.

• *Typically, appropriate terminals should be provided and clearly marked for this class of connection. Failure to do so may result in the new connections causing interruption to other services, with consequent disputes as to who is to be responsible for remedial action.*

A1.2   PABX systems

Small electronic PABX or Key Telephone Systems are likely to be used with both SOHO and star-wired installations in New Zealand, as these can be provided cost-effectively in comparison with multi-line telephones. It may be necessary to cover their connection in the user manual or installation instructions.

A1.3   Ringing decoders

Customers may connect ringing decoders in series with one or more items of CPE in various configurations, as explained in Sections 7 and 10 of Specification PTC 200. Type 2 decoders wired in Modes B and C may impact on preferred wiring practices.

A1.4   Ethernet routers

Routers are now widely installed in home LAN installations and will often be incorporated into an ADSL modem. The star point provides an ideal location for these items to be installed by end-users. It is recommended that the user manual and installation instructions for 4-pair terminated systems cover their connection.

• *See section 12 for further details.*

APPENDIX B   BROADBAND NETWORK SERVICES

B1.1   ADSL services

(1)   ADSL-based services, such as the various "JetStream" services offered by Telecom are now widely used by customers. It is necessary to separate the high frequency ADSL signals from the voiceband signals, either by means of a single "splitter" mounted in the network termination, or by means of line filters connected in any other jackpoints that are commoned with the one used for the ADSL modem.

(2)   With star wiring in place, the preferred option is to use a splitter and connect a specific jackpoint for the ADSL modem.

B1.2   ISDN Services

(2)   Where a small business customer is using digital services, such as Telecom's Integrated Services Digital Network (ISDN), direct cabling to any outlet accessing ISDN-based services is recommended. A Network terminating Unit (NTU) will generally be installed at the location of the computer in a home office system, but an S/T bus can be derived, as defined in specification PTC 113. This places a limit on the length of any transmission stubs due to commoning. Long stubs are to be avoided.

(3)   Where the customer requires two or more outlets to provide access to an ISDN service, the cabling arrangements shall comply with PTC 113. Note the likely need for terminating resistors.

• *PTC 113 summarises the S/T bus wiring configurations defined by the ITU. It is important that neither cable distances, nor stub lengths, exceed the limits defined by the ITU.*

B1.3   Digital voice Services

(3)   Digital access services to a PABX system will generally involve terminating the incoming cabling directly on multiplex equipment supplied by Telecom. In such cases, Telecom will make the necessary network connections.

B1.4   Services under development

(1)   A number of options are currently being considered by Telecom in order to provide additional high bit rate data or multi-media services to customers. These services will use the existing network cable and lead-in cable to the customer's premises.

• *It may be necessary in some cases to connect the Telecom-supplied network equipment at the outlet used by the customer's computer and to use spare pairs in the cable to route associated voice services back to the star point.*

• *Further information will be provided in due course, following the evaluation and trial by Telecom of these new technologies.*

(2)   In the future, it is expected that many customers will have voice and multi-media services delivered via an xDSL-based network access, using network termination equipment housed on the customer's premises. In these cases, the network equipment is likely to be located at the star point and provide separate ports for the various services and a splitter or line filters may no longer be required.

END OF SPECIFICATION PTC 225