Bell System (Telephones) Ltd.

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Digital

Video Door Entry System

With

Hands-free Colour Apartment Stations

Installation & Operation Manual

This manual applies to the following: -

BFD-DIG Digital Door controller – Version 1 Builds 1

BF Colour Apartment Station – Version 1 Build 1 to 2

BS Colour Videophone – Version 2 Builds 1 to 3

BSA Audio Phone – Version 1 Build 1

BSC4 Video Controller – Version 2 Build 7

BF Apartment Station Digital Entry System

bell*free* Apartment Station

BFD-DIG controller

BSC4 controller

BSA audiophone

BS videophone

BS Deskphone

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Introduction

Description

A bell*free* video door entry system consists of a door panel, positioned at the entrance of a building, apartment stations and other telephones, placed inside of the building for the convenience of the occupants and a power supply and controller which are usually located inside an electrical cupboard. The door panel comprises of a two-way speech unit, a camera, an LED display and sixteen push buttons – which are used by a visitor to initiate a call. The apartment station, which rings in response, allows a two-way hands free conversation (a touch is required to initiate the conversation and end the conversation) whilst the caller can be observed through the integral display. The operator can selectively allow visitors access to the building by touching a pad on the apartment station and so electrically releasing the door.

The bell*free* digital video door entry system is suitable for any building or entry point addressing a quantity of flats where a standard panel would be larger or more expensive; this is typically from 16 flats upwards.

The bell*free* digital system is supplied with a dedicated door controller, for each entrance, and a video controller for every four apartment stations. The basic system supports 1 apartment station per address, and up to 3 extension apartment stations (more with additional power supplies). Multiple entrances can be supported with the addition of one panel and one door controller for each entrance.

Main Features

- Enhanced audio for hands free operation
- Cat5 cable throughout; no co-ax required!
- 3.5" Flat screen high resolution TFT colour display.
- High resolution CCD colour day/night camera with infrared lamps.
- 12V d.c. operation
- High quality full-duplex speech amplifier.
- Automatic picture display while ringing.
- Ringer mute function.
- Ringer volume control.
- Fail safe or fail secure lock releases and magnetic locks (maglock).
- Lock release timer.
- Tradesman facility (optional).
- Facility for exit button and/or fire switch.
- Door open indication.
- Second camera option.
- Up to 3 extension apartment stations per flat.
- Mixed systems with BS videophones and BSA audio phones
- Multiple entrances supported.

bell*free* Colour Apartment Station
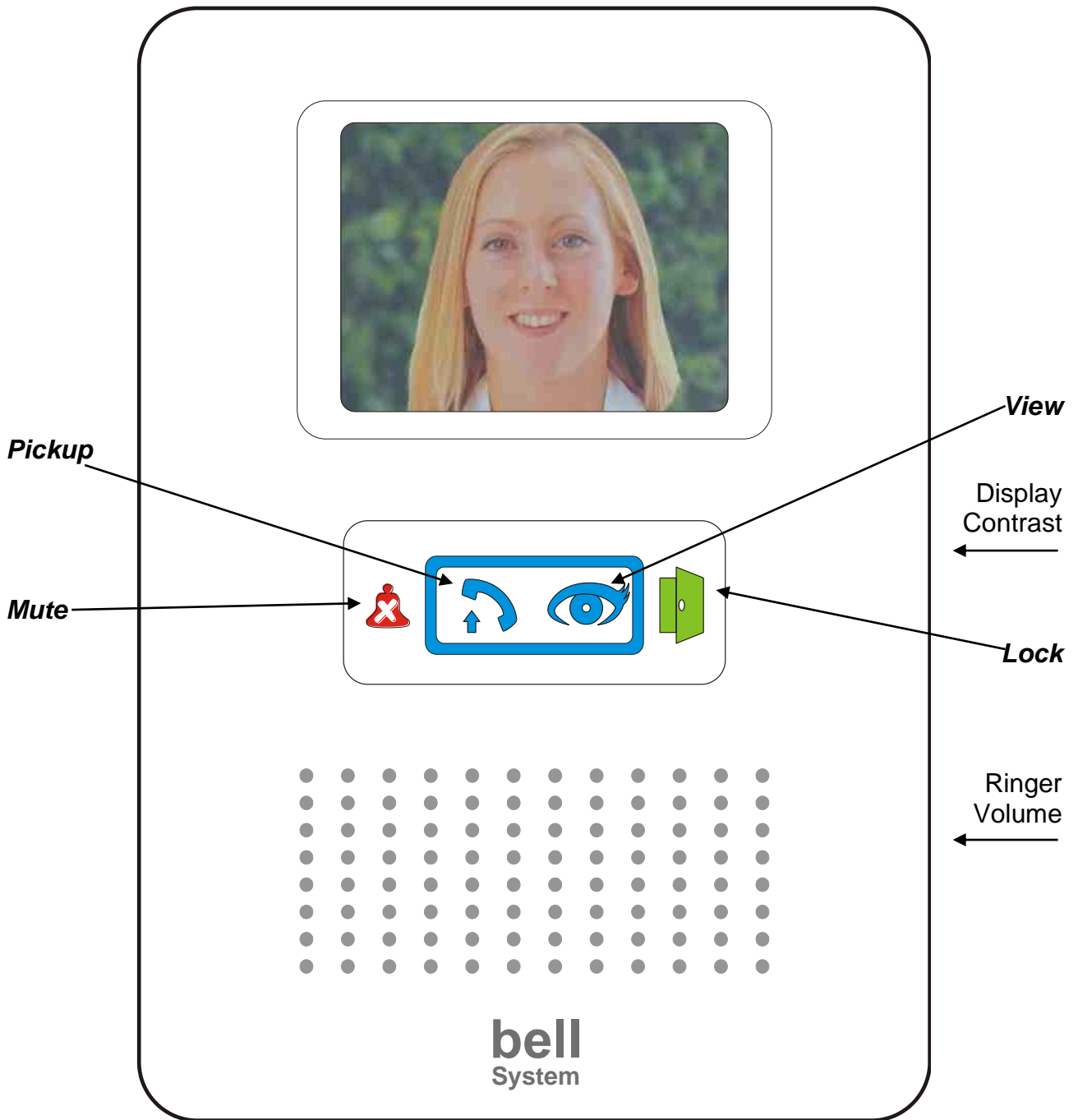
Symbol	Lamp	Steady	Flashing
Mute on/off	Red	Apartment station is muted	Doorbell – All Flash
Pickup / end	Blue	Call in progress	Ringing
View / camera select			
Lock	Green	Door is open	Touch to release lock

Basic System Operation

Panel Controls
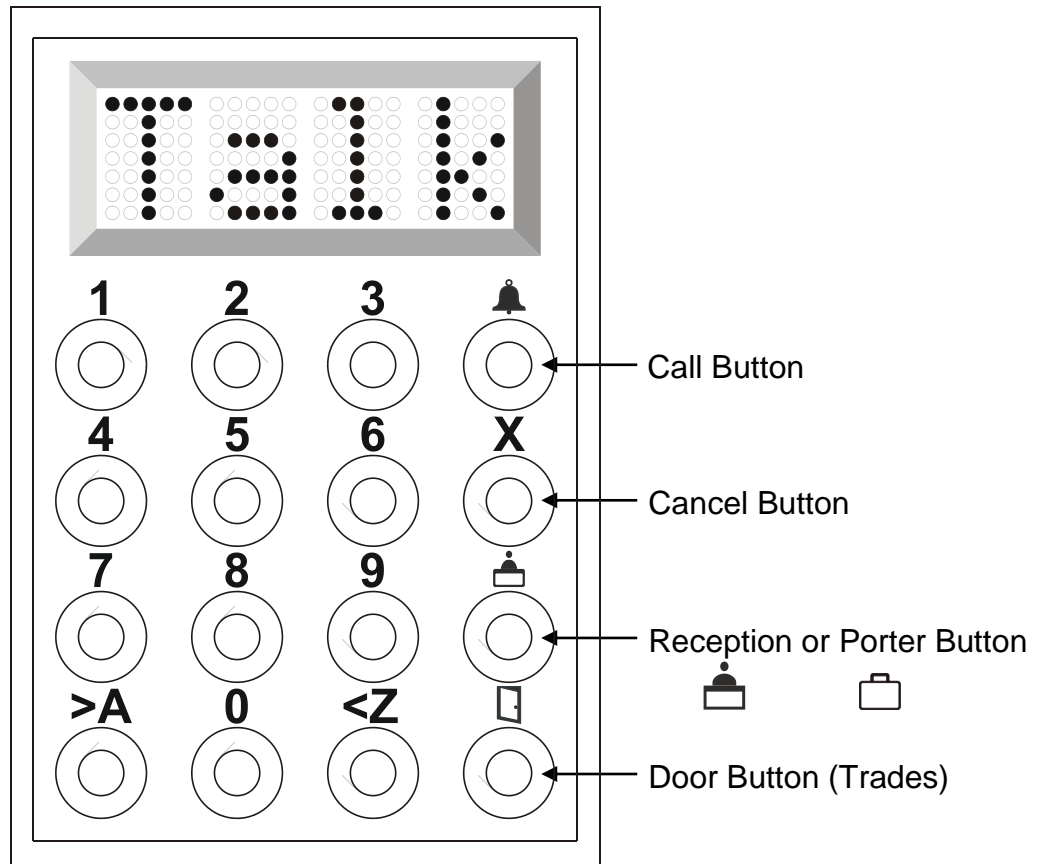
Number and Letter Buttons

The numbers 0 to 9 are used to enter numbers. The letter button >A enters letters beginning with A and each press advances through the alphabet, while the letter button <Z does the reverse starting with Z. For example pressing >A three times will give C then pressing <Z once will give B, or starting with Z; pressing 5 times will give V and then pressing >A twice will give X.

The *call* button is used to call flats or acts as a *bell* button calling the *reception* phone.

The *cancel* button cancels the current entry leaving a blank display.

The *reception* (AKA Porter or Concierge) button calls a pre-defined phone dedicated to that location.

The *door* or Trades button is used to gain direct access either directly or via a code.

Call sequence

When the resident's address is entered followed by the *call* button the addressed apartment station will ring and its blue *pickup / view* lamp will flash, highlighting the *pickup* and *view* symbols. The apartment station will continue to ring for up to 30 seconds or until the resident responds by touching the *view* symbol (see silent viewing below) or the *pickup* symbol. After using the *pickup* symbol the resident can freely converse with the visitor whose image is now displayed on the apartment station; at the same time the green *lock* symbol will flash to highlight the *lock* function.

The call may be terminated by touching the *pickup* symbol again or more usually by touching the *lock* symbol first to allow the visitor access through the entrance; the speech and picture will persist for a further 3 seconds while the door is being released.

Silent viewing

When the apartment station is ringing the resident can touch the *view* symbol to answer the call instead of the *pickup* symbol; this will stop the apartment station ringing and enable them to view the visitor for up to 60 seconds or until the *lock* symbol is touched to release the door. Silent viewing can be 'normalised' at any time by touching the *pickup* symbol and conversing with the visitor as described above.

Apartment Station Controls

The diagram in the introduction shows the apartment station and its controls. The controls are adjusted by touching the end of the slider and sliding the finger up and down. The default setting is ringer volume halfway and contrast slider fully down.

Auto Display

When 'Auto Display' mode is selected the picture will come on while the apartment station is ringing, otherwise the picture will only come on when the call is answered. Auto Display mode is usually pre-selected at installation and generally only one apartment station per flat should be set in this mode (see 'Extension Apartment Stations' below).

Ringer Mute

The resident can mute the ringing sound in the apartment station when they do not wish to be disturbed. Ringer mute is activated by touching the *mute* symbol on the apartment station, which then illuminates in red as a reminder. Touching the *mute* symbol a second time will disengage the mute function. Ringer Mute only stops the audible ring, but the blue ring lamp will still flash and all other functions work normally. Ringer mute will continue for the pre-set time even if a call is answered.

During installation it is possible to set a time limit for the mute function in various values from 2 minutes up to 10 hours or indefinitely. When this time period has elapsed the mute function will automatically disengage. Default timeout is never (See 'mute timer', page 25).

Door Status Indication

The green *lock* lamp on the apartment station will illuminate to warn the resident that a door has been left open following a call. This feature requires a door monitor contact to be fitted.

Call Privacy

Once a call has been made from an entrance panel only the apartment station(s) which is / are ringing may answer the call. Once the call is answered another apartment station will not activate (including extensions of the active apartment station).

User Activation (CCTV Mode)

User activation is a feature of the bell*free* 1 way system and is not available on digital systems. User activation is generally not recommended on larger systems as the conflicting demands of residents and callers can result in confusion and erroneous fault reports.

