Operating Instructions
ZMX/BD/10
ZMX/BS/10
ZMX/CS/10
Multiplexers

Programming Instructions
ZMX/BD/10
ZMX/BS/10
ZMX/CS/10
Multiplexers

This page is intentionally blank

Passwords

This page contains the system passwords. It is recommend that, for system security, you remove it from the manual and store it in a safe place.

The initial password, supplied with the unit for the menu system, is:

Password 1, ⟨⟩, ⟨⟩, ⟨⟩

The password for resetting your multiplexer to the factory settings is:

Password 2, (4) (1) (1)

You should change the password for the menu system (password 1) and record it below for future reference.

Password

_____

This page is intentionally left blank

This Manual

This manual provides unpacking, safety and installation instructions for the ZMX/BS/10, ZMX/BD/10 and ZMX/CS/10 Multiplexers. It also describes making system settings, using the menu system.

Warning
   Important safety instructions are contained in section 1. These must be read before unpacking your multiplexer.

This manual is divided into five main sections:

Section 1, **Important Safeguards**, contains vital safety information, including the Low Voltage Directive and EMC declaration, WARNINGS and CAUTIONS which must be observed when installing the unit.

Section 2, **Installation Instructions**, contains instructions relating to unpacking, associated equipment, mounting, and making connections to the unit. This section includes rear panel connector layout illustrations and connector pinning information.

Section 3, **Programming**, describes the menu system, which allows access to the system settings.

Section 4, **Setting Up The System**, describes how to set up the system using the programming facilities.

Section 5, **Specification**, provides a brief technical specification.

This page is intentionally left blank

Contents

APPENDIX A RS-232 REMOTE PROTOCOL

APPENDIX B FLICKER ADJUSTMENT

1 Important Safeguards

This product is exclusively for use in CCTV applications and has no other purpose.

Read and Retain the Instructions - All the safety and operating instructions should be read before the unit is operated and should be retained for future reference.

Cleaning - Unplug the unit from the outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

Attachments - Do not use attachments not recommended by the product manufacturer as they may cause hazards.

Water and Moisture - Do not use this unit near water. For example, near a bathtub, wash bowl, kitchen sink, or laundry tub, in a wet basement, near a swimming pool, in an unprotected outdoor installation, or any area that is classified as a wet location.

Accessories - Do not place this unit on an unstable stand, tripod, bracket, or mount. The unit may fall, causing serious injury to a person and serious damage to the unit. Any mounting of the unit should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

Ventilation - Openings in the enclosure, if any, are provided for ventilation to ensure reliable operation of the unit and to protect it from overheating, these openings must not be blocked or covered. This unit should not be placed in a built-in installation unless proper ventilation is provided. Do not place directly on other hot equipment, because this may increase its operating temperature.

Power Sources - This unit should be operated only from the class 2 isolated power supply provided.

Plugs - This unit may be equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the plug.

Power-cord Protection - Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, and the point where they exit from the appliance.

Overloading - Do not overload outlets and extension cords as this can result in a risk of fire or electric shock.

Object and Liquid Entry – This equipment must be protected from the ingress of foreign materials. Never push objects of any kind into this unit through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the unit.

Servicing – There are no user-serviceable parts. Do not remove the covers as this may expose you to dangerous voltages or other hazards, including moving mechanical parts. Refer all servicing to qualified service personnel.

Replacement Parts - When replacement parts are required be sure the service technician has used the replacement parts specified by the manufacturer. Unauthorised substitutions may result in fire, electric shock or other hazards.

Safety Check - Upon completion of any service or repairs to this unit, ask the service technician to perform safety checks to determine that the unit is in proper operating condition.

Coax Grounding - If an outside cable system is connected to the unit, be sure the cable system is grounded.

Lightning - For added protection of this unit during a lightning storm, or when it is left unattended and unused for long periods, unplug it from the wall outlet and disconnect the cable system. This will prevent damage to the unit due to lightning and power-line surges.

1.1 Safety

If you have any problems then contact Baxall Limited.

WARNING
Installation is only to be carried out by competent, qualified and experienced personnel in accordance with the country of installation's National Wiring Regulations

WARNING
Your multiplexer contains no user-serviceable parts inside.

WARNING
This unit contains a lithium battery whose expected life is in excess of five years. If your multiplexer looses its settings each time it is switched off then the battery needs replacing. In this instance return your multiplexer to Baxall Limited and we will replace the battery.

WARNING
There is a danger of explosion if the lithium battery is incorrectly replaced. Replace only with the same or an equivalent type recommended by the manufacturer. Dispose of unused batteries according to the manufacturers instructions.

WARNING
Do NOT use the 12V power leads in the RS-485 cable UNLESS it is to be used on a one-to-one connection between a unit with 12V power and a unit with no 12V power. For example, from a multiplexer directly to a keyboard that does not have its own power source.

In all other circumstances, such as multi-dropped multiplexers, do NOT use the 12V power leads in the RS-485 cable, use only the two wires for the actual 485 communications.

Refer to Baxall Limited before using your multiplexer in a medical and/or intrinsically safe application.

Do not exceed the voltage and temperature limits given in the specification. Only operate your multiplexer in a clean, dry, dust-free environment.

Note
The multiplexer's main function is to multiplex video and its secondary function is to provide alarms. For this reason, Baxall Limited recommend that you do not use your multiplexer as the main alarm system on your site but install a dedicated intruder/fire alarm where necessary.

1.2 Damage Requiring Service

Unplug the unit from the outlet and refer servicing to qualified service personnel under the following conditions:

- When the power-supply cord or plug is damaged.

- If liquid has been spilled, or objects have fallen into the unit.

- If the unit has been exposed to rain or water.

- If the unit does not operate normally by following the operating instructions.

- If the unit has been dropped or the cabinet has been damaged.

- When the unit exhibits a distinct change in performance.

- If the unit has no power even when the power supply appears to operate correctly. If this is the case then ask a service engineer to test the internal fuse.

1.3 Safety and Electromagnetic Compatibility (EMC)

Do not operate the unit outside the voltage and temperature limits given in the specification.

WARNING
   To reduce the risk of electrical shock, do not open covers. There are no user serviceable parts inside. Refer servicing to qualified service personnel.

This product is intended for use in general purpose CCTV applications in a residential, commercial or light industrial EMC environment.

Refer to your agent before installing or using the product in medical and/or intrinsically safe applications or in an industrial EMC environment.

WARNING
   This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

The product must be installed in accordance with good installation practice to enable the product to function as intended and to prevent problems. Refer to your agent for installation guidance.

Contact your agent to obtain a specification defining the acceptable levels of product degradation with regard to EMC immunity.

1.4 Manufacturer's Declaration of Conformance

The manufacturer declares that the product supplied with this document is compliant with the essential protection requirements of the EMC directive 89/336 and the Low Voltage Directive LVD 73/23 EEC. Conforming to the requirements of standards EN 55022 for emissions, IEC801 parts 2, 3 and 4 for immunity and BS415 superseded by EN60950 for Electrical Equipment safety.

1.5 Year 2000 Conformity

This product, which contains date and time-aware components, has been tested in accordance with British Standards Institution, DISC PD2000-1, A Definition of Year 2000 Conformity Requirements, and complies with the four rules set out in the document.

Rule 1. No value for the current date will cause any interruption in operation.

Rule 2. Date-based functionality must behave consistently for dates prior to, during and after year 2000.

Rule 3. In all interfaces and data storage, the century in any date must be specified either explicitly or by unambiguous algorithms or inferencing rules.

Rule 4. Year 2000 must be recognised as a leap year.

This product uses a two digit year format, with the following inferencing rule:

      Displayed year = 00 to 89   Inferred year = 2000 to 2089
      Displayed year = 90 to 99   Inferred year = 1990 to 1999

The clock chip is a Dallas 1202.

2 Installation Instructions

This section describes the unpacking and installation of your multiplexer.

2.1 Unpacking

You should keep the original packing for use when the unit has to be stored or transported. The packaging should contain the following items:

- The multiplexer unit
- A mains power supply and lead
- An Operating Instructions manual
- This Programming Instructions manual

Carefully check the unit for signs of damage. If damage has occurred, please contact the supplier and the carrier immediately and do not attempt to use the equipment.

2.2 Associated Equipment

A typical system, using this multiplexer, could contain the following components:

- A monitor
- A VCR (Standard or S-VHS)
- Cameras with 1V pk-pk composite video outputs
- 75 ohm BNC connectors and video coaxial cable for connecting the video signals.
- S-VHS connectors and leads if you are using an S-VHS VCR
- A mains power outlet for your multiplexer which allows for secure isolation (your Multiplexer has no ON/OFF switch for security reasons) in accordance with your national wiring regulations.

2.3 Location

Ensure that the site's AC power supply is stable and within the rated voltage of the external 12V DC power supply. If the site's AC power is likely to have spikes or power dips, use power line conditioning or a UPS.

Ventilation: Ensure that the location planned for the installation of the unit is well ventilated. Take note of the locations of the cooling vents in the unit's enclosure, and ensure that they are not obstructed.

Temperature: Observe the unit's ambient temperature specifications when choosing an installation space. Extremes of heat or cold beyond the specified operating temperature limits may cause the unit to fail.

Do not install the unit on top of other hot equipment.

You can place your monitor on top of the multiplexer if it weighs less than 16 Kgs.

2.4 Description

The products described in this manual are:

- ZMX/BS/10, 10-way, Monochrome Simplex Multiplexer
- ZMX/BD/10, 10-way, Monochrome Duplex Multiplexer
- ZMX/CS/10, 10-way, Colour Simplex Multiplexer

You can check which particular model you have by looking at the label on the bottom right of the unit's front panel.

The models include many advanced features such as activity detection, alarm handling, digital zoom, an alarm history log, programmable macro function keys, a scheduler to automatically start macros at pre-set times, a simple Summer/Winter time change function, access to Rugby Clock time control, remote programming and remote control, and they can be set-up quickly using easy-to-use on-screen menus.

With all of the models, the front panel contains all the operator control keys and indicators, while the video inputs, video outputs, alarm inputs and outputs, and the remote control connectors are housed on the rear panel.

All the models have 12 V DC power and are supplied with external AC power supplies. The colour models can accept either colour or monochrome video inputs without any additional set-up.

In general, the programming instructions provided in this document apply to all of the above models unless stated otherwise.

The front panel for the 10 way colour simplex model is shown in Figure 1. The other models have the same keys and indicators except, in the case of the 16 way models, which have 16 instead of 10 camera keys.
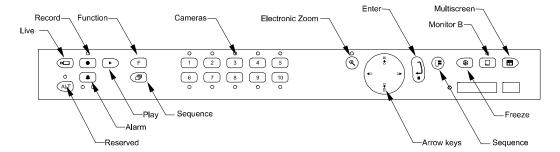

Figure 1 The multiplexer Front Panel

From an installation point of view the eight powerful MACRO style FUNCTIONS are useful to be able to control any or all the system settings with only 2 keystrokes.

2.5 Connections

The following instructions relate to the multiplexer only. Refer to the relevant instructions for the associated equipment.

All the connectors are on the back-panel of your multiplexer as shown in Figure 2. Your multiplexer has:

> 10 or 16 loop-through camera inputs (depending on the model) with automatic termination
>
> twin monitor outputs, Monitor-A and Monitor-B
>
> VCR input and output via BNC or S-VHS connectors
>
> 10 or 16 alarm-inputs (on a 25-way D-type connector) each of which can be normally-open (N/O) or normally-closed (N/C).
>
> RS-232 and RS-485 connectors (Rugby clock connection).

The 25-way D-type connector also has the contacts for the two alarm-output relays and a Vext input. The Vext input accepts a synchronising pulse-train from your VCR (see your VCR's instructions). This allows the multiplexer to follow automatically the time-lapse speeds of the VCR.
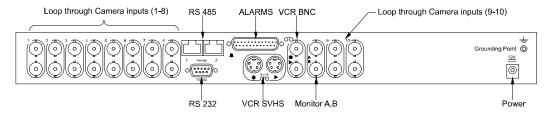

Figure 2 Multiplexer Back-Panel Connections

Camera Inputs

Use 75 ohm BNC connectors and video coaxial cable to connect to the camera input BNC sockets on the back of your multiplexer.

For each camera input there are a pair of BNC sockets, one for the camera input, the other for a looped through output. If you connect to both BNC sockets your multiplexer automatically removes the 75 ohm termination. If you use the loop through facility make sure that your application (e.g. a monitor or VCR) provides 75 ohm termination at the end of the line.

Connect up to your 10 or 16 camera inputs. You can use either the upper or the lower sockets.

Connect your loop through outputs to the through BNC socket in each pair.

If you have less than 10 or 16 cameras, you can disable individual camera inputs in the menu system, see page 27.

VCR

This consists of video connection and the Vext input (via a 25-way D-type connector, the synchronising pulse train from the VCR, connection.

For an S-VHS VCR, use 4-pin mini-din S-VHS connectors and leads. For a standard VCR use 75 ohm coaxial cable and BNC connectors.

If you are using S-VHS, then to get the full benefit, you must also select it in the VCR Setup menu.

Although the Vext connection is optional, by using it, you can automatically synchronise your VCR with the multiplexer. This simplifies the operation of your multiplexer. For connection to the Vext input, the Switch Input option must be used in the VCR Setup in the menu system.

Note
Some time-lapse VCRs do not transmit a Vext signal in 3 hour mode. In this case, if you are using the Vext input then select 3 hour mode in both the Alarm Record Speed and Normal Record Speed menu via the Record option in the main menu.

MUX - Record Output   VCR - Video In
                              S-VHS Connections
MUX - Play Input   VCR - Video Out

Figure 3 S-VHS VCR connections

MUX - Record Output   VCR - Video In
                              BNC Connections
MUX - Play Input   VCR - Video Out

Figure 4 Standard (BNC) VCR connections

Refer to your VCR instructions and connect:

VCR record output to the video in connector (or equivalent) on your VCR.

VCR play input to the video out connector (or equivalent) on your VCR.

The illustration indicates that the two leftmost connectors are VCR record outputs and the two right hand connectors are VCR play inputs (see Figures 3 and 4).

Monitor

Connect the MONITOR output using 75 ohm BNC connectors and video coaxial cable to your monitor(s) (see your monitor instructions).

When viewed from the rear of the unit, the left-hand connector is for Monitor-A and the right-hand is for Monitor-B.

Alarm Inputs And Outputs

25-way D-type Connector

Using the 25-way D-type connector, wire it according to the following instructions. Do not attempt to wire directly to the socket on the back-panel.

Figure 5 The 25-way D-type Connector Numbering

Figure 5 shows the connector, looking towards the rear panel. The numbers are labelled on the connector itself although they may be difficult to read.

Connections	Pin numbers
Alarm inputs 1 to 10; or 1 to 16	pins 1 to 10 (or 16)
Alarm-output 1 - connection (selectable N/O or N/C)	pin 17
Ground connections - (alarms and Vext inputs)	pins 18 to 20
Alarm-output 1 - common ground connection	pin 21
Alarm-output 2 - connection (selectable N/O or N/C)	pin 22
External alarm clear (pull to ground to clear)	pin 23
Vext, VCR synchronisation pulse-train	pin 24
Alarm-output 2 - common ground connection	pin 25

Table 1 25-way D-type Connections

Alarm Inputs

Each alarm input line can be triggered by a relay contact from devices such as pressure-pads, passive infrareds, smoke detectors etc. (refer to the relevant instructions).

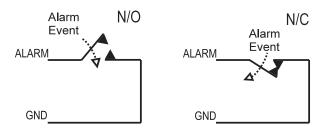The alarms are disabled while the menu system is active.

Figure 6 Normally-Open and Normally-Closed Connections

Alarm Outputs

Note
Do not exceed 30V AC/DC, 500 mA on an alarm-output relay.

The contacts must not be used at mains voltages.

The alarm output relays can be programmed in the menu system to respond to macro-functions, alarms and video-loss. The relays are active (see Figure 7) for the duration of the driving event.

Connect your application to the alarm-output relays (resistive loads only).
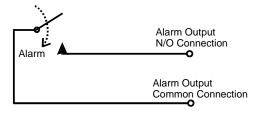

Figure 7 Alarm-Output Relays, Internal Circuitry

External Alarm Clear

You can use the External Alarm Clear to clear alarms by connecting it to ground on pins 18, 19 and 20. Clearing an alarm only clears the LED and the keyboard buzzer. The alarm output relay is always active for the duration of the alarm input. If the alarms are selected as latched or timed-out in the Alarms menu then the alarm-output can remain active after the alarm input has reset.

Vext Input

The Vext input (camera switch input) is for connection from the VCR to your multiplexer. The VCR uses it to tell the multiplexer each time it has recorded an image. The multiplexer then transmits the next image on its VCR record output (video-in on the VCR). By this mechanism the VCR can control the multiplexers recording speed.

Connect the Vext input (pin 24) and one of the ground pins to your VCR.

This facility is often referred to as a camera switch output, or similar, (see your VCR instructions.) It is especially useful on VCRs with dual recording speeds (alarm and normal) because the multiplexer will automatically follow.

Note
Some VCRs do not transmit a Vext in 3 hour mode. To ensure that this does not affect you, set the recording speeds for alarms and normal operation to be the same in the RECORD menu.

The Vext input accepts:

- TTL, field-synchronised, negative going pulse, duration 2-5 ms
- HIGH level, +4.5V to +5.5V
- LOW level, 0V

The multiplexer can be set to trigger off the negative or positive going edge (Vext Pulse Edge in the Record menu). There is also an option to allow compatibility with some older types of VCR (VCR type A and type B compatibility, also in the Record menu).

Check this against your VCR specification before using it.

Power

The multiplexer is supplied with a 12V DC class 2 output, auto-ranging: 110/230V AC ± 10%, 50Hz, input, external power supply. Its maximum power consumption is 20W.

Do not use any other power supply.

Do not connect the power until you have read the section Power-Up and Tests.

Following the wiring instructions on the label attached to the mains lead, attach a suitable three pin plug.

Note
The manufacturer accepts no responsibility for any damage caused by the use of any other power supply.

3 Programming Facilities

This section describes the facilities provided for programming your multiplexer using the menu system.

Note

The ALARM key ⬜ is disabled while the menu system is active.

3.1 Initial Actions After Switching On

The first time that your multiplexer is switched on, the default password for the menu system is set to password 1 (given on the removable page at the front of these instructions.) This is also true if you have reset to Factory Settings.

Once your installation is complete, turn on the power. Your multiplexer will start by displaying the software version and then a multi-screen display on Monitor-A. If you have previously changed any settings in the Menu system, your settings are still stored while the power is off and are now current.

Power-Up and Tests

Note

Read all the operating instructions before operating the unit.

- Power up all the cameras and the monitor, and only then power up the unit by plugging in the 12V DC class 2 isolated supply.

- With the unit in record mode, select each camera, full-screen, and check the picture quality. This is live video. If the picture quality is poor, check the loop-through terminations, the levels of incoming signals and ground loops.

- Record/Play quality: Record for 3 minutes at normal VCR speed (3 hour mode) and then play back the recordings, selecting each camera in turn. Check the playback picture quality. Ensure that the VCR's tracking adjustment is correct.

- For advice on setting-up cameras refer to your camera installation instructions.

- Test the VCR Vext switch pulse connection to the unit by setting the unit to Record mode, starting the VCR recording and then changing the VCR record speed on the VCR front panel. Play back the recording and observe that the unit displays **Pext** in the top right corner of your monitor.

- Alarms: Activate an alarm and observe that the programmed alarm actions take place, the buzzer sounds and the alarm LED flashes.

3.2 Using The Menu System

Your multiplexer provides user-friendly, on-screen menus for setting up the system. As an alternative to on-screen programming in the menus, the options can be downloaded via the RS-232 port from a central controller or PC. The protocols for this are given in Appendix A.

To enter the menu system, press the MENU key ⊕ and enter the 3-key password. The password is set to password 1 in the front of this manual when the unit is shipped. You should change the password (using the menu system) and remove the password page from the front of this manual to prevent unauthorised use of the menu system.

Caution: Simplex Units
   The menu operation will *stop* RECORD mode on *simplex* units if the password is correctly entered. Ensure that it is appropriate to *stop all recording* before entering the password.

The MAIN menu bar will appear once the correct password has been entered.

```
  Main  Quick-Setup
```

Navigating The Menu System

You have three menu levels, designed in such a way as to make it very easy to navigate around the menu choices. The best way to understand the menu system is to use it, with this manual handy for reference.

In general, the ENTER key ⤵ is used to go to the next level of menu, and the MENU key ⊕ is used to 'escape' to the previous level of the menus without making any changes.

You have access to the following menu levels:

Main Menu Level
This is a list of all sub-menus, each of which you can access.   The sub-menus are arranged into logical menu sections. To access a sub-menu from the Main menu, use the arrow keys ⟳ to select the desired section and then press the ENTER key⤵.

Pull-down Menus
Pull-down menus are the first sub-menu level. If additional choices are available in that sub-menu, typically these are made in Pop-up menus. Pull-down menus can be exited either by selecting Exit and then pressing the ENTER key⤵, or by pressing the MENU key ⊕.

Pop-up Menus
Pop-up menus are the last level in the menu system. In general, use the left/right arrow keys ⊙ to select sections in the Pop-up menu and then use the up/down arrow keys ⊙ to make changes to the values. There are, however, some Pop-up menus where the arrow keys have additional functionality.

In Pop-up menus, there are no EXIT selections.

To exit a Pop-up menu without making any changes, press the MENU key ⊕ or else select [CANCEL] and press the ENTER key. To exit and save the changes made, select [OK] and press the ENTER key.

CAUTION: Pressing MENU to exit from a sub-menu will *not* save the changes made in that sub-menu. The MENU key ⊕ is the same as CANCEL.

The Available Menus

The Menu Bar enables you to select Main or Quick-Setup. To do this highlight the one that you want using the left or right arrow keys ⊙ and press ENTER.

If you select Main, the main Menu is displayed. If you select Quick-Setup, the Quick-Setup menu is displayed.

The Main Menu

The Main Menu gives you access to all the programmable options, in logical sub-sections.

The programmable options provided are described in detail in section 3.3. You should read the corresponding section in the manual *before* starting to program the options in the menus.

The main menu has the following options:

```
Time/Date
Sequencing
Record

Camera Titles
Alarms
Macro
Motion Detection
Camera AGC

Communications
Camera Enable
Videoloss Action
Playback Format
VCR Setup
Factory Settings
Change Password

Exit
```

Time/Date

This option lets you specify whether the data and time are to be displayed on Monitor A and Monitor B, and what format is to be used. You can also set the time and date. You get the following pull-down menu:

```
Time/Date display
Set Time Format
Set Date Format
Set Time
Set Date

Exit
```

Sequencing

This option is used to specify the full-screen sequence list (as displayed when the SEQUENCE key ⊕ is pressed), the multi-screen dwell time (for the sequencing cameo in multi-screen mode) and the full-screen dwell time. You get the following pull-down menu:

```
Fullscreen Sequence List
Multiscreen Dwell
Fullscreen Dwell

Exit
```

Note
   You cannot edit the sequence list for cameo sequencing.