Cameras

The door controller has the capability of using one or two cameras, for instance a second panel camera for DDA or a 'third party' 'CCTV' camera located to offer a different entrance viewpoint. Touching the *view* symbol will alternate the view between camera 1 and camera 2 (if enabled).

Note. The camera to controller wiring has termination options which allow for connections to other video equipment. See the Camera sharing diagram on page 41 for details.

Extension Apartment Stations

Additional apartment stations may be added to each 'flat'. The number of extensions is limited only by power supply considerations. All apartment stations for that 'flat' will ring when called however typically only the master unit will display a picture while ringing. Once the master or extension apartment station is 'picked-up' the picture will display on that unit alone.

Lock Type

The door controller supports both fail-secure and fail-safe locks including magnetic locks of up to 1A rating. The lock time may be programmed between 1 and 99 seconds. (See 'Lock Release Operating time' and 'Lock Type' on page 20.

Exit Button and Fire Switch

An input is provided for an exit button, which can be installed on the inside of the door and allow residents to exit freely. Momentary operation of this button will operate the lock release for the programmed lock time. A Fire switch or other override device may use the same input to hold the door open indefinitely. Note. Fail secure locks must be continuously rated.

Trades Facility

The trades facility is accessed by pressing the *door* button. An optional time clock may be used to allow one function during the programmed time(s) and another at all other times.

These functions can be: – unlock the door, ask for an entry code or ignore the button press.

There are 2 entry codes available, a residents code and a tradesman's code.

DDA Functionality

The bell*free* digital video system has a range of options for entrance panels to help meet the requirements of the Disability Discrimination Act (DDA), including Illuminated Tactile buttons and reassurance tones to indicate apartment station ringing and door released. Contact your sales representative for further details.

Multiple Entrances

The bell*free* system allows multiple entrances to be catered for by the addition of a door controller and entrance panel for each entrance and additional power supplies.

Gate and Block Systems

Sites with two or more blocks sharing one or more site entrances are catered for with our BSSW Gate controller. The blocks can then work independently but will receive calls from the shared entrance.

For further details see the "bell*issimo* and Bellcall Manual Gate and Block (PD-120)".

Design Considerations

Equipment List

A bell*free* digital video system comprises the following: -

Model No	Description
N x BF	Colour Apartment station (N is the no of phones)
1 x BFP-DIG/LCP -OR-	Laser Cut panel with a BF-AMP speech unit, camera, VR buttons and LED display. Flush fitting only.
1 x BFP-DIG/VR(S)	Vandal resistant panel with a BF-AMP speech unit, camera, VR buttons and LED display. Flush or surface mounting.
1 x BFD-DIG	Door controller
M x BSC4	Video controller (one required for every 4 ways = N/4 rounded up)
K x PS4	4A 12V power supply. (one required for every 8 to 16 ways)
1 x 203	Fail-secure lock release, alternate types available.

Options

The following options are available: -

- Extensions model **BF** apartment station(s).

- Extensions using Video Phones model **BS**.

- Extensions using Audio only phones model **BSA**.

- Additional entrances, each comprising a **BFD-DIG** controller and **BFP-DIG** panel. (See also power supply requirements).

- Alternative lock releases, fail-safe and fail-secure.

- Timed Trades facility; specify a model **TS2000-BST** time-clock.

- Exit button. Model **5077** surface and model **5078** flush versions are available.

- Battery back-up power supply, Model **840** (12V 4A).

- DDA panels (Contact sales for further information).

Entrance Panel – Important Note

Careful consideration should be given to the location of the entrance panel to ensure the best possible lighting conditions for the camera. In general strong back lighting of the subject (by the sun and sky) should be avoided, as the contrast between foreground and background may be too great for the camera. The field of view should contain as little of the sky as possible, particularly if south facing. If a backlit situation is unavoidable, additional lighting may be necessary to illuminate the caller and avoid a dark outline image (silhouette). A light coloured or reflective surface around the panel will redirect backlight to illuminate the caller.

Door Controller

The door controller and power supply should be wall-mounted in a convenient cupboard or other protected environment with available mains power. Cable length to the entrance should be less than 50m. The door controller for the second and subsequent entrances may be situated in the same location, or to meet the 50m requirement may be situated in another location. Power supplies may be shared between door controllers placed in the same location, but controllers in separate locations must be separately powered.

Video Controller

The video controller(s) and power supply(ies) should be wall-mounted in a convenient cupboard or other protected environment with available mains power. Cable length to the apartment station should be less than 150m, see 'Cable Distances' page 13. In many cases the video controllers will be in the same location as the door controller(s), but they may be distributed as required to reduce wiring distances. When placed in different locations, each location must have its own local power supplies.

Gate Controller

The gate switch controller BSSW is wired between the block door controllers and the video controllers, so would normally be wall mounted next to a door controller.

For further details see the "bell*issimo* and Bellcall Manual Gate and Block (PD-120)".

Separately Powered Apartment Stations

The limitation of up to 4 apartment stations ringing but only one displaying, as indicated in the power supply and cable distance tables on page 13, can be overcome by the use of supplementary power from a 340C.

Power Supply Requirements

The system is powered by 12V power supplies only: -

Model PS4   12V, 4A.

Model 840   12V, 4A battery backup supply.

Model 340C 12V, 1.5A optional for extensions.

Note 1. The 28V referred to on the apartment station, video controller and wiring diagrams is internally generated in the controller. DO NOT use any power supply other than 12V or damage may occur.

Note 2. The PS4 power supply has been specifically designed to operate with the high-surge requirements of the system. Bell System is unable to guarantee functionality or provide support for systems which use third party power supplies.

Exact power supply requirements depend upon many factors. The number of power supplies included within a standard 'kit' or quotation assumes that all controllers are installed in one location and that there are no extensions.

The following table gives examples of the minimum number of controllers and power supplies for a given number of entrance doors and flats.

System	Control Equipment and Power Supplies
1 door 16 flats	1 x BFD-DIG door controller for digital panel 4 x BSC4 video controller 2 x PS4 12V 4A power supply
1 door 20 flats	1 x BFD-DIG door controller for digital panel 5 x BSC4 video controller 2 x PS4 12V 4A power supply
1 door 36 flats	1 x BFD-DIG door controller for digital panel 9 x BSC4 video controller 3 x PS4 12V 4A power supply
2 door 36 flats	2 x BFD-DIG door controller for digital panel 9 x BSC4 video controller 4 x PS4 12V 4A power supply

Distributed installations will typically require more power supplies. Also the use of other equipment such as coded access or proximity readers must be taken into account.

The following table is a guide to how much equipment a PS4 power supply can safely and reliably feed, please contact technical support for other variations.

Equipment 1 x PS4 can power	Comments
4 x BSC4 video controllers with 1 BF apartment station per output.	16 apartment stations directly powered. Extensions may be added if separately powered by 340C's.
1 x BSC4 video controllers with 2 to 4 BF apartment stations per output.	Extension phones must be set to ring only, use the above configuration to allow the extensions to have a picture while ringing.
1 to 3 BSC4's phones + extensions	16 apartment stations directly powered
1 x BFD-DIG door controller and 2 x BSC4 video controllers with 1 BF apartment station per output	8 apartment stations directly powered. Extensions may be added if separately powered by 340C's.
1 x BFD-DIG door controller and 1 x BSC4 video controllers with 2 to 4 BF apartment stations per output	Extension phones must be set to ring only, use the above configuration to allow the extensions to have a picture while ringing.
2 x BFD* door controllers (any type) with up to 2 cameras and 1A fail safe locks.	Both door controllers must be in the same location. No spare current available for other equipment unless both cameras or all the lock current is not used.

Cable Specification

All system wiring must be carried out using **Cat5** signal cable and where necessary 1mm² (or greater) power cable as tabulated below. Cat5 cable has a known performance for the transmission of video signals, whilst telephone or alarm cables are not suitable.

Bell System will be unable to offer any warranty or support for systems installed using incorrect cables.

Cat5 Cable Specification

Cat5 is our short reference for EIA standard UTP Category 5 Unshielded Twisted Pair data cable. This is a standard solid core twisted pair cable having 4 pairs (8-cores) and no shield. The cores are in pairs where Blue and 'Blue with a White stripe' are twisted together as the first pair. The other three pairs are similar with main colours Orange, Green and Brown.

- Also available and acceptable are:

  UTP Category 5e (Cat5e)

  UTP Category 6 (CAT6)

  UTP Category 6e (CAT6e)

  The exact cable can be chosen from the above on cost and availability grounds.

- STP (Shielded Twisted Pair) cables are **not** recommended.

- UTP "patch cables" are **not** recommended.

NOTE: Cat5 cable is easily identifiable as the specification is printed on the sheath

Cable Distances

Video Controller to BF Apartment Station			
System	**Distance**	**Cable**	**Comments**
Single apartment station per output or first apartment station	< 150m	1 x Cat5	
	< 300m	1 x Cat5 2 x 1mm^2	
Single apartment station + 3 extensions on each output, all cable powered	< 50m	1 x Cat5	Only Master apartment station has 'Auto display'; extensions are daisy-chained
	< 200m	1 x Cat5 2 x 1mm^2	
Single apartment station per output with separately powered extensions	< 150m	1 x Cat5	150m maximum to the cable powered apartment station; daisy-chain up to 300m total.
	< 300m	1 x Cat5 2 x 1mm^2	
All apartment stations locally powered with a 340C power supply	< 300m	1 x Cat5	Locally powered apartment stations have 'Auto display'; extensions are daisy-chained
	<25m to 340C	1 x pair of Cat5	
	<100m to 340C	2 x 1mm^2	

Door Controller to Video Controller(s)			
System	**Distance**	**Cable**	**Comments**
All Systems	<200m	1 x Cat5	N.B. maximum length from any camera to any apartment station must be less than 300m

Panel to BDF-DIG Door Controller			
System	**Distance**	**Cable**	**Comments**
All Systems, each entrance	<50m	1 x Cat5	Speech and video only
BFP-DIG/LCP	<50m	7 x pair of Cat5	Doubled up power
BFP-DIG/VR(S)	<50m	7 x pair of Cat5	Doubled up power
Lock Release up to 1A	<10m	1 x pair of Cat5	
	<50m	2 x 1mm^2	
Option: Exit button	<50m	1 x pair of Cat5	
Option: Door Monitor Switch	<50m	1 x pair of Cat5	

Power Supply to Controller			
System	**Distance**	**Cable**	**Comments**
All Systems, each PS4 to BFD-DIG or BSC4	<3m	2 x 1mm^2	Total length of any daisy chain
	<5m	2 x 1.5mm^2	

NB. A Cat5 cable has 4-pairs (8 cores)

For larger cable distances please contact manufacturer.

Installation & Commissioning

Checklist

The following checklist is a summary of what is required. Refer to the relevant pages for further details.

- Review the section headed 'Safety Information' on page 47.
- Ensure that 'Design Considerations' on page 9 have been understood.
- Confirm that Cat5 cable has been specified.
- Install the system according to instructions in this section.
- Check/set the door controller settings.
- Check/set the video controller jumper and switch settings.
- Check/set each apartment station dip-switch settings.

Wiring

Refer to the diagrams from page 33 onwards as appropriate for the equipment you have.

All wiring is carried out using a mixture of Cat5 for the signal wiring and 1mm² (or greater) cores for the power wiring; refer to Page 12 for further details. It is strongly recommended that a consistent colour code be used throughout such as that indicated on the connection diagram. Certain signals must be interconnected using a twisted pair from the Cat5 cable. These are clearly marked on the connection diagram and should be strictly observed.

Entrance Panel

The panel should be mounted at an optimum height of 1.6 m, measured between the ground and the centre of the camera window. With flush mounting panels it is advisable to apply mastic to the top and side edges of the panel to prevent water ingress behind the panel, but not to the bottom edge. On construction sites the panel must be protected from corrosive substances such as 'brick acid'. The panel should be cleaned only with a damp cloth containing dilute detergent.
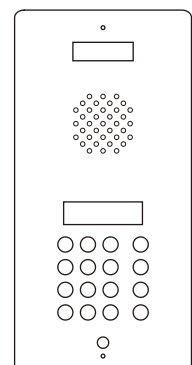
Apartment Station

The apartment station is designed to be surface or flush wall mounted onto plasterboard or other masonry at an optimum screen height of 1.6m. DDA considerations may reduce this height to 1.4m. Dimensions are shown in the diagrams below.