Record

This option is used to specify the order in which images are to be captured from the different input cameras. You can specify the normal record speed for the VCR, the alarm record speed, and whether or not Record Lock is to be used (for simplex models). You get the following pull-down menu:

```
Record List
Normal Record Speed
Alarm Record Speed
Record Mode Lock

Exit
```

Camera Titles

This option is used to specify whether camera titles are to be displayed on monitor A and B, and to edit those titles for each camera. You get the following pull-down menu:

```
Title Display
Edit Titles

Exit
```

Alarms

This option is used to specify whether the alarm input for each camera is normally open or normally closed and whether the alarms are latched, transparent or timed out. You can specify how the images from the alarmed cameras are to be recorded (interleaved, exclusive or no change) and whether some or all of the alarms are to be enabled or disabled. You can view the alarm history for the last 100 alarms and specify whether the alarm output relays are normally open or normally closed. You get the following pull-down menu:

```
Input Configuration
Alarm Latch
Record Mode
Enable / Disable
Alarm History
Relay Configuration

Exit
```

Macro

This option is used to specify macros and to set up the details for timed macros. You get the following pull-down menu:

```
Macro Record
Timed Macro Start

Exit
```

Motion Detection

This option is used to specify whether motion detection is enabled for individual or all the cameras. For each camera, you can specify which zones in the camera's view are to be active for motion detection. You can specify whether a motion detection indicator is to be displayed on the monitor and for each camera, the motion detection sensitivity, record rate and output relay to be used. You get the following pull-down menu:

```
Enable / Disable Detection
Setup Active Zones
Indicate Detection

Setup Parameters

Exit
```

Camera AGC

This option is used to specify the signal gain to be used for each camera. You get the following pull-down menu:

```
Signal Gain Setup

Camera : 01

  Gain :  05

[CANCEL]    [OK]
```
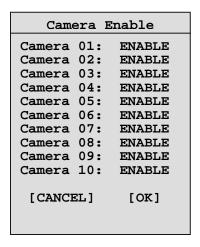
Communications

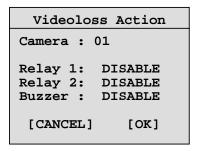This option is used to specify the communications baud rate to be used. You get the following pull-down menu:

```
RS232

Exit
```

Camera Enable

This option is used to specify which cameras are enabled or disabled. You get the following pull-down menu:

```
┌─────────────────────────┐
│     Camera Enable       │
├─────────────────────────┤
│ Camera 01:   ENABLE     │
│ Camera 02:   ENABLE     │
│ Camera 03:   ENABLE     │
│ Camera 04:   ENABLE     │
│ Camera 05:   ENABLE     │
│ Camera 06:   ENABLE     │
│ Camera 07:   ENABLE     │
│ Camera 08:   ENABLE     │
│ Camera 09:   ENABLE     │
│ Camera 10:   ENABLE     │
│                         │
│   [CANCEL]     [OK]     │
│                         │
└─────────────────────────┘
```
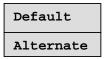
Videoloss Action

This option is used to specify what is to happen in the event of loss of a video input. You get the following pull-down menu:

```
┌─────────────────────────┐
│    Videoloss Action     │
├─────────────────────────┤
│ Camera : 01             │
│                         │
│ Relay 1:   DISABLE      │
│ Relay 2:   DISABLE      │
│ Buzzer :   DISABLE      │
│                         │
│   [CANCEL]     [OK]     │
└─────────────────────────┘
```

Playback Format

This option is used to specify the playback format for a multiplexed tape. You get the following pull-down menu:

```
┌───────────────────┐
│     Default       │
├───────────────────┤
│     Alternate     │
└───────────────────┘
```
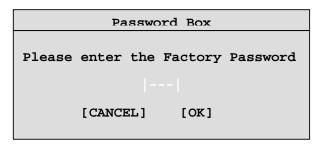
VCR Setup

This option is used to specify the type of VCR that is connected to the multiplexer. You specify whether it is type A or B, SVHS or composite, whether it has switch input and whether it has a negative or a positive leading edge. You get the following pull-down menu:

```
VCR Type A/B
SVHS/Composite
Switch Input ON/OFF
Switch Edge

Exit
```

Factory Settings

This option is used to specify that the multiplexer is to be reset with the factory settings. You get the following password box:

```
            Password Box

  Please enter the Factory Password

              |---|

         [CANCEL]    [OK]
```

You must enter the correct password to reset to the factory settings.

Change Password

This option is used to change the password for the menu system. You get the following password box:

```
            Password Box

          Enter a new Password

              |---|

         [CANCEL]    [OK]
```

When you have entered a new password, a confirmation box is displayed where you must specify the same password again. You should note the new password on the Password page of this document, which should be removed and stored in a safe place.

Exit

This option is used to exit from the menu system.

Quick-Setup Menu

The Quick-Setup menu gives you a quick way to change the time and date, and to edit the titles for each camera. You can set the normal record speed and the playback format and specify whether the connected VCR is composite or SVHS (colour units only). This allows for a quick minimal installation set up. You get the following pull-down menu:

```
Change the time
Change the date
Edit Camera Titles
Normal Record Speed
Playback Format
SVHS/Composite

Exit
```

Battery Backed-Up Memory For The Menu Options

Menu option selections are automatically saved to battery backed-up memory as they are made.

In general, the battery has a 5 year shelf life and can retain memory in the unit even if the unit is powered down for several months. If a unit is to be powered down for an extended time (3 months or longer) then the battery should be removed during power down, and replaced when the unit is ready to be put back into service. Alternatively, install a new battery when a unit has been powered down for an extended time.

Warning
   Battery installation must be done only by qualified personnel.
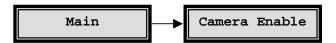
Note
All the data will be lost if the battery is removed, and the system will revert to the factory defaults.

Your Multiplexer stores your settings as you make them in non-volatile memory. This means that you can exit the MENU system at any time and you will not lose your settings, provided you have already selected OK where appropriate, and pressed the ENTER key🖑.

3.3 Setting Up The System

This section describes the use of the programming facilities introduced in section 3.

Camera Enable/Disable

Main	→	Camera Enable

If a camera is not installed, then the continual display of the on-screen videoloss indicator **V** can distract an operator. In addition, unnecessary time must be spent to remove the camera from the sequence lists and the record lists. The multiplexer takes care of this situation with one setting.

The multiplexer allows the user to set inactive cameras as DISABLED via a menu setting, so that videoloss indications are not shown. In addition, disabled cameras are automatically removed from all programmable sequence lists and the Record list.

Besides being used for cameras which are not installed, this feature is also very useful when a camera is undergoing maintenance, or has a temporary fault.

Note
The disabled setting does not affect cameras shown on Monitor-A during PLAY mode.

Recording

RECORD mode, is selected by pressing the RECORD key ⊙.

Record Mode on Simplex and Duplex Multiplexers

On a simplex multiplexer, RECORD mode is one of the three possible modes.

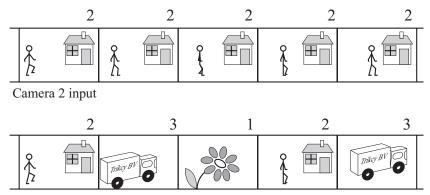RECORD mode must be activated by pressing the RECORD key ⊙.

On a duplex multiplexer, RECORD mode is always active in the background. It is not necessary to press the RECORD key since multiplexed recording will continue even if LIVE mode or PLAY mode are selected.

How Multiplexed Recording Works

To record several camera inputs on one video output, single images are digitally captured from each of the video input channels and then stacked consecutively to form a continuous video signal of time-sliced camera images. The time-slicing of several inputs onto one output is generally known as Time Division Multiplexing (TDM). Time base correction is performed during digital capture and so input cameras need not be synchronised.

The order in which the images are captured from the different input cameras is controlled by a user-programmed VCR record list (see page 31), which can be automatically modified by the system in the event of alarms or motion detection.

The multiplexed video fields can then be recorded onto a single VCR via the VCR OUT connector.

Camera 2 input

Cameras 1, 2 and 3 multiplexed to tape

Figure 8 Example of 3 Multiplexed Inputs

In addition to the video content sent to the VCR in each image, a packet of digital data which uniquely identifies the field is inserted into each image sent to the VCR. This packet data is not visible in the normal video and is used in the playback mode to recognise the incoming fields and to link them back to the original camera input from which they were captured. Besides the camera number, other status information stored in this packet of digital data includes time and date, camera status, camera title, time-lapse mode information as well as system and alarm status at the time of recording. This status information, during playback, is reconstructed and displayed with the corresponding camera. On playback, you can select one of several screen formats for display and also choose which cameras to display, in which position in a multi-screen display.

VCR Record List

You can program a Record List using the Menu System, which controls the sequence in which the single fields from each camera are multiplexed to the VCR during RECORD mode.

This list can consist of up to 30 camera numbers, in any order. This allows the same camera number to be repeated in the list as required.

The list can contain any camera several times. For example, if the list is set to the equivalent of "1 2 3 3 3 4 5 6 7 8 5__", then camera 3 will be recorded once in the record list cycle, but for three times the selected dwell time, and camera 5 will be recorded twice in the cycle. For a multiplexer, the programming for camera 5 is the preferred way to repeat a camera because it results in more evenly spaced updates for that camera.

A blank entry ends the list. For example a list set to the equivalent of "1 2 3 _ 5 6 7 _" will only record cameras 1, 2 and 3. The first 'blank' after the '3' ends the list.

Automatic Modification Of The Record List

The multiplexer will automatically modify the list in the case of alarms and/or motion detection, according to the modification parameters selected by you in the Alarm and Motion Detection menus. For example, you can select 'interleaved recording' on alarm. In this case, a camera in alarm will be recorded in virtual real time.

Note
> If alarms and motion detection occur at the same time, the alarm's modifications to the record list will take precedence and will cancel all modifications made to the record list via motion detection. Refer to the Alarm and Motion Detection sections in this manual for more detail.

VCR Programming

```
┌──────────────┐      ┌──────────────┐      ┌──────────────────────────┐
│     Main     │ ───▶ │    Record    │ ───▶ │  Normal Record Speed     │
│              │      │              │      │  Alarm Record Speed      │
└──────────────┘      └──────────────┘      └──────────────────────────┘
```

Note
> The multiplexer does not control the set up of the VCR itself. You must ensure that the VCR is correctly programmed and has correct alarm inputs.

Unless the Vext input (see below) is used, it is important that the multiplexer is programmed with the same record speeds as those to which the VCR has been set for normal and alarm recording. The multiplexer programming menus provide a simple interface for accomplishing this.

A VCR Camera Switch Input (or Vext) is also provided on the multiplexer, which automatically adjusts the speeds to coincide with the VCR operation. In this case, the multiplexer's recording speed need not be programmed.

Time-lapse VCRs are usually capable of dual speed operation, allowing two different speeds of recording during normal operation and alarm situations. This allows faster updates to be recorded in an alarm condition.

If the VCR switch input is not active, then the record speeds in the multiplexer menus must match those set in the VCR.

The record speeds can be programmed in the Normal Record Speed and Alarm Record Speed sections of the Record sub-menu. The factory default settings are 3 hour (NORMAL) and 3 hour (ALARM)

VCR Camera Switch Input (Vext)

Main	→	VCR Setup	→	Switch Input ON/OFF

Most time-lapse VCRs provide a hard-wired, pulse output to devices such as the multiplexer, indicating that the VCR has just completed recording of one image of the current camera. This lets the multiplexer know that it can switch to a new camera input. This feature simplifies your installation since it automatically takes care of synchronising the normal and alarm record speeds of the multiplexer with those of the time lapse VCR. No VCR speeds then need to be set up in the multiplexer menus, only on the VCR itself.

Provision is made for the VCR Camera Switch/Vext Input on the 25-way D-type alarm connector on the rear panel of the multiplexer. An auto-detection circuit in the multiplexer determines if this input is active, and automatically responds to it in the RECORD mode, if the switch input detection is enabled in the menus.

The factory default setting is ENABLED, which allows the autodetection circuit to operate. This is the recommended setting.
An on-screen **R EXT** indicator replaces the Record Speed indicator while this switch input is active and detected by the multiplexer.