Surface Mounting

86mm

137mm

Flush Mounting

Reinforcing batons

118mm
Wall Cut-out
178mm
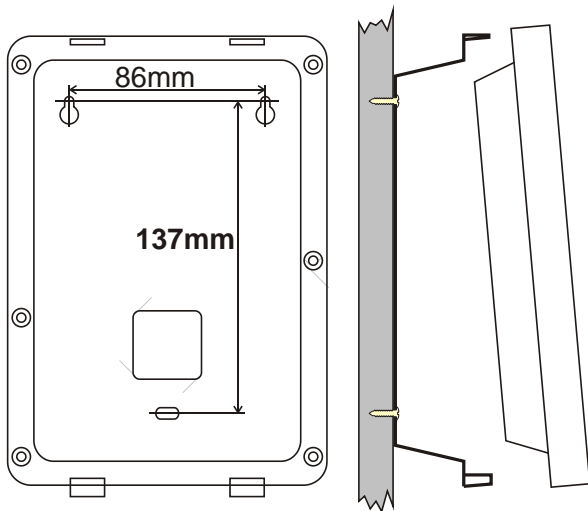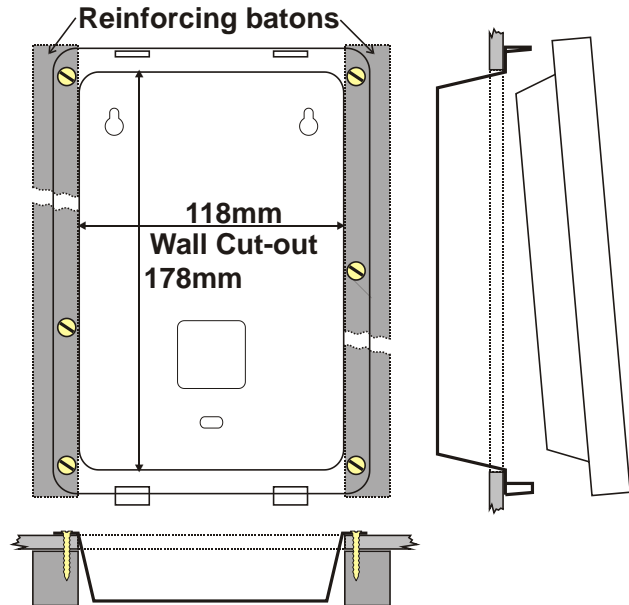
Mounting requires three No 8 screws (not supplied) and wall plugs may also be needed for a secure fixing.

Flush fixing requires a hole in the plasterboard reinforced with batons to give a solid fixing for the four or six No 8 screws.

The reinforcing batons are longer than the cut-out, so they may need to be split to allow insertion.

The apartment station unit is removed from the wall mounting box by pushing in the two circular buttons at the bottom and pulling apart, once open far enough the two hanging clips will release/lift off.

Replace the apartment station unit by hanging it on to the two hooks at the top of the wall mounting box and then push the bottom of the unit onto the two sprung clips.

Top, bottom and rear cable entry alternatives are available in the wall mounting box.

The Video terminator and dip-switch options are available from the back of the removable unit.

The video terminator jumper is next to the removable 10 way connector block. Dip-switch settings are summarised on the adjacent label (see also Page 25).

Doorbell

The apartment station has a doorbell function which is activated by the closure of a normally open contact. This would typically be from a non-illuminated door push.

BSA Audio Phone

The BSA audio phone can be used as a lower cost alternative to an extension apartment station. It is styled like the bell*issimo* videophone. The phone is manufactured in high-impact ABS plastic that imparts high durability and compliments most wall furnishings. It incorporates both **mute** and **lock** illuminated buttons and it has an Electronic Ringing Tone with an internal rotary pre-set volume control.

Remove the top cover of the BSA phone, which is secured by clips at both sides, by using both hands and placing fingers under the edges and using thumb pressure to release the clips.

The BSA audio phone should be fixed with two No 8 screws (not supplied).
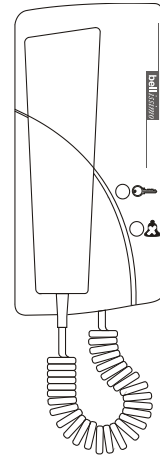
Videophone (Alternative to Apartment Station)

The BS Videophone is designed to be wall mounted onto plasterboard or other masonry at an optimum height of 1.6m. DDA requirements may require this to be lower.

Remove the top cover of the Videophone, which is secured by clips at both sides, by using both hands and placing fingers under the edges and using thumb pressure to release the clips.

If top or bottom cable entries are required, carefully remove the appropriate cut-out with side snips taking care not to damage any internal components.

The Videophone should be fixed with three No 8 screws (not supplied).

The Videophone is hung on the top two screws, allowing the cable (if present) to feed through and then the third screw is inserted at the bottom. Tighten all three screws.

Before replacing the Front Cover remove the protective film from the display lens and also check that the dip-switch settings are correct or change as necessary (see Page 26).
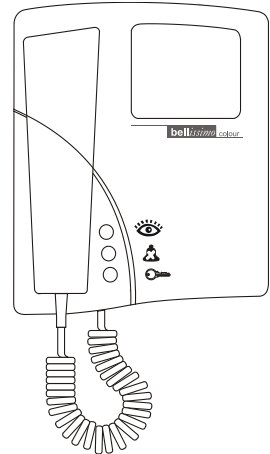
Electric Door Release

Both fail-secure and fail-safe lock releases (including magnetic locks) use the same terminals. To set the lock type, refer to the 'Door Controller Settings'. When installing lock releases please allow a little movement on the door, as operation will be impaired if fitted too tight.

NB. Magnetic locks (maglocks) must be fitted with a suppressor at the lock terminals. Some manufacturers fit an acceptable internal suppressor.

Fail Safe Exit: Notes

Fail safe exits require an exit button and this should be normally open so that the controller can be used to give a timed exit. If the exit button has both normally open and normally closed contacts, then the normally closed contact can be wired in series with the release or maglock along with the break glass in case of equipment failure.

A not uncommon problem with maglocks, because they cannot be mechanically overridden, is being locked out of the building due to lost codes, fobs or equipment failure. So consider an alternate building entrance, or an externally accessible secure keyswitch, or a reliable method of disabling the system during overnight secure lockup.

Fail Secure Exit: Notes

Commonly fail secure exit doors incorporate a thumb-turn, door handle or mini push bar rather than use of an exit button. Fire officers usually require a minimum of door handle or push bar to open a door on a fire exit route – not a thumb-turn.

Most fail secure locks are not continuously rated and if an electrical hold open system is used for say busy times, then a continuously rated release must be used.

Powered bolt, shoot-bolt or other more secure door locking systems may require the use of separate power supplies or a suppressor to be fitted. Shoot-bolt systems for instance tend to require at least 1.5A peak current and this will require the use of an isolation relay and a separate power supply for the lock.

Exit Button Input

The exit button is used to unlock the door for the pre-set lock operating time. The input is designed only for use with a normally open push button. 'Exit +' is the input and 'Exit -' is internally connected to 0V.

The 'Exit +' input can also be used for connection to other equipment to open the door as shown in Diagram J on page 42

Door Open Switch

The door open switch is used to provide an indication at the apartment station that the door has been left open. This switch can have closed contacts when the door is closed or open contacts when the door is closed, the choice being made in Panel Programming. The default of 'contacts open when door closed' must be selected when this feature is not required.

Time Clock Sharing

In a large system a single time clock can be shared between distributed equipment areas by borrowing one of the 'comm -' wires in the interconnecting Cat5 to use as the shared "Time clock common". See the detailed diagram on page 41.

Commissioning

The major components of the bell*free* Digital system are fitted with high quality pluggable screw terminal blocks. This enables all the connections to the system to be fully completed, whilst easily isolating individual pieces of equipment during testing and commissioning.

When powering up for the first time, it is highly recommended that only the most basic system be connected. i.e. 1 BF apartment station, 1 door controller and panel, and 1 video controller; the remaining equipment can be isolated by unplugging terminal blocks.

NB: Ensure the 1 door and video controller remain interconnected and that the 'end of line' controller is terminated temporarily using the jumpers (see page 23).

Proceed to test the system by calling the apartment station from the door panel in the usual way. Any problems can be resolved by rechecking wiring and connections, assisted by the various suggestions and tests in the section "Troubleshooting". Once the basic system is fully functioning, continue to reconnect and test the remaining equipment item by item until completed.

BFD-DIG Door Controller Settings

The BFD-DIG is programmed from the panel for all settings.

Security
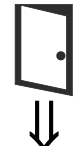
It is strongly recommended that the Panel Security Code (PSEC) be changed from its factory setting to prevent unauthorised access. Record the new number carefully as it cannot be easily changed if lost. It is also recommended that the Phone Programming Code (PPRG), Coded Access Code (ACOD) and Trades Access Code (TCOD) are all changed from default even if not used.

To access panel programming without the code requires physical access to the controller PCB, borrow a jumper from say video gain (remember the setting) and place it on the 5 pin programming header between pins 1 & 2. Now pressing the test button will enter panel programming for 30S when the panel security code can be read or set. When the programming is finished replace the jumper back to its original location.

Panel Programming

To use Panel Programming Mode: -

- First type the Panel Security Code (initially [3434]) followed by the *call* button.

- The display will show the first programmable parameter (ACOD), and then alternating at 1 second intervals will be the value and the parameter name.

- Press the *door* button to step down through the programmable parameters.

- Press the *reception* button to step up through the programmable parameters.

- The list rolls over bottom to top and vice versa.

- To change a numeric parameter simply type a new 1-4 digit value and then press *call*.

- To change other values simply press *call* to choose the next value.

- To exit Panel Program Mode press *cancel*.

- If no button is pressed for 30 seconds then programming mode will auto-cancel.

Code	Default	Access	Description
ACOD	1234		Coded access code – must be 4 digits
TCOD	6789		Trade access code – must be 4 digits
LTIM	0003		Lock Time: 1-99 seconds
LOCK	Secr		Lock Type: Secr (fail secure), Safe (fail safe)
CAM2	No		Camera 2: No (absent), Yes (present)
TRAD	0005		Trade Function: 0-9 – see table
DMON	Cwo		Door Monitor Polarity: Cwo, Owo
RECP	9898		Reception / Porter phone number
PSEC	3434		Panel security code
PPRG	1212		Phone programming security code
RING	0015		Ring Time – see table
TALK	0015		Talk Time – see table
TONE	Both		Ring and Lock Buzz-Tone enable, 4 settings
CANC	Yes		Allow *Cancel* button to terminate Call
BCAL	No		Bellcall BCP1 compatibility mode
12A?	No		Allows user entry of 12A to call BSC4 output 13

ACOD – Primary Access Code

Main code to open the door. Applies whenever the display indicates [Code]. The Trades mode (TRAD) needs to be set to 'Code' or 'Trade' as per the table below.

The code must be 4 digits and no letters, leading 0 is OK (e.g. [0246]).

TCOD – Secondary Access Code or Tradesmen's Code

Secondary 'tradesmen's' code to open the door. Valid only when the display indicates [Code] and the time clock selects the Trade option as per the table below.

The code must be 4 digits and no letters, leading 0 is OK (e.g. [0137]).

LTIM – Lock Release Operating Time

Door unlocked duration. Range 1 to 99 seconds. Only the last 2 displayed digits are used. A value of 0 will default to 1 second and a value containing alpha characters will default to 3 seconds.

LOCK – Lock Type

[Secr] = Fail secure lock: - Requires alternate mechanical means, key or thumb-turn to open on power failure.

[Safe] = Fail safe lock: - Lock opens on power failure.

CAM2 – Second Camera Present?

[No] = Only 1 camera,

[Yes] = Second camera present.

TRAD – Door Button Trades Mode

'None' = No function; pressing the *door* button is ignored.

'Door' = Pressing the *door* button opens the door.

'Code' = Pressing the *door* button prompts for the [ACOD] access code to open the door.

'Trade' = Pressing the *door* button prompts for either the [ACOD] or [TCOD] code to open the door

Setting	[0]	[1]	[2]	[3]	[4]	**[5]**	[6]	[7]	[8]	[9]
Time Clock Off	None	None	None	None	Code	**Code**	Code	Trade	Trade	Door
Time Clock On	None	Door	Code	Trade	Trade	**Door**	Code	Trade	Door	Door

DMON – Door Status Switch

[Owc] = Contacts open when door is closed: - The default allows for no switch fitted.

[Cwc] = Contacts closed when door is closed: - Standard normally closed switch.

RECP – Reception Phone Address

The *reception* button is used to call a reception desk or similar. The number is that of the called phone. The default is [9898] which is unlikely to be used by a flat.

PSEC – Panel Security Key

The security key is required to gain access to panel programming.