Note

On power up, the autodetection circuit will wait about 15 seconds to check if the VCR starts to output a switch pulse. The period of 15 seconds is approximately the period between switch pulses when the VCR is running in 960 hour mode. During this brief time, the multiplexer will not switch cameras at all, unless a switch pulse is detected. If the switch pulse ceases, the multiplexer will also take about 15 seconds to determine that it has in fact stopped and not just changed to 960 hour mode.

Switch Edge

Main	→	VCR Setup	→	Switch Edge

The menus provide a selection for the pulse edge used for the Switch/Vext input. Do not change this setting without first consulting Customer Support.

Monitor Outputs In Record Mode

MONITOR-A Output While Recording

On a duplex unit, you can select LIVE or PLAY mode while recording is taking place. Hence you can select any desired Monitor-A multi-screen output on a duplex unit, while multiplexed recording takes place on the VCR output. Monitor-A images can be frozen.

On a simplex unit, Monitor-A only displays analogue, full-screen images while RECORD mode is selected, and Monitor-B follows Monitor-A.

During recording, the multiplexer indicates the speed at which it is recording on Monitor-A. It uses the same time-format for the indicator as is generally used by time lapse VCRs. For example, **R024** will be displayed to indicate that the unit is **R**ecording in **24 hour** mode. If the VCR Switch Input is active, then **R EXT** will be displayed.

On a simplex unit, this indicator will only be seen in RECORD mode. On a duplex unit, this indicator will be visible in all modes.

Monitor-B Output While Recording

The Monitor-B monitor always displays analogue live, full-screen images of the camera inputs, regardless of which mode is selected. The display can also sequence.

Alarm Displays On Monitor B

The flashing indicator, **ALM**, is displayed in the live image for the camera in alarm.

On a simplex unit in RECORD mode, the Monitor-A and the Monitor-B outputs are the same, and both will automatically switch to a full-screen live display of a camera in alarm. Multiple simultaneous alarms cause the display to sequence between alarmed cameras, with a fixed dwell time of 1 second.

Note
   During RECORD mode, the alarm image on a simplex unit cannot be frozen on Monitor-A.

Recording With Live Mode Selected On A Simplex Multiplexer

On the simplex unit, the unit's VCR output during the LIVE mode is identical to the Monitor-A, with the on-screen text present at that time. There will be no multiplexed recording, and no digital data identifying each field.

On the duplex model, normal multiplexed recording can take place from the VCR output even when LIVE mode is selected.

Record Mode Lock On A Simplex Multiplexer

Main	→	Record	→	Record Mode Lock

This function does not apply to duplex models as they are always in RECORD mode. On the simplex unit, it is often required that recording cannot be stopped by the operator, either deliberately or in error. Recording will be stopped when switching to LIVE or PLAY modes. To prevent recording being stopped, RECORD mode can be locked ON in the menus, which are password protected. If power is lost to the unit while RECORD mode is locked ON, then instead of powering up in the LIVE mode, the unit will automatically revert to RECORD mode when power is restored.

VCR Type A / B

```
┌─────────────────┐     ┌─────────────────┐     ┌─────────────────┐
│      Main       │ ──▶ │    VCR Setup    │ ──▶ │   VCR Type A/B  │
└─────────────────┘     └─────────────────┘     └─────────────────┘
```

There are two basic types of time lapse VCRs. The multiplexer is designed to operate with all commonly available time lapse VCRs (type A). There are some less common VCRs (type B) which use a shorter interval between captured fields, which can result in excessive duplication of cameras during normal recording.

Note
   Do not change from type A to type B unless you have been advised to do so by your supplier.

Live Video Display

To select LIVE mode, press the LIVE key 🖿.

The term 'LIVE mode' refers to the live Monitor-A digital displays, typically multi-screen displays of several cameras. The digital zoom and freeze can be used on digital images.

In LIVE mode, Monitor-A displays multi-screen images of several cameras in formats that you can select. Regardless of the mode selected, Monitor-B only displays live analogue full-screen images of one camera at a time and so cannot be digitally frozen or zoomed.

Live Mode - Monitor-A Displays

There are several different displays that you can select on the Monitor-A multi-screen output during LIVE mode. These range from pics-in-pics (PIP) to a 4x4 display of 16 cameras (depending on the model) and full-screen for a selected camera.

If a multi-screen does not have all the cameras displayed, the system can sequence all remaining cameras in the last cameo.

You can also select a full-screen digital display of any of the input cameras and a sequenced display of full-screen cameras.

To select different Multi-screen displays press the MULTI-SCREEN key 🖽 on the front panel.
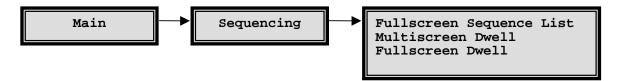
Each time the key is pressed, a new multi-screen format is selected. The order in which the multi-screens will appear each time the MULTI-SCREEN key is pressed is as follows:

Multi-screen			Notes
16-WAY	(4X4)		16-way multiplexers only
13-WAY	(1X12)		16-way multiplexers only
10-WAY	(2X8)		
9-WAY	(3X3)		
7-WAY	(3X4)		
QUAD	(2X2)		
PIP	(1 in 1)		
16-WAY (repeats from top of list)			

Sequencing In Cameos

Press the SEQUENCE key ⊡ while in Live multi-screen mode to automatically sequence all the undisplayed cameras in the lower right cameo. The cameo sequence list cannot be edited.

Multi-Screen Dwell Time

```
┌─────────────────────┐      ┌─────────────────────┐      ┌──────────────────────────────┐
│        Main         │ ───► │     Sequencing      │ ───► │  Fullscreen Sequence List    │
│                     │      │                     │      │  Multiscreen Dwell           │
└─────────────────────┘      └─────────────────────┘      │  Fullscreen Dwell            │
                                                          └──────────────────────────────┘
```

The dwell time for sequences can be specified in the Sequencing sub-menu of the menu system.

Automatic Camera Location Memory

If you have set up the camera numbers and locations which are to be displayed in a particular multi-screen, then the unit will automatically save that selection and will display the same camera selection and locations each time that particular multi-screen is selected. This is saved in volatile memory.

For example, if cameras 9, 4, 7 and 2 are selected for the quad multi-screen, then whenever you select the quad multi-screen, those cameras will be displayed, and in the same quadrants as you originally selected.

Automatic Multi-Screen Format Memory

If you switch from a multi-screen display to a full-screen camera image, then when the MULTI-SCREEN key is next pressed, you will automatically return to the last multi-screen format that was being viewed.

Set-up Of Cameras In Multi-Screen Displays

Any camera can be displayed in any position in the multiplexer multi-screen displays. The default multi-screen displays show the cameras in ascending order. In LIVE mode, you can display one camera in more than one position, while in PLAY mode each camera can be displayed once only on each multi-screen.

To make it simple for you to select any camera for display in any cameo in a LIVE multi-screen, the multiplexer uses the concept of **Active Cameos**.

Note
   Active cameos are not allowed in a 16-way playback multi-screen on a 10-way unit.

An active cameo is simply an on-screen indication of which particular cameo will be affected by the next front panel keystroke. Active cameos are used mainly to give you a simple way of specifying which camera is to be displayed in which cameo, but other useful functions such as cameo freeze and zoom to full-screen are also available.

An active cameo will only be present if you specifically select active cameo mode.

Press the ENTER key ✍ while displaying any multi-screen. The top left cameo will be the initial active cameo.

The active cameo is indicated by flashing the camera number and its title. You can use the ARROW keys to move to a particular cameo, and press a camera key to add a camera to it. When a camera has been selected, the next cameo in the multi-screen becomes active. When you have finished, press the ENTER key ◌.

Key Functions During ACTIVE CAMEO Mode

Key	Function
Arrow key ◌	Moves the active cameo around the multi-screen.
Camera key ⑨	Selects which camera to display in the active cameo. The active cameo will then automatically advance to the next logical cameo on the right so that you can easily enter camera numbers in several cameos without using the arrow keys.
FREEZE key ❄	Freezes the cameo.
ZOOM key ⊕	Switches to a full-screen display of that camera. This will cancel active cameo mode.

Notes
   If the ZOOM key is pressed with no active cameo selected, then the display will switch full-screen to the camera displayed in the top left cameo.

Live Mode - Full-Screen Displays On Monitor-A

Resolution of Full-screen displays (Colour models)

You can switch the resolution of digital full-screen displays from 'frame' displays to 'field' displays on Colour models. The lower resolution 'field' displays can result in less 'flickering' on some high contrast camera scenes.

To switch between 'field' resolution and 'frame' resolution on a full-screen display, press the camera number key of the camera which is already being displayed full-screen. The display will toggle its resolution each time the key is pressed.

Note
   This is a global system setting, not a camera-by-camera setting.
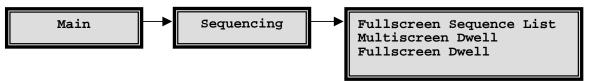
Field Or Frame Indication (Colour Models)

A minus sign (**-**) will be displayed next to the time / date display of camera 1 only to indicate that 'field' resolution has been selected. The indicator is removed if 'frame' resolution has been selected.

Full-screen display

A full-screen display of any camera is selected on Monitor-A by pressing the corresponding camera key.

Full-Screen Sequence List

Main	→	Sequencing	→	Fullscreen Sequence List Multiscreen Dwell Fullscreen Dwell

There is one full-screen sequence list which operates on both Monitor-A and Monitor-B. The list has 30 entries.

The list is 30 entries long so that it can contain any camera several times. For example, if the list is set to the equivalent of "1 2 3 3 3 4 5 6 7 8 5 __", then camera 3 will be displayed once in the sequence cycle, but for three times the selected dwell time, and camera 5 will be displayed twice in the sequence cycle.

A blank entry ends the list. For example a list set to the equivalent of "1 2 3 _ 5 6 7 _" will only sequence between cameras 1, 2 and 3. The first 'blank' after the '3' ends the sequence list.

Factory Default

The default full-screen sequence list contains all cameras. This default list will display each camera for the default dwell time of 3 seconds in each cycle.

Full Screen Sequencing On Monitor-A

Select any full screen display by pressing the camera number, and then press the SEQUENCE key.

Pressing the SEQUENCE key ⏺ again, pressing any camera key, or pressing the MULTI-SCREEN key ⏹, will stop the sequence.

Live Mode - Monitor-B Displays

Monitor-B is a full-screen, live analogue display of the camera inputs. It displays only full-screen, live images, regardless of the mode selected.

You can select a fixed display of any one camera on Monitor-B, or a sequenced display of several cameras according to the full-screen sequence list specified by you in the menus.

To operate on Monitor-B, the Monitor-B key must be pressed first. Text on Monitor-A indicates that Monitor-B is selected. The LED in the Monitor-B key will light, and while the LED is lit, any keys pressed will affect Monitor-B and not Monitor-A. Pressing the

Monitor-B key again will switch off the LED and subsequent keys will operate on Monitor-A.

Refer to the description of the full-screen sequence list above for Monitor-A (see page 39). The same list is used for both Monitor-A and Monitor-B, and for LIVE and PLAY modes.

Dwell Time

The full-screen, dwell time is set in the Sequencing sub-menu under the Full-Screen Dwell option . The same dwell time is used for both Monitor-A and Monitor-B, and for LIVE and PLAY modes.

PIP Display - Size And Position

The PIP (picture-in-picture) display on Monitor-A can be displayed in one of three sizes (two for monochrome units in PLAY mode), and it can be displayed in one of two positions.

The sizes can be 1/4, 1/9, or 1/16 of full-screen for Colour units, and 1/4 or 1/16 for mono units in PLAY mode.

The PIP can either be displayed on the lower right hand side of the display, or else on the top left hand side of the display.

Changing The PIP Size And Position In LIVE Mode

The PIP size and position can be changed during LIVE mode by using the arrow keys ⟳. The up and down arrow keys will change its position, and the left and right arrows will change its size, left being smaller and right being larger.

Editing Titles, Changing Positions And Colours

Main	→	Camera Titles	→	Edit Titles
Quick-Setup	→	Edit Camera Titles		

To edit the camera titles, use the Camera Titles sub-menu in the menu. The factory defaults show the camera titles as Camera 1 - Camera n.

Titles can be displayed either at the top or at the bottom of the camera view, or the titles can be switched off. The titles can also be displayed as black, grey, or white characters. This feature is selectable for each camera during either LIVE or PLAY modes.

Select a full-screen view of that camera on Monitor-A, and then press ENTER to toggle the title position and Colour. You can select one of seven options for each camera.

The following cycle will be followed as the ENTER key 🖑 is pressed:

Position	Colour
Top	black
Top	grey
Top	white
Do not display this camera title	
Bottom	black
Bottom	grey
Bottom	white
Do not display this camera title	
Top	black (repeats from top of list)
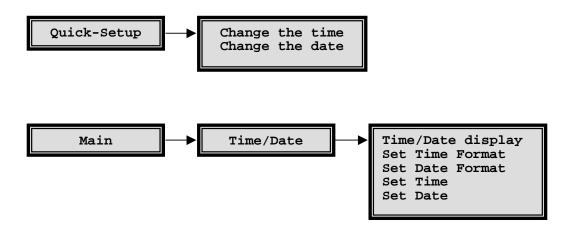
Notes

This setting affects only the Monitor-A display. Text on the Monitor-B display is not moved.

Note that the title display can be turned ON or OFF for each camera via the Camera Titles sub-menu. This is effective in both LIVE and PLAY modes.

Editing The Time and Date, and Changing The Colours

To edit the time and date, use the Quick-Setup menu or the Time / Date sub-menu from the Main menu.

```
┌──────────────┐      ┌──────────────────┐
│ Quick-Setup  │ ───▶ │ Change the time  │
└──────────────┘      │ Change the date  │
                      └──────────────────┘
```

```
┌──────────────┐    ┌──────────────┐    ┌────────────────────┐
│    Main      │──▶ │  Time/Date   │──▶ │ Time/Date display  │
└──────────────┘    └──────────────┘    │ Set Time Format    │
                                         │ Set Date Format    │
                                         │ Set Time           │
                                         │ Set Date           │
                                         └────────────────────┘
```

Summer / Winter Time Change

Setting the time requires that you know the menu password. In some installations personnel with access to the menus are not available to reset the unit's clock during time changes for summer and winter. The multiplexer provides a simple shortcut to set time forward by an hour in spring and back by an hour in the fall, by using the following Function key.

To adjust the clock by an hour for Summer / Winter time changes press the FUNCTION key ⒡ and then press the SEQUENCE ⊡ key.

In March and April, this will cause the time to be adjusted forward by one hour.
In September and October, this will cause the time to be adjusted back by one hour.

This function can only be used once in each period. For example, if you press FUNCTION + SEQUENCE during March, it will add an hour to the time. If FUNCTION + SEQUENCE is pressed again, then it will be ignored until September.

When setting the date, select the correct day of the week, 1 to 7. For example, if today's date is set on a Wednesday and Sunday is day 1 in the week, then enter a '4' during date set-up. This is used to start Timed Macros on the correct day.

The time can be in one of two formats, and the date can be in one of three formats. The time format can be either to a 12 hour or 24 hour clock. The date format can be either DD/MM/YY, MM/DD/YY, or YY/MM/DD.

To change time and date Colour on Monitor-A, select camera 1 full-screen, and toggle its title position and Colour as described on page 40. Each time the cycle is completed for camera 1, the time/date Colour will be toggled to a new Colour. This time/date Colour setting is a global system setting.

When the time/date Colour has been selected, toggle the camera 1 title position and Colour to its desired state.

Note
The time/date display can be turned OFF for either MON-A or MON-B in the menu system, using the Time/Date sub-menu. The MON-A setting is effective in both LIVE and PLAY modes.

Playback

To enter PLAY mode, press the PLAY mode key ⏵.

When playback is first started, the unit will automatically select a multi-screen display on Monitor-A, which can show all the cameras which were recorded on that tape.

PLAY mode will always stop any LIVE mode multi-screen displays on Monitor-A.

Note
On the simplex multiplexers, PLAY mode will also cause RECORD mode to stop.

Your video multiplexer can display video played back from a VCR whether it was originally recorded from a valid multiplexer, or whether it was recorded off a normal video input, i.e. not multiplexed. Tapes that were not recorded on a multiplexer will automatically be played back without attempting to separate the fields.

The multiplexer can also correctly interpret tapes encoded on Dedicated Micros multiplexers, by changing a user-selectable option in the menu system. This is useful in installations which already have other multiplexers in use (see Decoding Tape Formats From Different Multiplexers, page 44.

On playback, you can select one of several multi-screens on Monitor-A to display the recorded images which are being played back from the VCR. During playback, all on-screen text on Monitor-A will show the status, time and date at the time of recording.

Monitor-B will always display live analogue signals. No playback images are shown on Monitor-B. During playback, the text **LIVE** is displayed on Monitor-B so that you can clearly see that the signal on Monitor-B is live, while that on Monitor-A is a playback signal.

How Playback Works

When playing back multiplexed recordings which were originally recorded from a multiplexer, time-stamped video fields are received from a VCR connected to the VCR IN connector or YC input on the multiplexer's rear panel, each field being uniquely identified by its own digital data packet. These embedded digital data packets are decoded, and the video field is linked to its original input camera. You can select which cameras to display during playback, and so the video field for that camera is displayed (or skipped) according to your playback selection. All the associated status information, including titles, time and date of recording, as well as the alarm or video loss status of the camera is reconstructed from the digital data packet and displayed as on-screen text during playback. Because the on-screen text is re-constructed and generated for on-screen display (as opposed to being recorded on the VCR as part of the video display) you are assured of very clear and legible status and titles during playback.

Setting The VCR Playback Speed

You must select the playback speed on the VCR, and not on the multiplexer. There is no related set-up required on the multiplexer during playback.

The multiplexer will automatically adjust its display to match the VCR playback speed.

Indicators

The on-screen indicator (**P024** for example, for 24 hour mode) tells you the speed at which the tape was recorded. It does not indicate the speed at which the tape is being played back. To find out the playback speed, you must look at the VCR's playback speed indicator.

The multiplexer will display the text **N/A** if a camera does not get updated from tape within a minimum time (**N/A** signifies that the camera is Not Available). This is a warning message, not an error message. This indicator warns you that the update rate is very slow or updating may have stopped. It warns that there may have been events that were not captured during the recording, or the tape data may be corrupted.

Decoding Tape Formats From Different Multiplexers

Main	→	Playback Format	→	Default Alternate

Your multiplexer can decode tapes recorded on other multiplexers. If a tape from a DM compatible multiplexer is to be played back, the Alternate format must first be selected from the menu system.

Tapes Recorded On A Compatible System

The unit must be set to Default format in the Playback Format sub-menu to decode tapes recorded in Baxall ZMX format. This is the factory default setting.

Tapes Recorded On A Dedicated Micros Compatible System

To decode these tapes, select the Alternate option. When play is selected, an on-screen '**ALT**' indicator will indicate that DM Compatible decoding is in progress. During DM tape decoding, the multi-screen formats can be selected exactly as for the normal multiplexer tape playback.

Note
If DM (Alternate) decoding is currently selected, tapes made via your multiplexer will not be correctly decoded, and vice-versa.

PLAY Mode - Monitor-A Displays

Monitor-A Multi-Screen Display Formats

When playback is first started, the unit will automatically select a multi-screen
display on Monitor-A, which can show all cameras which were recorded on that tape.

To select a different multi-screen, press the MULTI-SCREEN key ⊕. To select
different cameras in a multi-screen, use active cameo set-up (see page 37).

During PLAY mode, you can select the multi-screen formats which are available in
LIVE mode, except for PIP, 7-way, 10-way and 13-way displays on the mono units,
and except for 7-way and 13-way displays on the colour units (see page 35)

Full-Screen Displays

To select a camera for full-screen playback on Monitor-A during the PLAY mode,
push the corresponding camera key once. A full-screen display of that camera from
tape will be displayed full-screen.

When Tapes Cannot Be Decoded

If the multiplexer cannot decode a tape which is being played back, the system will
display a blank screen. The fields will not be decoded or separated.

There are two possible reasons why a tape cannot be decoded:

1) the tape was not recorded on a multiplexer, or

2) the tape is not compatible with the decoding format you have selected.

In the event that the tape was actually recorded on either a compatible multiplexer or
a DM multiplexer, but is not correctly decoded, first check to see that the correct
Playback Format has been selected in the menu system.

With the VCR playing back, press the FUNCTION then the PLAY mode key ⊙ to
view the undecoded input.

The time and date are displayed on-screen during PLAY mode. You should note,
however, that this is the recorded time, not the current system time.

The indicator, **V**, in a multi-screen and **VDL**, in a full-screen, will be displayed in the
corresponding camera image if there was video loss at the time that the recording
was made.

Note
Any camera which is not detected on tape for 8 or more consecutive cycles during
playback, and is not flagged as a video loss camera, will result in the warning
message, **N/A,** signifying that it is Not Available. This is a warning message only.

Several circumstances can cause an **N/A** indication. These are:

1) The camera may not have been included in the record list at the time of recording.

2) The camera may have been disabled at the time of recording.

3) The images for that camera on tape have been corrupted and cannot be decoded at time of playback.

4) The VCR play speed is very slow.

The **N/A** indicator helps you to tell the difference between images which are not being updated during playback and images which are being updated from tape but have no movement within the image.

The indicator, **A,** will be displayed with the corresponding camera image on Monitor-A if there was an active alarm at the time that the recording was made.

There is no indication on-screen to show that the unit is decoding in the multiplexer's compatible format, because this is the unit's native mode.

Caution
The Monitor-B time and date, alarm, videoloss, titles and all other on-screen data and indications will be related to the current, live data, and must not be confused with the playback data which is being displayed on Monitor-A.

Play Mode - Changing Text Positions And Colours

The positions and colours of camera titles, and the colour of the date / time can be set separately for playback.

PLAY Mode - Sequencing During Playback.

During PLAY mode, the multi-screens and full-screens can be sequenced according to the sequence list and dwell times programmed in the menu system.

Caution
This option must be used with caution if the VCR is set to time-lapse speeds while playing back.

When sequencing the display during playback, **do not** set the VCR's play speed such that the frequency at which any one camera is played back off the tape is slower than the frequency that the sequence list will switch through cameras in the list.

Recommendation
Set the VCR to its normal speed (3 hour for PAL) when sequencing displays during playback.

Alarms

```
┌──────────────┐      ┌──────────────┐      ┌──────────────────────┐
│     Main     │ ───▶ │    Alarms    │ ───▶ │  Input Configuration │
└──────────────┘      └──────────────┘      └──────────────────────┘
```

The multiplexer is equipped with one alarm input per camera input, each of which is normally associated with its corresponding camera input. An active alarm input can result in an on-screen indication on both Monitor-A and Monitor-B, a flashing front panel LED, an internal buzzer and automatic modification of the record list to give the camera in alarm a higher update rate.

Two isolated alarm output relays are provided. One relay can be activated by any alarm input, and the other by video-loss or by activity detection.

The alarm inputs are configured as zero potential relay contacts, individually programmable via the menu to be normally open (NO) or normally closed (NC). To select the alarm input configuration as NO or NC, use the Input Configuration section of the ALARM sub-menu. The factory default is NO.

During alarms, the multiplexer can automatically adjust the record list so that any cameras in alarm are recorded at a higher rate, according to your selections.

Alarm inputs, if not used, should be set as N/O.