The code is entered then pressing the *call* button, the default is [3434] and it is recommended that this be changed for security.

This code can contain letters and numbers for added security.

PPRG – Phone Programming Security Key

The phone programming security key is required to gain access to flat number programming. The default is [1212] and it is recommended that this be changed for security.

This code can contain letters and numbers for added security.

This function is for when the BFD-DIG is used in Bellcall systems and is not relevant to bell*free* video systems.

RING – Ringing Time/Call Time and Ring Effect

Enter from 0 to 15 as per the table

Setting	Ring Time	Ring Cadence or Sound Effect
0	5s	1 in 3 – 1 ring every 3 seconds
1	8s	1 in 3 – 1 ring every 3 seconds
2	10s	1 in 3 – 1 ring every 3 seconds
3	15s	1 in 3 – 1 ring every 3 seconds
4	20s	1 in 3 – 1 ring every 3 seconds
5	30s	1 in 3 – 1 ring every 3 seconds
6	40s	1 in 3 – 1 ring every 3 seconds
7	45s	1 in 3 – 1 ring every 3 seconds
8	50s	1 in 3 – 1 ring every 3 seconds
9	60s	1 in 3 – 1 ring every 3 seconds
10	30s	1 in 3 (Reserved For future use)
11	30s	1 in 3 (Reserved For future use)
12	30s	2 in 15 – 2 rings, 15S silence, repeat
13	30s	1 in 15 – 1 ring, 15S silence, repeat
14	30s	1 in 5 – 1 ring every 5 seconds
15	**30s***	**1 in 3* – 1 ring every 3 seconds**

* Default setting

TALK – Talking Time/Apartment Station Active

Enter from 0 to 15 as per the table

Setting	Talk Time	Setting	Talk Time	Setting	Talk Time	Setting	Talk Time
0	15s	4	60s	8	150s	12	60s
1	20s	5	75s	9	180s	13	60s
2	30s	6	90s	10	60s	14	60s
3	45s	7	120s	11	60s	**15**	**60s***

TONE – Re-assurance Tone

To conform to DDA requirements the controller can provide a re-assurance tone at the door when an apartment station is being called and also when the door lock has been operated.

The volume is adjustable from 0 using the volume control on the BFD-DIG controller PCB (see the diagram on page 34). In addition there is a choice of which tone is sounded.

Four settings are available: -

[Both]   =   Ringing and lock tones.

[Call]   =   Ringing tone only.

[Lock]   =   Lock tone only.

[None]   =   No tones.

CANC – Cancel Key Compatibility

For use with a new controller in older systems with any BSC4 video Controller below Build 4, or BS801 audio phone below Build 6, or BC801 or BC801P audio phones below Build 6. These older systems are not capable of cancelling a call and the phones will continue to ring even though the door controller has closed down.

If this situation applies then ensure [CANC] is set to [No] otherwise the default is [Yes].

BCAL – Bellcall Compatibility Mode

For use in mixed systems with a BCP1 panel revision V2.0 upwards. Switching compatibility mode to [Yes] changes the number format for addressing a phone and removes the 3 Second overhang of speech when operating the lock from a phone.

BS801 audio phones from Build 6, or BC801 or BC801P audio phones from Build 6, and all BSA phones already have number format transparency built in and do not need this switch.

Default is [No], set to [Yes] only when in a mixed BCP1 with older phones.

Must be set to [No] when addressing any apartment station or videophone.

12A? – Flat 13 Numbered as 12A (From build 4)

For use when flat numbering is … 11, 12, 12A, 14, 15 … When set to [Yes] entering "12A *call*" will actually send "13" so that the BSC4's can be set to respond to … 11, 12, 13, 14, 15 …

BFD-DIG Door Controller Jumper Settings

Camera Terminator

There is a separate jumper for both video Camera inputs. This has three settings, 75R for terminating coaxial cable, 100R for terminating twisted pair Cat5 cable and None for use when passing the cable on to another device or controller.

Video Gain Control

The 'Video Gain' jumper on door controllers should always be set to '0' unless directed by 'Bell System Technical Support'. This jumper is only required on some systems with very long cable runs, camera to apartment station well in excess of 150m. Inappropriate use of this jumper with short runs will cause picture problems.

BSC4 Video Controller Settings

Jumper settings

The "Video Gain" jumper on video controllers should always be set to "0" unless directed by Bell System Technical. This jumper is only required on some systems with very long camera to apartment station cable runs well in excess of 150m. Inappropriate use of this jumper with short runs will cause picture problems.

The "Video Terminator" jumper must be set to OFF on all but the furthest Video Controller from the Door Controller(s), this one must be set to ON.

Switch settings

SW6 is a rotary 16 position switch which sets the apartment station (Phone) addresses as per the following table. These numbers represent actual flat numbers for the digital controller; they also correspond to the inputs on the BFD8 or BFD72.

SW6 Setting			
Pos	Phone 1	Phone 2	Phone 3	Phone 4
0	None	None	None	None
1	1	2	3	4
2	5	6	7	8
3	9	10	11	12
4	13	14	15	16
5	17	18	19	20
6	21	22	23	24
7	25	26	27	28
8	29	30	31	32
9	33	34	35	36
A	37	38	39	40
B	41	42	43	44
C	45	46	47	48
D	49	50	51	52
E	53	54	55	56
F	57	58	59	60

SW6

Shown at 0
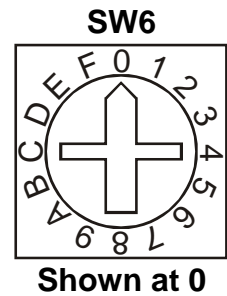
ATTENTION

Each SW6 MUST be set correctly for the phones to ring.

This switch is shipped set to 0 to prevent multiple phones ringing on initial installation.

Address Offset SW7

SW7 is an 8 bit switch that is used to increase the addressing range. For each bit that is switched ON add the corresponding value to the amount set by SW6. This allows flat addresses up to 3210 to be set (6410 or higher with the jumper below).

Bit	Offset
1	+1
2	+2
3	+50
4	+100
5	+200
6	+400
7	+800
8	+1600

Each bit on SW7 adds the corresponding amount to the address set by SW6. Do not set a total value above 9995

SW7

OFF ↔ ON
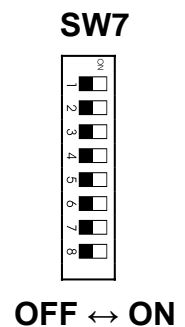
Odd/Even Addressing Jumper PROG pins 1-2

This jumper alters the addressing of Phone outputs 2, 3 and 4 such that they all become either odd or even numbers. So if the address of output Phone 1 is 12 say the other outputs become 14, 16 and 18. If the address were 31 then the other outputs are 33, 35 and 37.

The use of this jumper precludes the use of extended addressing by PROG pins 2-3, if both are required contact Bell System Technical. The jumper is stored on pins 4-5.

Extended Addressing Jumper PROG pins 2-3

This jumper adds +3200 to the Phone 1 address set using SW6 and SW7. Phone addresses up to 6410 (Phone 1 output) can be set. Custom versions will show the custom offset on the build label.

The use of this jumper precludes the use of Odd/Even addressing by PROG pins 1-2, if both are required contact Bell System Technical. The jumper is stored on pins 4-5.

Custom Alternate Addressing Option

Special versions of the BSC4 can be ordered to allow addressing above 6413. The value +nn00 is shown on the build label. This jumper adds +nn00 to the phone 1 address set using SW6 and SW7The jumper is stored on pins 4-5.

For instance by a custom version Build 7+5000 would make the jumper add 5000, the BSC4 would then be able to address from 1 to 3210 and 5001 to 8210 (Phone 1 output).

The use of this jumper precludes the use of Odd/Even addressing by PROG pins 1-2, if both are required contact Bell System Technical. The jumper is stored on pins 4-5.

BF Apartment Station Switch Settings

Mute Time Setting SW2 (1-4)

SW2

1	2	3	4	Mute Time
On	On	On	On	Disabled[1]
Off	On	On	On	2 minutes
On	Off	On	On	5 minutes
Off	Off	On	On	10 minutes
On	On	Off	On	15 minutes
Off	On	Off	On	20 minutes
On	Off	Off	On	30 minutes
Off	Off	Off	On	45 minutes
On	On	On	Off	1 hour
Off	On	On	Off	2 hours
On	Off	On	Off	4 hours
Off	Off	On	Off	5 hours
On	On	Off	Off	6 hours
Off	On	Off	Off	8 hours
On	Off	Off	Off	10 hours
Off	**Off**	**Off**	**Off**	***Indefinite[2]**

OFF ↔ ON

*Default setting

[1]Disabled means touching the *mute* symbol has no effect.

[2]Indefinite; the *mute* is cancelled by touching the symbol again.

SW2

OFF ↔ ON

Individual Functions DIP-SW2 (5-8)

SW2-5	Master / Slave	Which Apartment Station to set
*Off	Master	Only or first apartment station per BSC4 output.
On	Slave / extension	Second and subsequent apartment stations per BSC4 output.
SW2-6	**Auto Display on Ring**	**Apartment Station display behaviour**
*Off	Display during ring	Picture is on while ringing, stays on when answered.
On	No display during ring	Picture is off while ringing, comes on when answered.
SW2-7	**Spare**	**Spare**
*Off		
On		
SW2-8	**Spare**	**Spare**
*Off		
On		

*Default setting

BS Videophone Switch Settings

Mute Time Setting SW2 (1-4)

SW2

1	2	3	4	Mute Time
On	On	On	On	Disabled[1]
Off	On	On	On	2 minutes
On	Off	On	On	5 minutes
Off	Off	On	On	10 minutes
On	On	Off	On	15 minutes
Off	On	Off	On	20 minutes
On	Off	Off	On	30 minutes
Off	Off	Off	On	45 minutes
On	On	On	Off	1 hour
Off	On	On	Off	2 hours
On	Off	On	Off	4 hours
Off	Off	On	Off	5 hours
On	On	Off	Off	6 hours
Off	On	Off	Off	8 hours
On	Off	Off	Off	10 hours
Off	**Off**	**Off**	**Off**	***Indefinite[2]**

OFF ↔ ON

*Default setting

[1]Disabled means touching the *mute* symbol has no effect.

[2]Indefinite; the *mute* is cancelled by touching the symbol again.

SW2

OFF ↔ ON

Individual Functions DIP-SW2 (5-8)

SW2-5	Master / Slave	Which videophone to set
*Off	Master	Only or first videophone per BSC4 output.
On	Slave / extension	Second and subsequent videophones per BSC4 output.
SW2-6	**Auto Display on Ring**	**Videophone display behaviour**
*Off	Display during ring	Picture is on while ringing, stays on when answered.
On	No display during ring	Picture is off while ringing, comes on when answered.
SW2-7	**Mute Function**	**Action of muted videophone**
*Off	Ringer mute only	Videophone indicates ring by flashing the *view* symbol, picture comes on if SW2-6 is off, no sound.
On	Disable videophone	Videophone does not respond to a call.
SW2-8	**Video Terminator**	**Which videophone has the setting**
Off	No termination	Any videophone not at the end of the cable.
*On	Terminated	The videophone at the end of the cable.

*Default setting

Troubleshooting

Common Faults

A very high percentage of calls to our technical support number, regarding new installations, are resolved to faulty wiring. The reasons for these are various: -

Broken cores, especially short links, sometimes broken inside the insulation!

Connectors clamped onto the insulation instead of copper.

Wire in the wrong side of a rising clamp connection, the clamps need to be unscrewed far enough to stop the wire going "underneath".

Shorts or opens due to cables having been stapled or nailed through.

A common fault is wiring a connector left to right instead of right to left, or one or more twisted pairs the wrong way round.

Tip. The heads of screws on connectors are not a reliable means of making a connection with a meter, try pushing the probe into the wire entry point.

Quick Fault Reference

These tables provide a quick indication of the possible fault.

Power Problems	
Apartment station resetting (The three indicators lights show the power on sequence).	• Power supply intermittent short or overload. • More than 1 extension enabled for auto display. • Lock output short-circuit; see 'Lock Problems'
28V LED does not light on controller.	• Temporarily remove connection to 28V+ output. If it now comes on there is a short on the apartment station wiring. • 12V input connections are reversed or missing.
PS4 output voltage fluctuating, meter reading unstable.	• Output overload is causing current limit to operate; check allocation of controllers to power supplies, see page 10 for details. • See Lock Problems below.