Alarm Handling Capability

```
┌──────────────┐      ┌──────────────┐      ┌──────────────────────┐
│     Main     │ ───▶ │ Camera Titles│ ───▶ │     Alarm latch      │
└──────────────┘      └──────────────┘      └──────────────────────┘
```

Alarms will result in an automatic full-screen image of the camera in alarm on Monitor-A and Monitor-B. The alarms can activate an output relay. The alarms can be latched until accepted by the operator, or latched for a preset time, or follow the status of the alarm input. The alarm latching is a system-wide setting, selectable by you.

Simple menu tables make it quick and easy for the you to select the desired alarm action.

Alarm Displays In Live Mode

During alarms in LIVE mode, Monitor-A will automatically switch to a full-screen display of the camera in alarm. If multiple alarms are active, Monitor-A an B will automatically sequence between the alarm cameras at a fixed 1 second dwell. This dwell is not programmable.

You can freeze the camera in alarm on Monitor-A by pressing the FREEZE key ⊛.

Note
> The Monitor-B screen will not revert to its original fixed display after the alarm is cleared. It will continue to display the last alarm camera. However, if sequencing was active on Monitor-B before the alarm, then Monitor-B will continue to sequence after the alarm is cleared.

Alarm Displays In Play Mode

Regardless of the mode selected, Monitor-B will always display live images. Hence, during PLAY mode, live alarm inputs will cause live alarm displays on Monitor-B, not Monitor-A. Monitor-A will continue to display playback images.

Monitor-A During PLAY Mode - Recorded Alarms

In PLAY mode the Monitor-A display will not automatically provide alarm displays based on recorded alarm status. Monitor-A will display the playback images from the VCR according to your selected formats, and will display the normal **A** alarm indicator only if a camera was in alarm at the time that a recording was made.

Caution
If a camera which had an alarm at the time of recording is not selected by you for display, there will be no on-screen indication at all that the alarm occurred. Thus if you are looking for cameras in alarm during playback, ensure that all the cameras on tape are displayed by using a 16-way multi-screen.

Alarm LED And Internal Buzzer In PLAY Mode

The LED and internal buzzer alarm indicators will be activated only if a live alarm is active. Alarm status played back from a recorded tape has no effect on these indicators. The internal buzzer can be disabled via an internal hardware strap.

Alarm Displays In Record Mode, Simplex Models Only

During RECORD mode only, and on the simplex model only, Monitor-A displays are always analogue full-screen, exactly the same as Monitor-B's normal mode.

As a result, the simplex model cannot display a multi-screen image on Monitor-A during recording, and alarms cannot be manually frozen. If an alarm occurs during RECORD mode, Monitor-A will automatically switch to the live analogue full-screen display of the camera in alarm. If multiple alarms are active while recording, the simplex unit will automatically sequence between the alarm cameras at a fixed one second dwell. This is exactly the same display as on Monitor-B during alarms.

Recording For Alarms

Main	→	Record	→	Alarm Record Speed

You can select either Normal recording, Exclusive recording or Interleaved recording to take place whenever an alarm occurs. The latter two modes will always result in a faster update to tape of a camera in alarm.

Note
This is a global setting, and is not set up individually for each alarm input.

To select the recording rate during alarms, choose the Alarm Record Speed option in the Record sub-menu.

Normal

Normal recording during alarms means that there is no priority recording for the cameras in alarm, and the record list will be unchanged while alarms are active. However, you can still program the VCR and the unit to switch from a time-lapse speed to a faster recording speed during alarms, which by itself can ensure that alarm events have a faster update speed.

Exclusive

Exclusive recording will cause the system to record only alarmed cameras. All non-alarmed cameras are omitted from the record list while an alarm is active. Exclusive recording mode is typically chosen only when several simultaneous alarms can be expected to occur very often, and where near real-time records of those alarm events are needed. The disadvantage of choosing this mode is that events on non-alarm cameras will not be recorded at all while any alarm is active.

If real-time recording of single alarms is required on mono models, select Exclusive recording. However, bear in mind the disadvantage of selecting this mode.

Note

On colour models, which have PVP, if only one camera is in alarm and the alarm speed is set to 3-hour mode, then the unit will automatically select Interleaved recording, even though Exclusive mode is selected. This is because the fast update will still result in a real-time update of the camera-in-alarm during interleaved recording at 3-hour recording speeds.

Interleaved

During interleaved recording, both the alarmed cameras and non-alarmed cameras are recorded, but the alarmed cameras, having a higher priority, are interleaved between non-alarmed cameras.

Interleaved mode offers increased recording of cameras in alarm, without stopping the recording of other cameras. This is the mode recommended for most installations.

Example

Non-alarmed cameras:	1,2,3,5,7
Cameras in alarm:	4,6

Interleaved recording sequence: 1,**4,6**,2,**4,6**,3,**4,6,4**,4,**6**,5,**4,6**,6,**4,6**,7,4,1, ..etc.

Note
> Because of the fast update rate of the colour units, if one camera is in alarm, interleaved mode will result in real-time playback of the camera in alarm. In general, on the colour units, interleaved recording will give very fast update speeds of cameras in alarm even for multiple alarms. This is not the case for the mono units, which do not have fast PVP recording at alarm speeds.

Alarm Indicators

There is an on-screen display of an **A** in each corresponding cameo of multi-screen displays and **ALM,** on any full-screen displays relating to cameras in alarm. The indications will be flashing.

An additional indication, in the form of an LED, is provided on the front panel, under the ALARM key ⬚. The left hand LED will flash if any live alarm is active and has not been cleared.

An internal buzzer can sound while any live alarm is active. This buzzer can be silenced by pressing the ALARM key or if required, disabled.

Alarm Latching

Main	→	Alarms	→	Alarm Latch

There are three ways of latching alarms, which may be selected via the menu. These are:

1) Latched until the operator cancels it (Latched).
2) Not latched (Transparent).
3) Latched for a pre-set time (Timed Out).

To set the type of latching, select Alarm Latch in the Alarms sub-menu. All the alarm inputs are controlled by this single setting.

Latched Alarms

Alarms are latched as they become active. An alarm will stay active until the operator acknowledges it by pressing the ALARM key ⬚. There is no time-out period.

When the operator acknowledges the alarm, it will be cleared, whether the alarm input is still active or not.

Timed out alarms are latched for a pre-set time out period from the start of the alarm becoming active. After expiry of the time out period, the alarm is automatically cleared unless the alarm input is still active and then it will clear immediately after the alarm input ceases. Alarms that cease and restart before the time out is complete, will restart the time out period.. The time out period is programmable in the menu system.

Timed out alarms can be cleared by the operator at any time by pressing the ALARM key 🔺. Like latched alarms, if the operator cancels the alarm, it will be cleared whether the alarm input is still active or not. Alarms that are cleared by the operator before their inputs have ceased, will not be reactivated until the alarm input ceases and restarts.

Alarms are active only while the alarm input is active. As soon as the alarm input ceases, the alarm will be automatically cleared. A Transparent alarm cannot be cleared by the operator, it will remain active as long as the corresponding alarm input is active.

Application Note
> If it is necessary for the operator to be able to clear active alarms, and Transparent mode is preferred, then select timed-out alarms instead of transparent alarms in the Alarm Latching sub-menu, and set the time-out period to one second.

Alarms that have been acknowledged by the operator will not be reactivated unless the alarm input has ceased and then restarts.

Alarm Outputs

Two outputs are provided to enable you to program automatic external actions such as a speed change on the VCR, or alarm lights or sirens. The relay outputs are rated at 30v 500 mA. Alarms always activate Relay 1.

They are provided in both the normally open (NO) and normally closed (NC) configuration on the rear panel of the unit.

The alarm outputs can be activated by motion detection, by active alarms, by videoloss, or by Macro functions.

The multiplexer also allows you to read the status of the alarm inputs for each camera via the RS-232 remote control port.

Alarm History

Main	→	Alarms	→	Alarm History
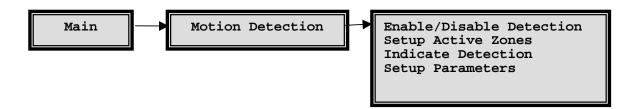
An alarm history is kept in a cyclic buffer. History data, including the camera number, time and date are kept in memory for up to 100 events. The most recent 100 alarm events can be viewed on-screen in the menu system, by selecting the Alarms menu and then selecting Alarm History.

A table will appear, allowing you to browse forward and backwards among the last 100 alarmed events.

The RS-232 remote control capability allows an operator to upload the alarm history to a PC or a similar controlling device.

Motion Detection

```
┌─────────────────┐     ┌─────────────────────┐     ┌──────────────────────────────┐
│                 │     │                     │     │  Enable/Disable Detection    │
│      Main       │────▶│  Motion Detection   │────▶│  Setup Active Zones          │
│                 │     │                     │     │  Indicate Detection          │
└─────────────────┘     └─────────────────────┘     │  Setup Parameters            │
                                                     │                              │
                                                     └──────────────────────────────┘
```

The multiplexer offers comprehensive motion detection capabilities, including sensitivity settings and detection area selection per camera. Motion detection is used to adjust the rate at which cameras are recorded.

The motion detection provided on these multiplexers is not intended for intrusion detection, only for activity detection.

Activity Detection

Activity detection simply looks for changes in the luminance in various selected areas of the screen, and if changes are above a set threshold then the activity detector interprets that to be activity. Changes in light and camera vibration can also be falsely interpreted as activity. This method is used in the 'motion detection' offered by most multiplexers, and is adequate to detect activity in a scene.

Extensive Setup Capabilities

Motion detection can be enabled or disabled individually on each camera, or on all cameras.

Motion detection can be set up separately for each camera via the menus. The motion detector uses a detection grid of 256 zones per camera. Each zone consists of many detection points, averaged over the zone. The zones can be individually enabled or disabled, so that some parts of the camera view can detect motion and other parts can ignore motion. You can select one of 10 levels of sensitivity for each camera to compensate for contrast and lighting conditions.

The set up has been made as uncomplicated and easy as possible. A menu structure with an on-screen grid and set up prompts is used to simplify set up.

Automatic Record List Modification

With motion detection, it is possible to automatically record cameras with motion at a higher rate than cameras which have little or no motion. This is the most common use of motion detection in multiplexers, and requires only activity detection. The unit automatically inserts a camera into the record list more often whenever activity is detected, so that the cameras with more activity are recorded at a higher rate. The multiplexer offers advanced set up for the Record List modification: The rate of increase can be set by you in the menus so that cameras with activity can be recorded twice as often as normal, or four times as often, or they can be interleaved.

Programmable Outputs

You can select one or both of the two output relays to be activated when motion is detected. This can be set up separately in the menu system for each camera.

Motion Indicators

The indicator, **M**, will appear in each camera scene on Monitor-A whenever motion has been detected. The indicator is not present on full-screen analogue displays. This motion indicator will stay on each active camera's display for at least 2 seconds after the motion has ceased. The motion indicator can be turned on and off in the menu system, via the Indicate Detection section of The Motion Detection menu.

The default setting is off.

Note
The primary purpose of the multiplexer is efficient video multiplexing and the alarm handling and motion detection are secondary functions. National standards relating to alarm equipment should be taken into account when choosing equipment to use with the multiplexers, and in general the multiplexer should not be the only alarm device on the site.

Setup - Enabling And Disabling Motion Detection On A Camera

| Main | → | Motion Detection | → | Enable/Disable Detection |

The factory default setting is each camera has motion detection disabled when the unit is first powered up.

The first action which should be taken by you with respect to motion detection during installation, is to enable the cameras on which activity detection is desired. For verification, turn on the 'M' indicator.

If motion has been turned on, but there is no **M** indication in the corresponding camera's display during motion on that camera, first check that the indicator display is correctly turned on in the Indicate Detection option of the Motion Detector sub-menu. If motion is still not detected, check the set up of the detection zones and the sensitivity setting as detailed in sections Setup - Enabling And Disabling Detection Zones and Setup - Setting Sensitivity respectively.