Panel Display Problems	
No display	• No power at display, check for a minimum of 10V. • To test display, cycle the power on BFD-DIG and check for both version numbers displayed. "BDV1" then "V4.0"
Display indicates "F 1 – –"	• "D" connection open circuit.
Display indicates "F 2 – –"	• "D" connection: no data received. • "D" connection shorted to 0V
Display indicates Fail	• Apartment number entered was called but did not respond. In a large system with BSSW controller, the panel at the gate displays Fail when the block with that apartment number is Busy. Otherwise see Call Problems below.

Apartment station, Video or Audio Phone Call Problems	
Apartment station does not ring or flash when called. Display indicates Fail.	• Apartment station off hook or muted. • No power to apartment station; check that the mute lamp illuminates when the mute symbol is touched. • Data wiring has a fault, Data A or Data B connection broken. • 0V to controller missing on separately powered apartment station.
No extension apartment station rings or flashes when called.	• Data wiring has a fault, Data A or Data B connection broken.
Green Lock light on apartment station flashes once when called.	• Apartment station set to slave with no master present or responding.

BSC4 Video Controller Tests

When the system is idle (no calls in progress) pressing the 'Test' button activates the 'Audio On, 'Status' and one of the 'Select n' LED's for 3S. If the system is not idle (Version 2 only) pressing the 'Test' button will cause a system wide reset.

There are 4 green LED's which indicate power to the individual phones, on board fuses will operate if a short exists.

The BSC4 also has 4 'Phone' test buttons which can be used to verify the 'data' connection to the apartment station. Pressing the 'Test Phone n' button should cause the apartment station and extensions, if any, to ring and the associated 'Select n' Led to light.

Touching *pickup* or touching *view* will cause the 'Audio On' and 'Select n' LED's to light. There will be no audio as no door panel is active. The display on the apartment station will light up to grey or blue unless the video camera is directly wired to the BSC4 input.

Touching *pickup* again will cause all the LED's to extinguish. Touching the *lock* symbol instead will cause the 'Status' LED to light and after 3S all the LED's will go off.

If this sequence works repeatedly then the A and B data connections are probably OK. and the +28V and 0V must also be OK. The test also shows that the BSC4 software is running and diagnostics can now focus on the door controller to video controller wiring.

If it fails an apartment station can be connected locally with a short cable to eliminate the cable being faulty.

Speech Problems	
Loud tone at the entrance speaker. (Acoustic feedback)	• Broken Audio 1 or Audio 2 connection. • Intermittent or broken Data A or Data B connection. • Apartment station has reset; see the power faults table.
No speech from apartment station to entrance	• Missing or Broken Spkr + or Spkr - connection.
No speech from entrance to apartment station	• Missing or Broken PM + or PM - connection.

Lock Release Problems	
Lock release does not operate or clicks but does not open.	• Connections to Lock Release are open or shorted. • Voltage drop due to cable too thin. • Lock current is too high; Power supply is resetting. • Lock release jammed due to over tight fitting.
Maglock does not hold strongly.	• Voltage drop due to cable too thin.
TEST: Press '**Test'** Button on Door Controller (when system idle):	• Confirm 'LOCK' LED illuminates for 3 seconds. • Check Output Voltage at LOCK terminals.
Lock release operates all the time or in reverse	• See Panel Programming – Lock on page 20 and check that the correct lock type is selected. • Normally closed switch has been used for exit button.
Lock operates from the exit button but not the test button or apartment station.	• Normally closed switch has been used for exit button.

Video Problems	
Blank picture when: - Calling apartment station or Touching *view*	• Broken or missing Video + or Video - connection. • Cameras incorrectly configured refer to **CAM2** setting on page 20 • Call is from an audio only panel.
No picture when calling apartment station	• Check auto display switch is on. See page 25
No picture when touching *view*	• CCTV is not available on digital controllers
Repeated touching of *view* does not select cameras as expected.	• Check **CAM2** setting at all entrances is set for correct number of cameras at that entrance
Unstable picture	• Power supply voltage low. • Terminator switch not set on last apartment station. • Too many terminator switches set on. • Video gain jumper set to high on a short run. • Very bright area in background upsetting camera.
Unstable picture possibly with areas looking like a photographic negative.	• Video + and - reversed, or M and S reversed.
Entrance cannot be seen at night	• Power not connected to camera IR night illumination. Connect 1 to + on camera.

Specifications

BFD-DIG Door Controller	
Size	185mm x 230mm x 42mm
Supply Voltage	10.8V min, 13.8V typical, 15V max
Current Consumption	80mA idle @13.8V, 500mA active Includes display, speech not cameras.

Model C-CAMBS Colour Camera	
Size	60mm x 57mm x 31mm
Supply Voltage	10V d.c. minimum, 15V d.c. maximum
Current consumption	175mA maximum without IR 215mA maximum with IR (Link 1 to +)
Image Device	1/3" CCD
Sensitivity	0.01 lux, auto switching to B/W in low light levels
Minimum Focus	100mm
Viewing Angle	92º (typical)
Video Output	PAL composite video 1Vpk-pk (75 Ohm)
Resolution	More than 330 lines
Back light compensation	Yes

BSC4 Video Controller	
Size	185mm x 230mm x 42mm
Supply Voltage	10.8V min, 13.8V typical, 15V max
Current Consumption	350mA idle, 3A max @13.8V

BF Colour Apartment Station	
Size	210mm x 260mm x 60mm
Fixing	Wall Mounted
Supply Voltage	11V minimum – local power supply only. 20V to 28V typical
Current Consumption	25mA @28V idle, 375mA @ 11V active
Buzzer Mute Time	Disabled, 1minute through 10 hours, indefinite

BS Colour Video Phone	
Size	210mm x 260mm x 60mm
Fixing	Wall Mounted
Supply Voltage	11V minimum – local power supply only. 20V to 28V typical
Current Consumption	25mA @28V idle, 375mA @ 11V active
Buzzer Mute Time	Disabled, 1minute through 10 hours, indefinite

BF Apartment Station Digital Entry System

Model BSA Phone	
Size	235mm x 105mm x 25mm
Supply Voltage	10V d.c. minimum, 30V d.c. maximum
Current consumption	20mA idle, 67mA ringing @13.8V

Model BF-AMP Speech Unit	
Size	95mm x 75mm x 30mm
Supply Voltage	10.5V d.c. minimum, 15V d.c. maximum
Current consumption	250mA d.c. maximum

PS4 Power Supply	
Size	236mm x 105mm x 81mm
Output Voltage (regulated)	13.5V d.c. min, 13.8V d.c. nom, 14.1V d.c. max
Output Current	3A continuous, 4A peak (5 minutes max)
Mains Supply Internal Fuse	Not user replaceable
Supply Voltage	230V 50Hz nominal
Temperature Range	0 ºC to 50 ºC

340C Power Supply	
Size	140mm x 60mm x 53mm
Output Voltage (regulated)	13.5V Min, 13.8V Nom, 14.1V Max
Output Current	1A continuous, 1.5A peak (5 minutes max)
Mains Supply Internal Fuse	Not user replaceable
Supply Voltage	230V 50Hz nominal
Temperature Range	0 ºC to 50 ºC

840 Power Supply – Battery Backed	
Size	350mm x 330mm x 80mm
Output Voltage (regulated)	13.5V Min, 13.8V Nom, 14.1V Max
Output Current	3A continuous, 4A peak (5 minutes max)
Mains Supply Internal Fuse	T2A 20mm HBC (HRC) Ceramic
Battery Fuse	F4A 20mm Glass
Supply Voltage	230V 50Hz nominal
Temperature Range	0 ºC to 50 ºC

BSSW Gate Controller / Block Isolator	
Size	185mm x 230mm x 42mm
Supply Voltage	10.8V min, 13.8V typical, 15V max
Current Consumption	80mA idle, 210mA max @13.8V

Diagram A – Basic System Wiring Overview

**BF
Apartment
Station**

**1 Cat5
per phone**

**Up to 150m
(1 Apartment
station)**

**(For over 150m
or extensions
see diagrams H&I)**

**BSC4   4 way
Video Controller**

**BSC4   4 way
Video Controller**

Further
Controllers

Cat5

2 x 1mm²

Cat5

Further
Entrances

Cat5

Cat5

**(For power supply
requirements
see table)**

**PSU
PS4
12V**

**BFD-DIG
Door Controller**

**BFD-DIG
Door Controller**

**PSU
PS4
12V**

**All cable MUST be
Cat5
4 pair data cable.**

**Except for power
wiring where stated.**

**Multiple
Cat5
Cables**

**Multiple
Cat5
Cables**

Cat5 requirements

14 pairs

+ (optional)
Exit button 1pair
Door monitor 1pair
2nd Camera 2 pair

Up to 50m

BFP-DIG/VR(S)
or
BFP-DIG/LCP
Panel

Lock wiring options		
Lock	0.5A	1.0A
12m	1 pair	1 pair
25m	1 pair	2 pair
50m	2 pair	4 pair
50m	2x1mm²	2x1mm²

Entrance 2

Lock
release

Entrance 1

Lock
release

Diagram B – BFD_DIG PCB Detail

Camera 1				Camera 2				Input							Output							
								Video		Audio		Data		**Commn**		Video		Audio		Data		28V
+	−	M	S	+	−	M	S	+	−	2	1	B	A	−	−	+	−	2	1	B	A	−	+

Cam2

100 75 High — Cam1
100 75 High — Cam2

Video

Audio

Video Gain — 4 3 2 1 0

Speech
Vol+
Vol−
Save

Panel Speaker

HF Prog 1

Status

Test

Panel Tone Volume

Prog-6 1

−	SPKR	
+		Speech Unit
−	12V	
+		
−	PM	
+		

−	Time
+	

bell
System
© 2010

Label BFD-DIG
Version No
Build No

bellfree
BFD-DIG

Lock Power

Enhanced Speech Door Controller

1	2	3	4	5	6	7	8	9	+	−	D	E	F	G	+	−	+	−	+	−	+	−	+	−
									12V		TX		RX		Exit		Door		Lock		12V		12V	
Keypad									Display / Keypad											Power				

Diagram C – BFD-DIG Keypad Matrix
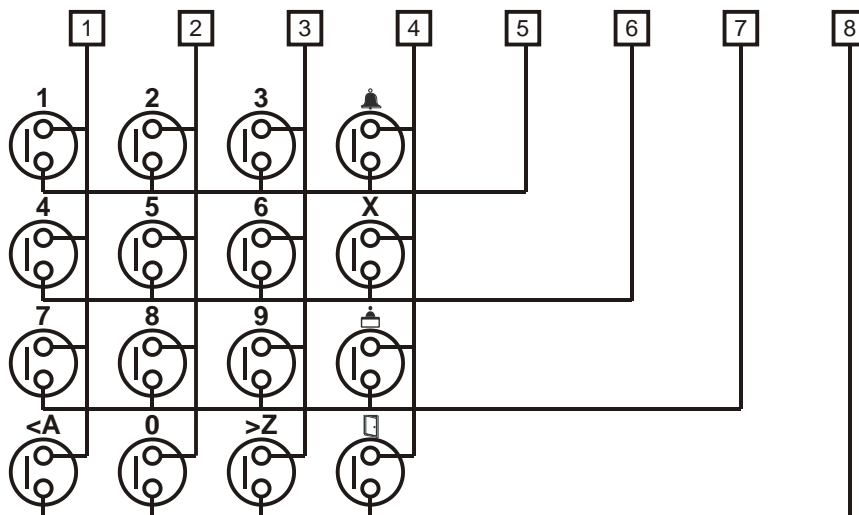
Diagram D – Basic System Wiring Detail

From previous controller

To Next controller

Cat5 Input

W/Brn	Brn	W/Grn	Grn	W/Org	Org	W/Blu	Blu

–	+	2	1	B	A	–	–
Video	Audio		Data	Commn		

Cat5 Output

W/Brn	Brn	W/Grn	Grn	W/Org	Org	W/Blu	Blu

–	+	2	1	B	A	–	–
Video	Audio		Data		28V

Camera Inputs

+	–	M	S	+	–	M	S
Camera 1				Camera 2			

BFD-DIG
Door Controller

Speech Unit

Spkr –	W/Brn
Spkr +	Brn
12V –	Grn pair
12V +	Org pair
PM –	W/Blu
PM +	Blu

| Time – | |
| Time + | |

Power Supply

Door Panel

CAMBS
Camera

(Optional Link For Infra Red Lamp)

| M |
| S |
| 1 |
| – |
| + |

Door Panel / **Display / Keypad** / **Entrance** / **Power Supply**

Keypad Connections

1	2	3	4	5	6	7	8
Blu	W/Blu	Org	W/Org	Grn	W/Grn	Brn	W/Brn

12V		TX		RX		Exit		Door		Lock		12V		12V	
+	–	D	E	F	G	+	–	+	–	+	–	+	–	+	–

BF-AMP
Speech Unit

Spkr –	W/Brn
Spkr +	Brn
12V –	Grn pair
12V +	Org pair
PM –	W/Blu
PM +	Blu
Mic –	
Mic +	

BD10
Display Module

| 0V |
| D |
| +V |

Keypad:
1	2	3	🔔
4	5	6	✕
7	8	9	⌂
A>	0	<Z	

1	Blu
2	W/Blu
3	Org
4	W/Org
5	Grn
6	W/Grn
7	Brn
8	W/Brn

Panel Mic
Red
Black

= = 2 x 1mm²

PS4
Power Supply
12V

230V Mains

| – |
| + |

TS2000
Time Clock
(Optional)

| – |
| + |
| CO |
| NO |
| NC |

Power to Display 3 cores each

Time Clock To Further doors

Exit button or Fire Switch (optional)

Door Monitor Switch (optional)

Lock

Lock wiring options

Lock	0.5A	1.0A
12m	1 pair	1 pair
25m	1 pair	2 pair
50m	2 pair	4 pair
50m	2x1mm²	2x1mm²

All signal cable MUST be Cat5
See "Cable Specification"

| Blu |
| W/Blu |
| Org |
| W/Org |
| Grn |
| W/Grn |
| Brn |
| W/Brn |

Cat5 4 twisted pairs data cable.

One pair in the Cat5 cable
A — A
B — B

This symbol is used to indicate where a twisted pair connection must be used
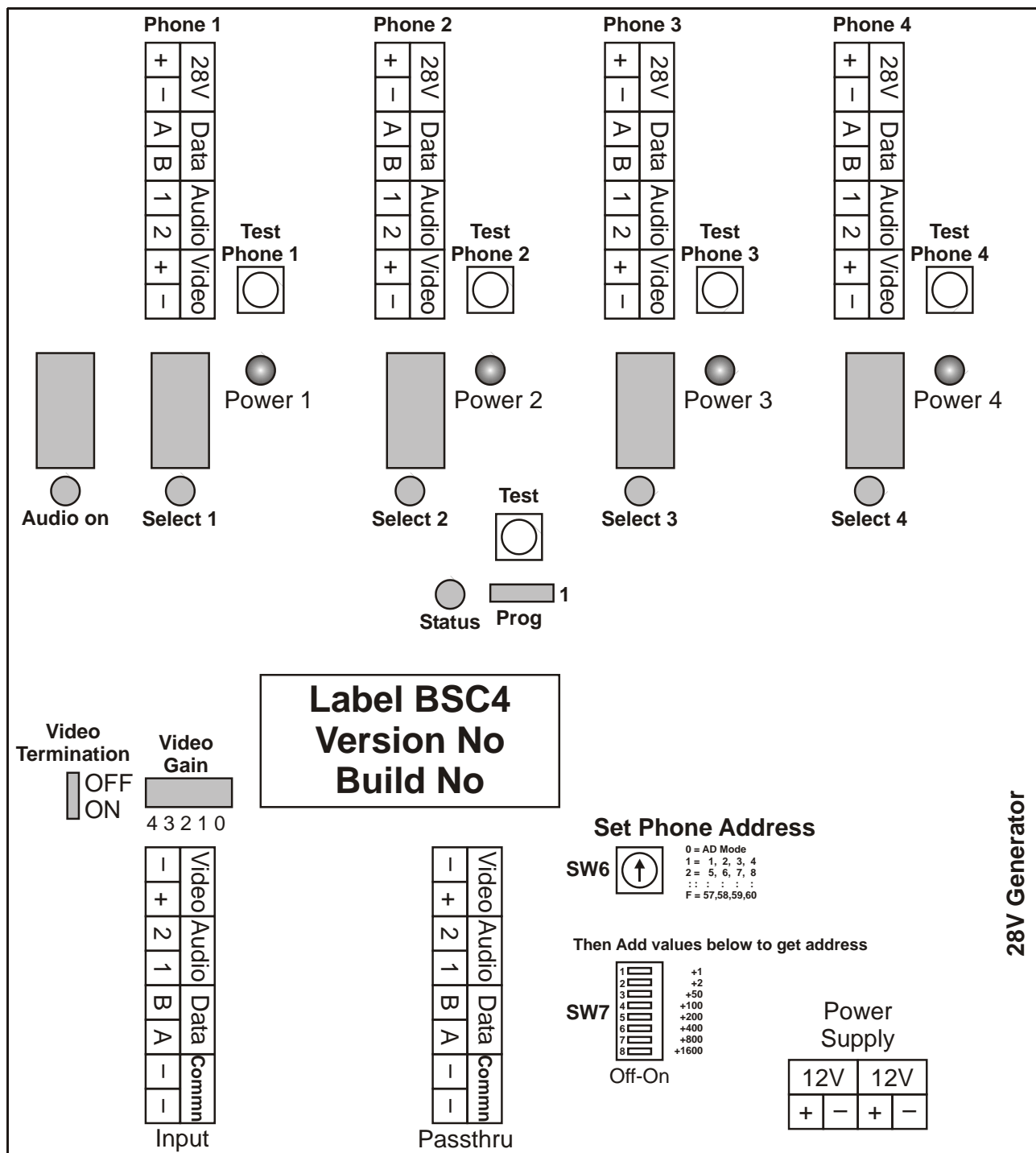
Diagram E – BSC4 PCB Detail

Phone 1		Phone 2		Phone 3		Phone 4	
+	28V	+	28V	+	28V	+	28V
–	Data	–	Data	–	Data	–	Data
A		A		A		A	
B	Audio	B	Audio	B	Audio	B	Audio
1		1		1		1	
2	Video	2	Video	2	Video	2	Video
+		+		+		+	
–		–		–		–	

Test Phone 1   Test Phone 2   Test Phone 3   Test Phone 4

Power 1   Power 2   Power 3   Power 4

Audio on   Select 1   Select 2   Test   Select 3   Select 4

Status   Prog   1

Video Termination   **Video Gain**

OFF
ON

4 3 2 1 0

Label BSC4 Version No Build No

Set Phone Address

Input		Passthru	
–	Video	–	Video
+	Audio	+	Audio
2	Data	2	Data
1	Commn	1	Commn
B		B	
A		A	
–		–	
–		–	

SW6   ⬆

0 = AD Mode
1 = 1, 2, 3, 4
2 = 5, 6, 7, 8
: : : : : : :
F = 57,58,59,60

Then Add values below to get address

SW7

1	+1
2	+2
3	+50
4	+100
5	+200
6	+400
7	+800
8	+1600

Off-On

Power Supply

12V		12V	
+	–	+	–

28V Generator

Diagram F – BSC4 Wiring Detail
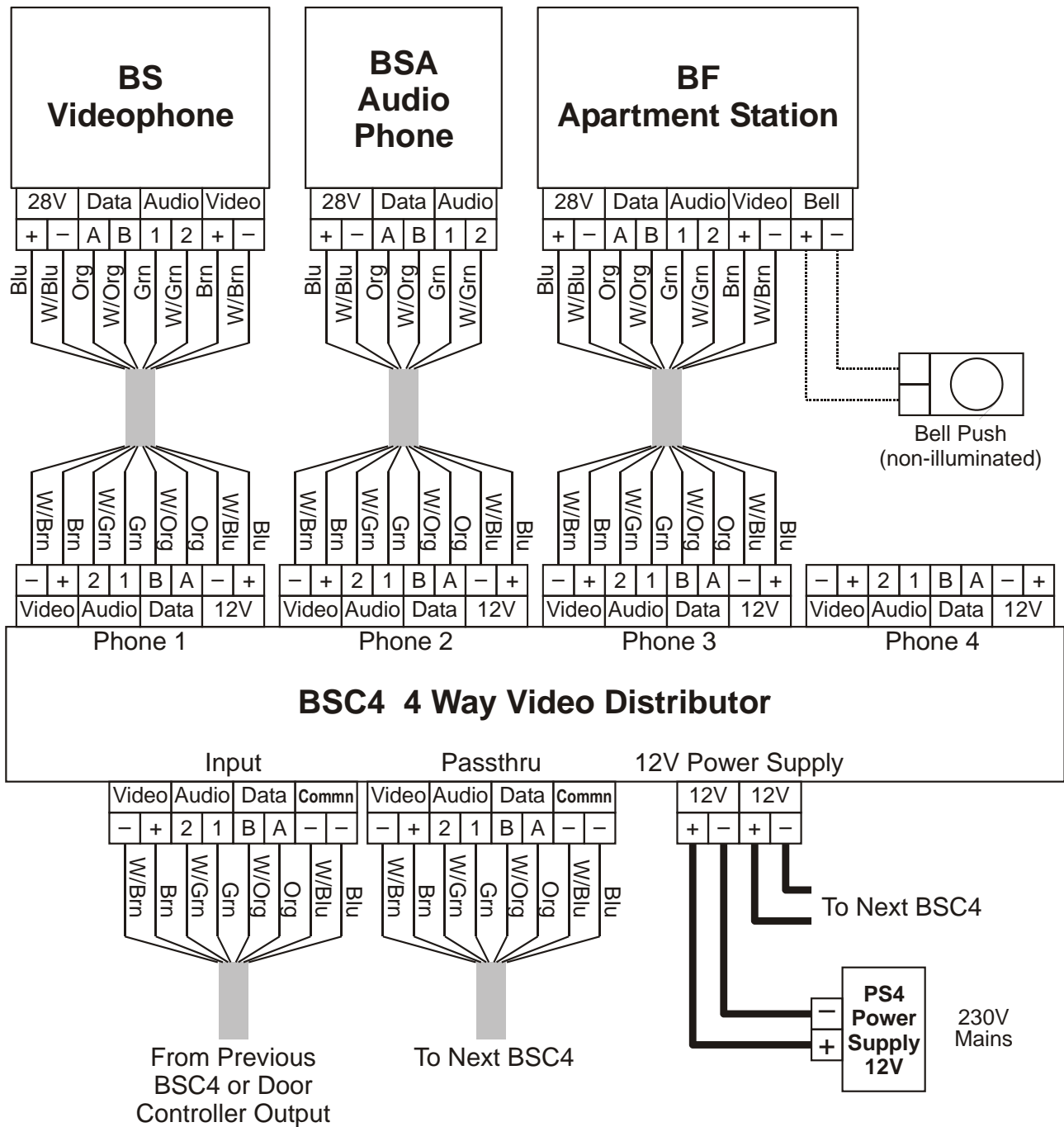
Diagram G – Large system Overview

Illustration of Power Supply Distribution

Further
Entrances

Further
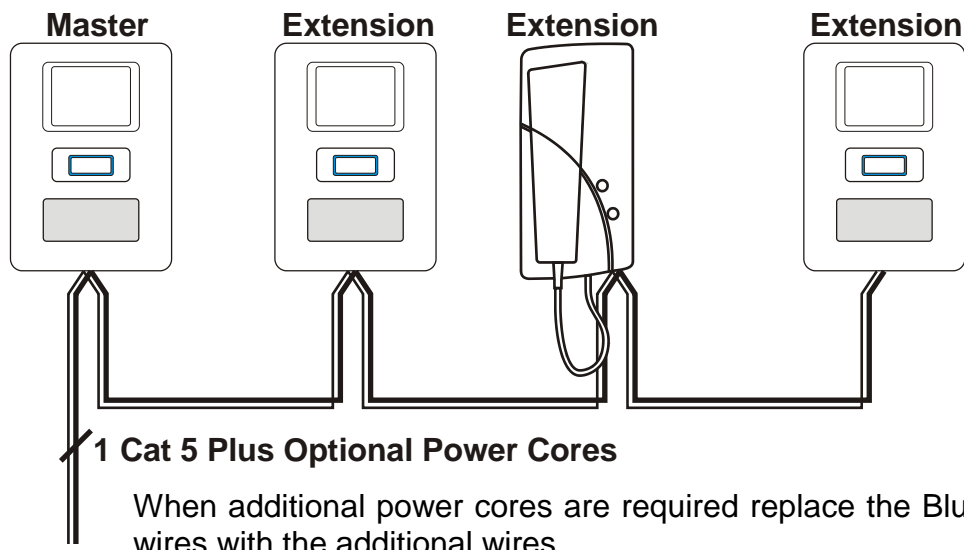Controllers

2 x 1mm²

Passthru

**BSC4...
Controller**

Input

*x 4
Monitors*

**Detailed Wiring and
Power Supply
Calculations
are in Manual**

Cat5

Cat5

2 x 1mm²

**Door
Panel**

**BFDxxx
Controller**

Input

Passthru

**BSC4...
Controller**

Output

Input

*x 4
Monitors*

**Correct
Video
Operation
Requires
This
Daisychain
Wiring**

2 x 1mm²

PS4 12V

Cat5

2 x 1mm²

**Door
Panel**

**BFDxxx
Controller**

Input

Cat5

Output

Cat5

Passthru

**BSC4...
Controller**

Input

*x 4
Monitors*

PS4 12V

2 x 1mm²

Cat5

2 x 1mm²

**Door
Panel**

**BFDxxx
Controller**

Input

Passthru

**BSC4...
Controller**

Output

Cat5

Input

*x 4
Monitors*

2 x 1mm²

PS4 12V

Diagram H – Extension Apartment Station Wiring

1 Cat 5 Plus Optional Power Cores

When additional power cores are required replace the Blu and W/Blu wires with the additional wires