Setup - Enabling And Disabling Detection Zones

| Main | → | Motion Detection | → | Setup Active Zones |

The 256 zones are arranged in a 16 x 16 grid. Each zone can be enabled or disabled by you, via the menu system. The factory default is that all zones are enabled. Note, however, that all cameras have motion disabled as detailed on page 52. This must not be confused with enabling or disabling individual zones within the camera scene.

During set up, use the menu system to disable zones which may contain movement that is incidental or not important. Incidental motion can include the possible

movement of trees in the wind, vehicles in an adjacent street, allowable pedestrian areas, or areas with glass and other highly reflective surfaces which can be sources of apparent motion via reflections.

To enable or disable zones, select Setup Active Zones from the Motion Detection sub-menu. A new menu will prompt you to select a camera. The camera number can be selected using either the arrow keys ⟲, or the camera keys. The title will also be displayed for information purposes only - it cannot be edited in this particular menu.

After selecting the camera which is to be set up, the system will switch Monitor-A to the camera chosen and will then draw a 16 x 16 grid over the camera view. Each block in the grid is one of the 256 zones.

Cursor

The top left zone will have a flashing square indicator ☐, known as the cursor. The zone which has the flashing cursor can be enabled or disabled. When the cursor reaches the end of a line in the zone grid, it will automatically wrap around to the beginning of the next line.

Use the ALARM key ⊡ to select either the enable or disable mode, and then use the ARROW keys ⟲ to 'paint' the adjacent zones with the mode selected.

The ALARM key ⊡ toggles between three possible zone set up modes, and the cursor will change colour as shown below:

Mode	Cursor colour
No Action	grey/white
Enable Zones	black/white
Disable Zones	clear/white

The on-screen prompts shown during the zone set up are as follows:

ALM: NO ACTION   **ENTER TO EXIT**

As you press the ALARM key ⊡, you change the action from NO ACTION to ENABLE to DISABLE and back to NO ACTION. Press the ENTER key ⟲ exit.

The **NO ACTION** set up mode is used to get the cursor to a part of the grid where zones must be changed to enabled or disabled. This is normally used if only a small part of the grid needs to change. After selecting no action by using the ALARM key ⊡, use the arrow keys ⟲ to go to the first zone to be changed.

The **ENABLE** set up mode is used to change disabled zones to enabled zones. Enabled zones will sense motion, according to the sensitivity and the minimum target size set for the camera. When this mode is selected, the zone which has the flashing cursor will be changed to an enabled zone. The arrow keys ⊙ can be used to move the cursor and enable as many other adjacent zones as necessary. Change the mode to NO ACTION or DISABLE when no more adjacent zones need to be changed.

The **DISABLE** set up mode is used to change enabled zones to disabled zones. Zones which are disabled will ignore all motion. After using the ALARM key ⬛ to select the DISABLE mode, the cursor and arrow keys ⊙ can be used to disable as many adjacent zones as necessary, exactly as was described above to ENABLE zones.

Indications
To indicate whether each zone is enabled or disabled, enabled zones have a grey " □ " indication and disabled zones have no indication inside the corresponding grid position.
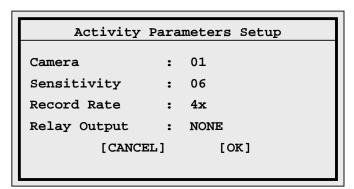
Press ENTER to exit the zone set up screen, and return to the Motion Detection menu. All the changes will be saved as they are made. In the Motion Detection sub-menu, you can then set up sensitivity for the same camera, or zones can be set up for a different camera.

Setup - The Motion Parameters Menu

| Main | → | Motion Detection | → | Setup Parameters |

The three motion parameters, sensitivity, automatic increase in record rate on motion, and output relays, are all chosen in a single menu table on a camera-by-camera basis.

Select the Setup Parameters section of the Motion Detection sub-menu to set any of these parameters. The Motion Detection Setup, Select Camera window will appear, where you select the camera. Select the camera by using the arrow keys ⊙ and pressing enter. This will display the activity parameters for the selected camera. For example:

```
        Activity Parameters Setup

Camera          :   01

Sensitivity     :   06

Record Rate     :   4x

Relay Output    :   NONE

        [CANCEL]        [OK]
```

The Camera field displays the number of the selected camera and cannot be changed. The Sensitivity, Record Rate and Relay fields are described below.

Setup - Setting Sensitivity

The motion detection on each camera can be set to one of 10 levels of sensitivity to movement. The sensitivity setting is set on a camera-by-camera basis, and applies to all the zones in any particular camera scene.

Each zone stores 256 grey levels of discrimination, averaged over the zone's area. The sensitivity to change in a zone can be set to the most sensitive by selecting a sensitivity of 10, and to the least sensitive by selecting a sensitivity of 1.

A sensitivity of 10 will detect a change of 5 grey levels in a zone, averaged over the zone. A sensitivity of 1 will detect changes of 100 grey levels or more within a zone, averaged over the zone. The factory default sensitivity is 5, for all cameras.

To set the sensitivity for any camera, select Setup Parameters from the Motion Detection sub-menu.

Recommendations
When setting or adjusting sensitivity, choose the highest setting that does not result in very frequent 'false' motion settings. The higher the sensitivity, the more likely it is that incidental movement will be detected as motion. If motion is indicated without apparent cause, reduce the sensitivity.

Record Rate

Your multiplexer shares one VCR between many cameras. As a result, the video from a camera which normally provides 50 fields a second, must be time sliced and reduced to a rate of far fewer fields every second. This allows the other cameras to insert fields into the same video stream going to the VCR. The lowered update rate for each camera is not a problem if there is little movement in the scene. If, however, there is activity in the camera view, it is always preferable to get as many updated fields of the activity as possible, so that important activity events are recorded.

Your multiplexer solves this dilemma in two ways:

1) It has a very fast, optimised update rate to tape .

2) It allows the rate of update of each camera to tape to be automatically adjusted by the system if there is ongoing motion within a camera's field of view. In this way, cameras without activity are recorded less often and cameras with frequent and continuous activity are recorded more often and so can capture more of the activity.

A unique feature of your multiplexer is that the increase in update rate can be set by you in the menu system. Cameras with activity can be recorded at the same rate, or twice or four times as often as they would normally be recorded, or they can be interleaved. This allows you the flexibility to set up the system according to the requirements of the particular installation.

Note
The record list and record rate can also be modified by an active alarm. A record list update resulting from an active alarm input will always override any record list modifications which resulted from sensing activity.

To set the record rate increase during activity, select the Setup Parameters option of the Motion Detection sub-menu. There are four choices of Record Rate increase for activity:

       NO CHANGE
       2 X
       4 X
       I (Interleaved)

The first choice, NO CHANGE, is usually chosen only if most cameras are expected to have motion at the same time. Interleaved is normally chosen only if very few cameras will have motion at any one time. A setting of 2x may be optimal if not all the cameras are connected, and on the 10 Way models. The factory default setting is 4x for all cameras.

Relay Output

Two relay outputs are provided to enable you to program automatic external actions such as a speed change on the VCR, or alarm floodlights or sirens.

The relay outputs are rated at 30v 500 mA. They are provided in both the normally open (NO) and normally closed (NC) configuration on the rear panel of the unit, and are isolated.

The two outputs can be activated by activity detection, by active alarms, by video loss, or by Macro functions. The choice of which output is activated by which event is selectable via the menu system on a camera-by-camera basis.

Selecting the Relay Outputs
Select the Setup Parameters section of the Motion Detection sub-menu.

In the Relay Output field, you have the following four choices for each camera:

       NONE
       1
       2
       1+2

The factory default setting for Alarm Output Relays is as follows:

All Alarm Inputs will activate	Relay 1
All Activity Detection will activate	Relay 2
All Video Loss will activate	None

Special Functions

Videoloss

You get the indication, **V,** displayed in each affected cameo of the multi-screen display and **VDL** on any corresponding, full-screen displays.

You can select an output to be closed whenever video loss is present, and can turn the buzzer on and off during video loss, as follows:

1) Select the Videoloss Action sub-menu.
2) Select the Camera for set up.
3) In each output field, ENABLE or DISABLE the corresponding relay.
4) In the Buzzer field, select ENABLE or DISABLE.

Monitor-A: If the camera is being displayed at the time that videoloss occurs, the camera image will be frozen. However, if sequencing is in progress, the display will be blanked when it is switched to a camera experiencing videoloss.

Monitor-B: Monitor-B cannot freeze images, and so the display will always be blanked while a camera with videoloss is selected.

When videoloss is detected, the affected camera is temporarily removed from the record list, and the coded digital data recorded with each field will be updated to indicate a videoloss situation on the affected camera. This videoloss status is then shown during playback. The multiplexer system continues to monitor cameras which have videoloss and will automatically restore the cameras when videoloss ceases.

Disabling Cameras

The multiplexer allows you to disable cameras which are not connected, or will be out of service for an extended time, so that unnecessary videoloss messages can be avoided see page 30.

Freeze Operation

Press the FREEZE key ⊛ to freeze multi-screen or full-screen displays on Monitor-A in the LIVE or PLAY modes. The FREEZE button is used both to freeze and to unfreeze displays.

Note that frozen images can be ZOOMed.

Freezing A Single Multi-Screen Section

Using an active cameo (see page 37), you can freeze (or unfreeze) only one cameo in a multi-screen display made up of many different cameras. This is useful when an event must be frozen for further investigation or for review by a supervisor, but the balance of the cameras must continue to be monitored.
Zoom operates on either a frozen or a non-frozen display. A zoomed signal can be frozen.

Indicator

A * is displayed in each affected cameo of the multi-screen display and **FRZ** on any corresponding full-screen displays. The indication will be flashing.

Note
   The FREEZE key ⊛ must be pressed again to unfreeze the display.

Zoom

The multiplexer provides a digital 2x zoom on full-screen displays on Monitor-A, during LIVE or PLAY modes.

To zoom an image, first select a full-screen display on Monitor-A and then press the ZOOM key ⊛. The image can be frozen before it is zoomed.

Electronic pan and tilt ability is provided on all zoomed displays. This allows you to examine images more closely.

Use the arrow keys ⊙ to pan and tilt to different sections of the zoomed image.

Indicator

There is an on-screen **ZOOM** indication when zoom mode is in effect, and the LED above the ZOOM key is lit.

The ZOOM key ⊛ is used to enter and exit zoom mode. Press the ZOOM key ⊛ to exit zoom mode.

Note
   In the RECORD mode on a simplex unit, pushing the ZOOM key ⊛ has no affect.

Selecting VCR As An Input (VCR View)

You may need to view the video output of the VCR, typically this is to check VCR output or settings.

Note
   On simplex units, this function is not available during RECORD mode.

To select the VCR as an input, press the FUNCTION key Ⓕ and then press the PLAY key ▷.

To de-select the input, repeat the above procedure.

Adjusting The Camera AGC

```
┌─────────────────────┐        ┌─────────────────────┐
│        Main         │ ─────▶ │     Camera AGC      │
└─────────────────────┘        └─────────────────────┘
```

The unit has a versatile camera-by-camera AGC Range adjustment. This allows you to set the unit up via simple menus to compensate for camera inputs that have excessive video levels outside of the normal AGC range. This is a set up function which would normally be used by the installer.

Example

Cameras with auto-iris lenses can be adjusted during installation so that the video is consistently at a much higher level (brighter) than the standard video signals. This is often done to compensate for cable losses, or simply to improve the general video appearance. This may take the video levels beyond the range of the unit's AGC.

The multiplexer allows you to easily adjust the input AGC separately for each camera from the front panel controls.

To adjust the input AGC for any camera, select the Camera AGC sub-menu from the main menu.

The default AGC range setting is 5 for all inputs.

Adjusting The VCR Brightness And Contrast

The multiplexer provides a simple front panel adjustment to digitally adjust the contrast and brightness of the playback signal from the VCR. This can also be used to compensate for some VCRs which output a higher or lower video signal level than the standard.