Cat5

From Controller   **To More Extensions**
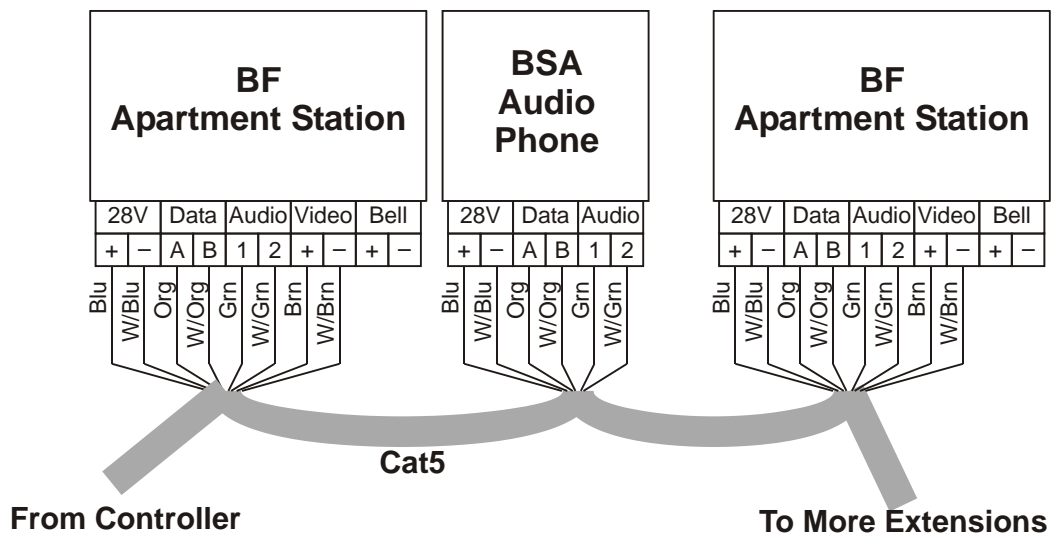
Note. For each cable run :-

- Only one unit must be Master (Recommend the first unit)
- Auto display on one video unit only (For auto display on multiple video units see next Diagram)
- Extension video units must be "daisy chain" wired to preserve video quality
- The last (or only) video unit on the cable requires the Video Terminator "ON" all other video units must have the Video Terminator "OFF"

Diagram I – Apartment Station Local Power Wiring

Where more than one extension video unit is required to provide "auto display" then additional power supplies will be required

Master   **Extension**   **Extension**   **Extension**

1 Cat5

PSU 340C 12V

PSU 340C 12V

The 28V+ connection is only connected to the local power supply.

BF Apartment Station

28V		Data		Audio		Video		Bell	
+	−	A	B	1	2	+	−	+	−

Blu | W/Blu | Org | W/Org | Grn | W/Grn | Brn | W/Brn

PSU 340C 12V

12V	
+	−

BF Apartment Station

28V		Data		Audio		Video		Bell	
+	−	A	B	1	2	+	−	+	−

W/Blu | Org | W/Org | Grn | W/Grn | Brn | W/Brn

For maximum cable distance see text

The 28V− connection must be made between all units and the controller.

From Controller   **Cat5**   **To More Extensions**

Note. For each cable run :-

- Only one unit must be Master (Recommend the first unit)
- Extension video units must be "daisy chain" wired to preserve video quality
- The last (or only) video unit on the cable requires the Video Terminator "ON" all other video units must have the Video Terminator "OFF"

Diagram J – Camera Sharing & Time Clock Sharing

Camera Termination Options

Cameras may be wired in either twisted pair or coax and shared with other equipment.
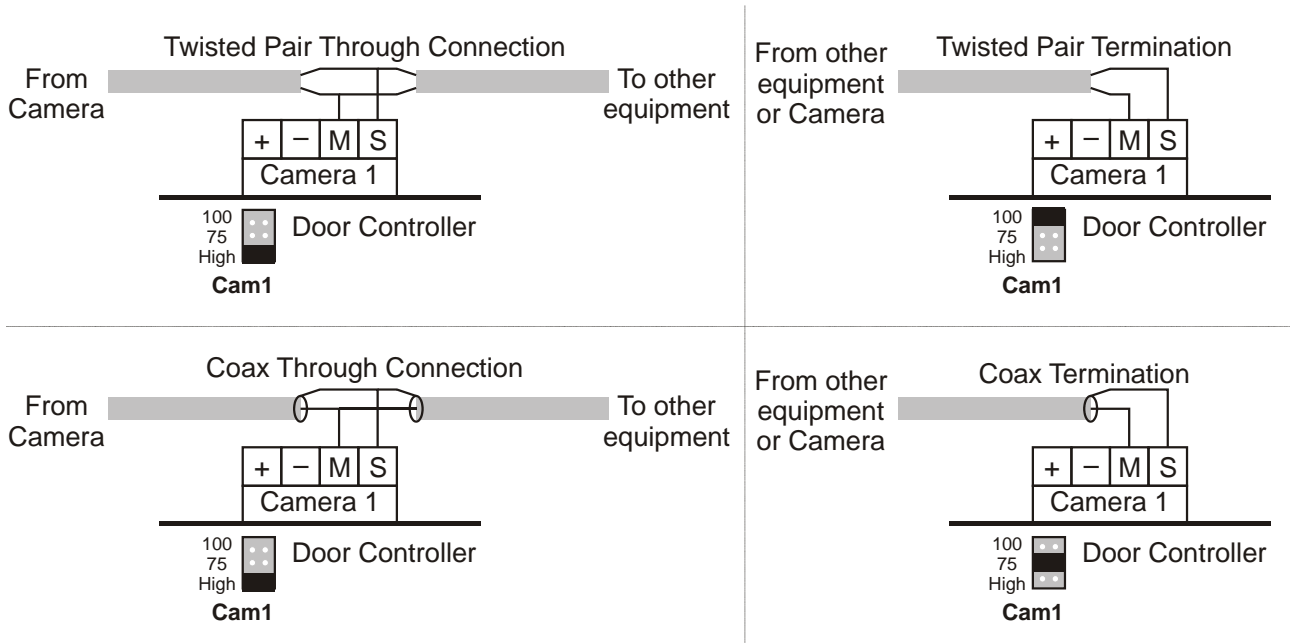
Time Clock Sharing

A time clock can be shared between distributed equipment areas by borrowing one of the 'comm -' wires in the interconnecting Cat5 to use as the shared "Time clock common".

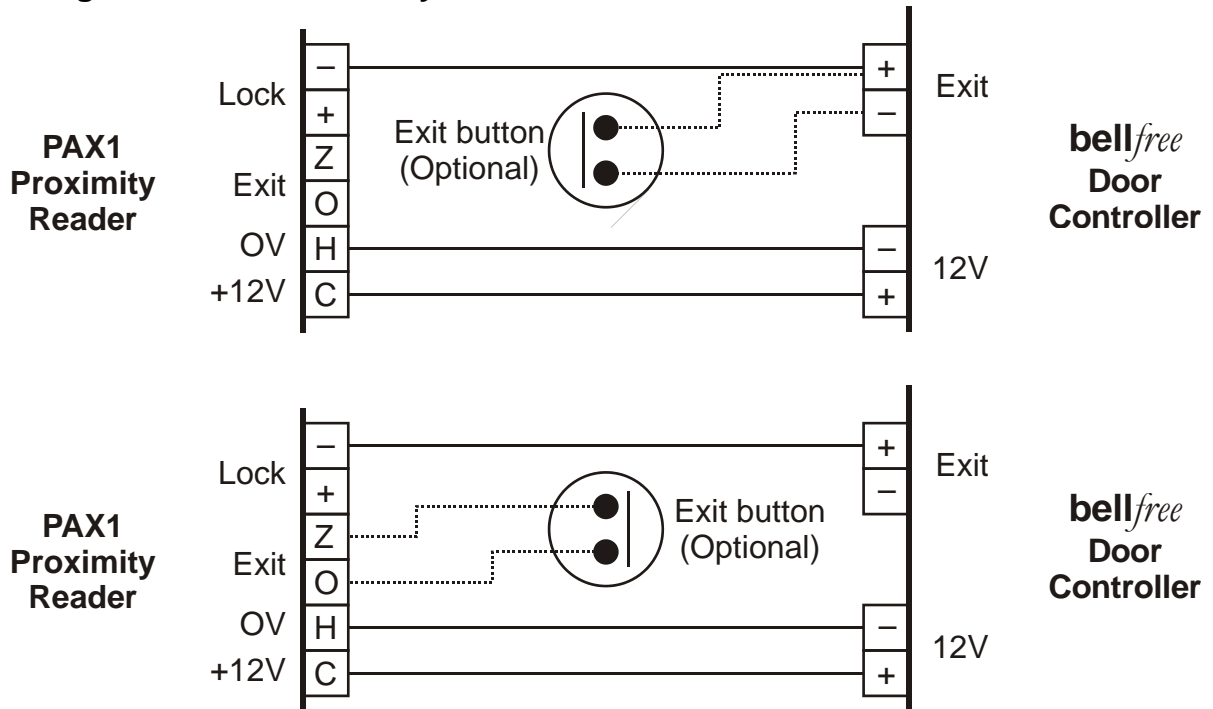The "Time clock common" signal is sharable across all Bell controller types.
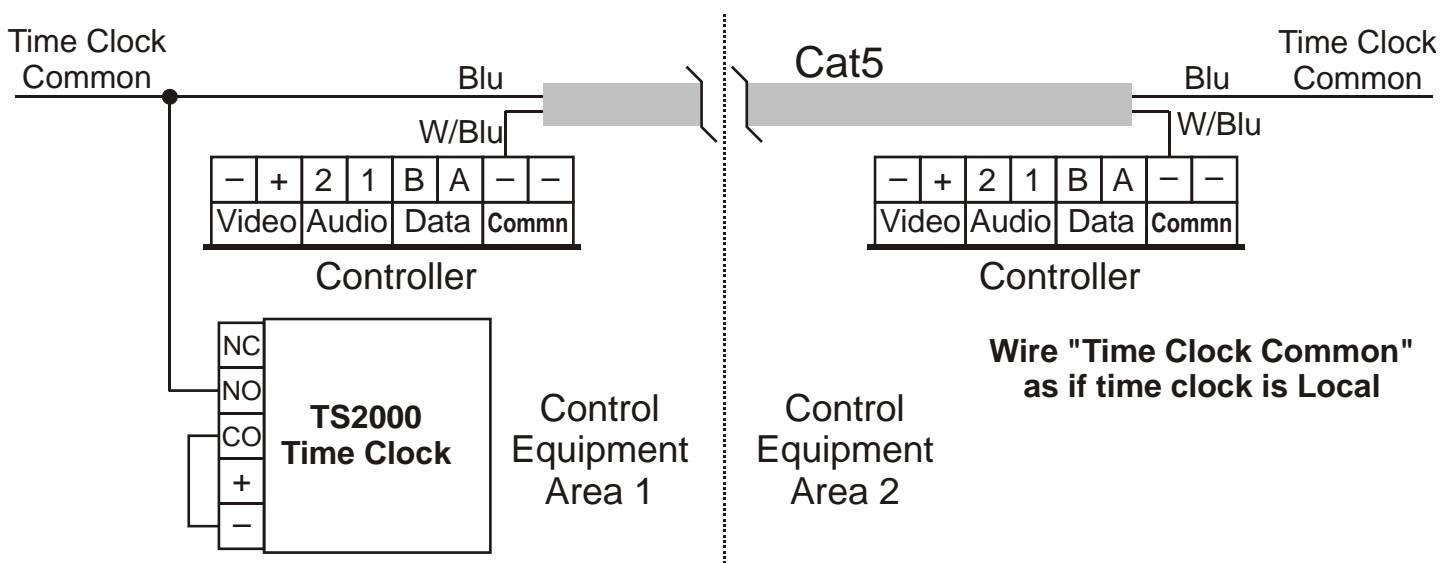
Diagram K – Combined Connections bell*free* With Lock

Connecting a Bell PAX1 Proximity Reader

Connect the lock release as per this manual. Leave the Proximity Reader set to fail secure, the BFD controller sets the lock type.

Use a lock time card to reduce the lock time to 1 or 2 seconds, otherwise the PAX1 will extend the bell*free* lock time to 7 seconds. Lock time cards are in all Fob packs except the starter pack.

Note 1.   A normally open exit button can still be wired to the BFD controller in addition to the proximity wiring. Alternatively the exit button can be wired to the proximity reader

ACT 1000/2000/3000 Proximity Controller or 100e/200e Extender
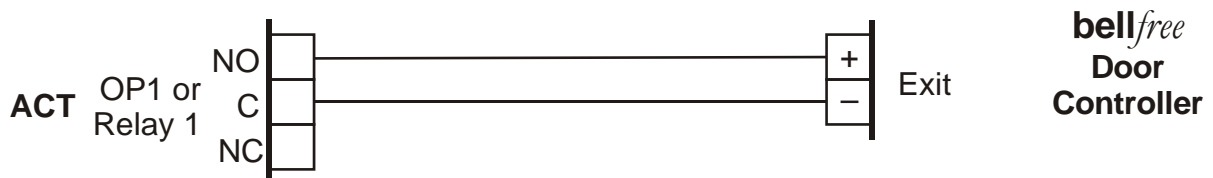
The lock output on an ACT controller is a volt free relay contact, so as long as it is not used for another purpose it can be directly connected to the exit input of a bell*free* door controller.

A 2 wire interface is shown, but if a common 12V supply is in use then the Exit-input may be left unconnected and the corresponding ACT relay connection can be connected to a local 0V terminal.

Diagram K – Continued

### Connecting a Bellcode Coded Access Controller
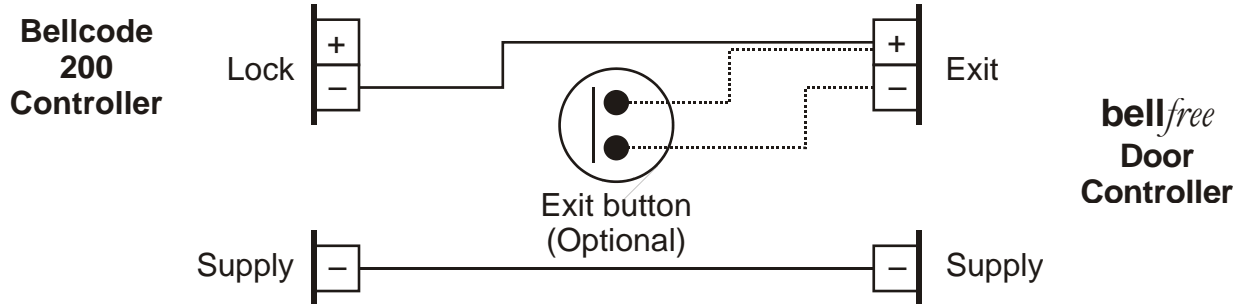
Connect the lock release as per this manual. Leave the Bellcode controller set to fail secure, the BFD controller sets the lock type.

See "Bellcode Manual inc CK200 CS109 (PD-078)" for the other installation and setting instructions.

Note 1. A normally open exit button can still be wired to the Bellcode unit in addition to the bell*free* wiring.

Note 2. A "12V-" connection will be required if the 2 units are not sharing a power supply.

Taking an Output From a Third Party System
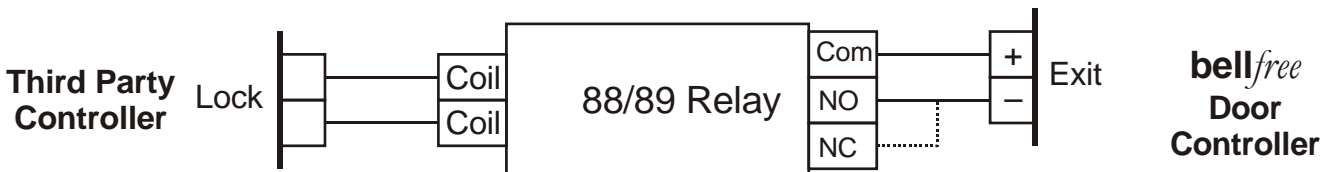
For 12V a.c. systems use an 88 relay and for 12 d.c. systems use an 89 relay. For systems with other lock voltages, a relay with a suitably rated coil will be required.

For systems with a fail safe output the common and normally closed contacts will be required.

# Diagram L – Combined Connections Third Party Lock

Connecting a Bell PAX1 Proximity Reader
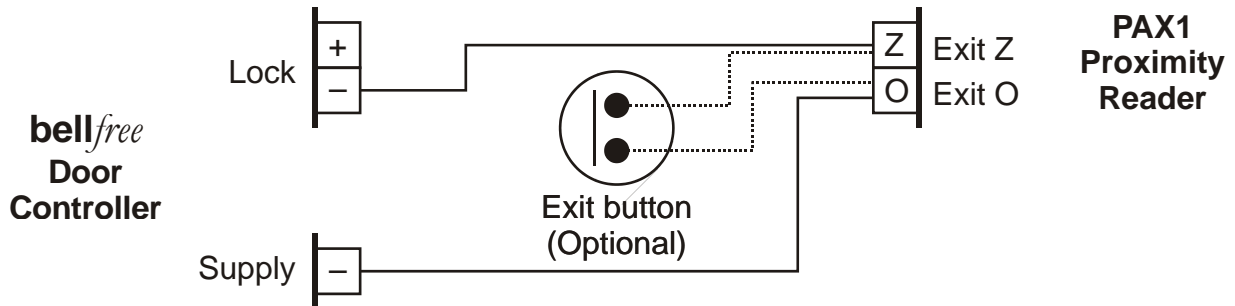
The bell*free* door controller is set to fail secure. The diagram assumes a common power supply, if not an extra wire will be required to connect the PAX1 Exit O to the bell*free* 12V-.

N.B. The power wiring to the PAX1 must be able to carry the lock current with less than 2V voltage drop.

### ACT 1000/2000/3000 Proximity Controller or 100e/200e Extender
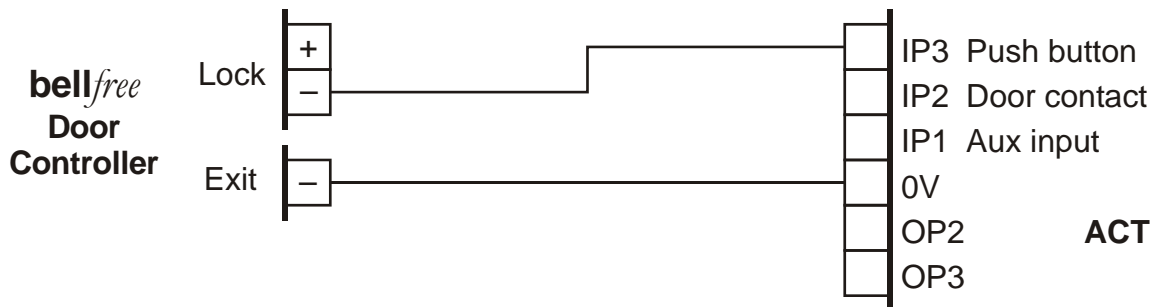
Notes

1. Connect the lock release or Maglock using the ACT Manuals.

2. Leave the bell*free* controller set to Fail Secure regardless of the type of release used.

3. A normally open exit button can still be fitted to the ACT controller in addition to the bell*free* wiring.

4. If the 2 units are not sharing a power supply, then a connection from bell*free* controller Exit- to ACT 0V will be required.

5. Look for the notes on the ACT installation diagram concerning the use of links when the door contact is not used and when a power supply without power fail is not used.
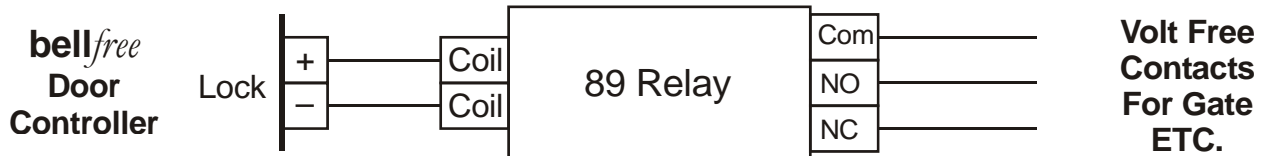
Diagram L – Continued

Connecting a Bellcode Coded Access Controller
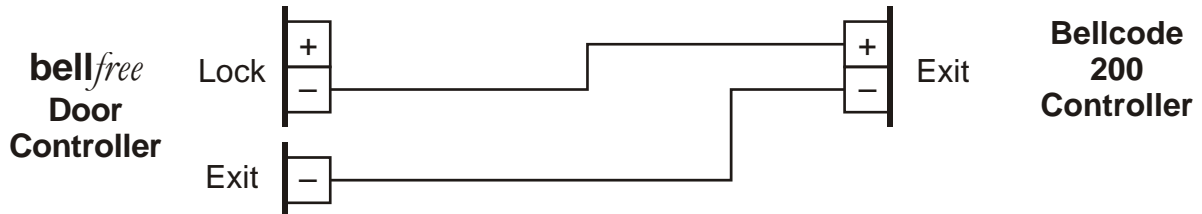
The bell*free* door controller is set to fail secure.

The Exit- to Exit- wire is only needed if the two units do not share a common power supply.

Opening a Gate or Locks on Third Party Systems

The bell*free* door controller is set to fail secure.

Use COM and NO or COM and NC as required for the gate controller or third party access system.

Safety Information and Declarations

Connections to the 240VAC mains supply must be carried out by a qualified electrician or similar competent person, and made in accordance with current legislative requirements. A two-pole switch (as provided by a Consumer Unit or Switch-Fuse) must be included to isolate both Live and Neutral during Installation or Maintenance. The circuit must be protected by a fuse or other current-limiting device, rated according to the capacity of the cable used, up to a maximum of 10A. Use only mains cable to BS6004 or equivalent, within the following specified limits:

	Min	**Max**
Conductor Diameter	1.0mm (0.8mm^2)	2.25mm (4mm^2)
Cable Diameter	4.0mm	8.0mm

Model 840 Power Supply (with battery standby)

The Model 840 power supply must be placed in a protected indoor environment such as an electrical cupboard. It must be secured to the wall with adequate fixings so that there is no possibility of it falling. The lead-acid battery for the standby power supply is shipped in separate packaging. It should only be connected once the system has been fully tested. Connection is made by 2 leads with spade terminals; observe the correct polarity – red to positive, black to negative. Care must be taken to ensure that the terminals of the battery are not shorted together by metal objects, as this may constitute a Fire Hazard. The Control Cabinet is IP55 rated (to exclude dust) and is vented to avoid the build-up of gases. Do not block any vents that may be apparent.

A good mains safety earth must be connected to the cabinet housing the power supply

Where the power supply is fitted with a replaceable internal mains fuse and or battery fuse, always replace with the same type as indicated on the power supply. The fuse must be approved to BS EN 60127 or equivalent.

Power Supply Model	**Mains Fuse (Time Delay)**	**Battery Fuse (Quick Blow)**
840	T2A 20mm HBC (HRC) Ceramic	F4A 20mm Glass

Model PS4 and 340C Power Supplies

These power supplies must be wall-mounted onto plasterboard, or a similar non-conductive material, in a protected indoor environment such as an electrical cupboard.

When fitting the power supply cable (both mains and low voltage) ensure the cable entry cut-outs in the enclosure lid are no larger than necessary for the cable diameter used and under no circumstances must they be taken beyond the outer cut-out zones.

Bell System (Telephones) Ltd.

Presley Way,

Crown Hill,

Milton Keynes

MK8 0ET.

Tel: 01908 261106 (Sales and Technical Support)

FAX: 01908 261116

        OR

        Local rate numbers

Tel: 0845 121 4008 (Sales and Technical Support)

FAX: 0845 121 4009

E-mail: sales@bellsystem.co.uk

         technical@bellsystem.co.uk

Website: www.bellsystem.co.uk

Standards

This product complies with European directive 89/336/EEC on

Electromagnetic Compatibility and Low Voltage Directive 72/23/EEC.

Emissions: Generic BSEN 61000-6-3

Immunity: Generic BSEN 61000-6-1

Low Voltage: Generic BSEN 60950

CE

BS EN ISO 9001:2008 Certificate number GB2000389