To adjust the VCR signal contrast and brightness, select PLAY mode ⏵ and then select the playback camera image to be enhanced full-screen on Monitor-A. Use the arrow keys ✛ to adjust the signal.

VCR Playback Brightness

Use the up/down arrow keys ✛ to adjust the brightness.

VCR Playback Contrast

Use the left/right arrow keys ✛ to adjust the contrast.

Macro Functions

Macro Functions allow you to pre-program frequently-used key sequences, and frequently-used menu setups. These can be quickly executed as a two-keystroke function.

Up to eight macros, each having 32 key-strokes, can be programmed into the multiplexer.

Recording is started via the menu system. Playback is started from the front panel using the FUNCTION key Ⓕ and camera keys. A macro can be stopped during its playback by pressing the FUNCTION key Ⓕ.

The macro functions can be started automatically at up to 20 preset times during the week by using the built-in macro scheduler, see page 63.

Recording A Macro

| Main | → | Macro | → | Macro Record |

Macro recording is started from the menu system, and so macro recording can only be done if you have the password to the menu system.

To initiate recording, select MACRO in the main menu, and select Macro Record from the sub-menu. This displays the Macro Record window where you select the number of the macro that you wish to record (1 to 8). Upon selection, the system will automatically exit the menus. Subsequent keystrokes will be recorded into that macro.

Each keystroke will be recorded, until either the FUNCTION key Ⓕ and ENTER is pressed to terminate the macro recording, or until 32 keystrokes have been recorded.

Note
   An on-screen indicator, **Fn** plus the macro number, will appear and will stay on the screen until recording of that macro is complete.

Special Keys Used During Macro Recording

The following two-key combinations provide you with special actions within macros.

Key combination	Action
FUNCTION then 1	Activate output relay 1
FUNCTION then 2	Reset output relay 1
FUNCTION then 3	PAUSE macro, 1 second
FUNCTION then 4	PAUSE macro, 5 seconds
FUNCTION then 5	Activate output relay 2
FUNCTION then 6	Reset output relay 2
FUNCTION then ENTER	End Macro recording

Menu Setup Using Macros

If you press the MENU key ⊕ during macro recording, the recording of subsequent keystrokes is stopped.

Notes
1) Instead of recording keystrokes, the macro only records the final setting of each set up parameter for those sub-menus which are accessed by you.

2) Upon playback of the macro, the unit will retrieve only those recorded menu set up parameters, and will set the unit up accordingly.

3) Parameters in sub-menus, which were not accessed during recording of the macros, will not be recorded or retrieved during playback of the macro.

Exception
In the Motion Detection sub-menu, macros can only be used to enable and disable motion detection. The other motion detection parameters cannot be set via macros. The following parameters should, therefore, be set up during installation:

1) Output Relay selection, 1 or 2 or both, per input.

2) Output Relay NO or NC selection.

3) 'M' indicator ON/OFF selection

4) Videoloss relays and buzzer selections, per input

5) VCR switch pulse edge selection

6) VCR type A or B selection

7) Setup Parameters

Ending The Recording Of A Macro

Press the FUNCTION key ⊏F⊐ and then the ENTER key ↺ to end the recording of a Macro.

Recommendation
Make a list of the function of each macro with its macro number, for later use in playing the macros.

A section is provided in the back of this manual to conveniently keep a list of the macros and their intended functions.

Note

Each macro can contain **32 keystrokes**. Exceeding this will cause the macro recording to terminate.

There is no macro editing capability. To check a macro function, play back the Macro by pressing the FUNCTION key ⬭F⬭ and the macro number (camera key), and check for correct its operation. If the macro does not appear to function correctly, delete the macro as described below and re-enter it.

Deleting A Macro

To delete a macro, record an empty macro over it. To record an empty macro, start macro recording and immediately press FUNCTION plus ENTER to end the recording.

Playing A Macro

A macro can be played back simply by pressing the FUNCTION key ⬭F⬭, followed by the macro number (camera key ⬭9⬭).

While the macro is playing back, **Fn** and the macro number are displayed.

A macro can be stopped during its playback by pressing the FUNCTION key.

Timed Macros

Main	→	Macro	→	Timed Macro Start

Macros can be started at a fixed time and day of the week by using the Macro Scheduler. The Macro Scheduler allows you to program up to 20 events which will automatically run one of the macro functions.

Scheduled events can be started on a preset time on a particular day of the week, or at a preset time on every day of the week. Any macro can be started by each of the 20 scheduled events, and a macro can be started by more than one event.

To set up the Macro Scheduler, select the Timed Macro Start section of the Macro sub-menu.

For each of the 20 events choose a Day, a Time and the Macro to run for that event entry:

Day: select the day of the week, 1-7, on which the event must start a macro. To see the day of the week corresponding to today's date, select the Date set up menu from the Time/Date sub-menu. If the macro is to be run every day at the same time, select '**' for the Day field. If a 0 is entered for the day, the scheduled event entry is cancelled and will not start the macro.

Time: Select the time to run the macro function.

Macro: Enter the number of the macro to run.

Keep a record of scheduled events for easy reference. A table is provided in the back of this manual to list the scheduled events.

Remote Control

RS-232 Remote Control

RS-232 remote control is via a 9 way 'D' type connector, on the rear panel. This is used to provide fully-programmable remote control from a PC or similar controller. It is possible to read and set up all the menu functions and also control the front panel controls via the RS-232 port.

Functions included are:
Menu programmed functions

All front panel keys

Alarm history read

Operating Status read

RS-232 baud rates are selectable from 1200 to 9600. The factory default is 9600.

To set the baud rate, select the RS-232 option of the Communications sub-menu.

Refer to Appendix A, RS-232 REMOTE PROTOCOL for more details.

9-way Connector
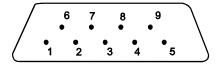
Figure 9 9-way Connector Numbering

Pin	Signal	Function
1	-	not used
2	Rx	Receive Data
3	Tx	Transmit Data
4	-	not used
5	GRD	Ground
6	-	not used
7	-	not used
8	-	not used
9	-	not used

Table 2 9-way Connections

4 Specification

Feature Specification

Password protected system settings

Parallel Video Processing (colour models) ensures a camera update rate typically 2 to 3 times faster than normal multiplexers (without a need to synchronise the cameras).

Playback of any Baxall ZMX recording, DM compatible recordings (NPX1, NPX+, DIAMOND, DIAMOND+ and all GEM) and standard video recordings

On-screen programming via menus (settings retained when powered off)

Secure 1 hour adjustment for Summer/Winter time without access to the menu system.

Inputs and Outputs

10 or 16 loop-through camera inputs, depending on the model, with automatic termination

Composite and S-VHS VCR input and output (colour models only)

VCR (Vext input) automatically synchronises the recording speed

Dual monitors with on-screen captions

Function Keys

Eight user-defined, macro style functions

Upto 20 event (Macro) Scheduler Macro Function commands, daily, or once a week at a specified time.

Display Options

LIVE, PLAY and RECORD modes:

Full screen, Sequence (adjustable dwell and camera list), multiscreen, x2 Electronic-Zoom, Freeze Frame

Full screen, Sequence (adjustable dwell and camera list)

Record and Playback

In 3-hour, multiplexed, record-mode the multiplexer typically records up to 50 unique fields of video per second, with no requirement for synchronising cameras.

Compatible with all common time-lapse VCRs

Programmable time-lapse modes (Normal and Alarm)

Data restored at playback; time/date, alarms and camera titles

Alarms Events

10 or 16 alarm-inputs each N/O or N/C on a 25-way D-type connector (max 100 ohm contact resistance)

Videoloss Detection

Activity Detection

Alarm Responses

Interleaving or exclusive recording of alarmed cameras
Normal and Alarmed recording speeds
Alarms : buzzer, flashing LED and on-screen A or ALM text
Videoloss : buzzer, flashing LED and on-screen V or VDL text
Recorded alarms are also indicated during playback
2 Alarm-output relays max 30V AC/DC, contact max 500 mA - N/O or N/C programmable
Manual-Reset, Auto-Reset, or Contact-Closure
Keyboard and External Alarm Clear

All Video Inputs and Outputs

75 Ohm BNC connectors

Video: 1V pk-pk composite (PAL compatible)

Composite or S-VHS VCR connections

High display resolution 720 x 576, Recorded resolution 720 x 288

Camera Switch Input (Vext)

Accepts a TTL, field-synchronised, negative going pulse, duration 2-5 ms. Edge triggered with the edge selectable in the menus.

HIGH level, +4.5V to +5.5V

LOW level, 0V

Power

Auto-ranging : 110/230V AC $\pm$10%, 50Hz, to 12V DC external power supply provided.

Power Consumption: Max : 20W

Physical Specifications

Operational temperature limits:

0 deg C to +40 deg C at 10% to 80% relative humidity (non-condensing)

Storage temperature limits:

-20 deg C to +60 deg C at 10% to 95% relative humidity (non-condensing)

Dimensions (mm)	Weight (Kg)	Material	Colour
358(D)x43(H)x443(W)	4.5	Mild Steel	Grey

5 Function List

MACRO #	DESCRIPTION
1	
2	
3	
4	
5	
6	
7	
8	
{F} + Play	VCR VIEW. Selects the VCR as an input so that the VCR can be set up.
{F} + SEQ	SUMMER / WINTER TIME. Sets clock ahead 1 hour in March/April and back 1 hour in September / October

6_List Of Scheduled Functions

Day of week set up: Monday = _____

EVENT	DAY	TIME	MACRO TO RUN
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Appendix A
RS-232 Remote Protocol

COMMUNICATION TYPES:-

a. Remote Front Panel Simulation
b. Remote Data and Commands

a. Remote Front Panel Simulation

i) Data structure

Byte 1: 0xFF
Byte 2: 0x55
Byte 3: Front Panel Key Code

ii) Description

Byte 1 & 2 are communication type ID bytes.

Byte 3 contains the code for a specific front panel key.
The different keys and their corresponding codes are as follows.

Key	Code
NO_KEY	0
RECORD_KEY	1
PLAY_KEY	2
LIVE_KEY	3
ALARM_KEY	4
FREEZE_KEY	5
ZOOM_KEY	6
SEQ_KEY	7
MON-A_KEY	8
CAM_1_KEY	9
CAM_2_KEY	10
CAM_3_KEY	11
CAM_4_KEY	12
CAM_5_KEY	13
CAM_6_KEY	14
CAM_7_KEY	15
CAM_8_KEY	16
CAM_9_KEY	17
CAM_10_KEY	18
CAM_11_KEY	19
CAM_12_KEY	20
CAM_13_KEY	21
CAM_14_KEY	22
CAM_15_KEY	23
CAM_16_KEY	24
MENU_SETUP_KEY	25
SELECT_KEY	26
RESERVED	27
MACRO_KEY	28
RESERVED	29
RESERVED	30
RESERVED	31
RESERVED	32
RESERVED	33
MON_B_KEY	34
CAMERA_POWER_KEY	35
WASH_KEY	36
AUTO_PAN_KEY	37
LIGHTS_KEY	38
WIPE_KEY	39
PRESET_KEY	40
FOCUS_FAR_KEY	41
FOCUS_NEAR_KEY	42
IRIS_CLOSE_KEY	43
IRIS_OPEN_KEY	44
ZOOM_IN_KEY	45
ZOOM_OUT_KEY	46
TELEMETRY_KEY	47
LEFT_ARROW_KEY	48
RIGHT_ARROW_KEY	49
UP_ARROW_KEY	50
DOWN_ARROW_KEY	51
UP_LEFT_KEY	52 /* PSUEDO KEY */
DOWN_LEFT_KEY	53 /* PSUEDO KEY */
UP_RIGHT_KEY	54 /* PSUEDO KEY */
DOWN_RIGHT_KEY	55 /* PSUEDO KEY */
RESERVED	56
RESERVED	57

b. Remote Data and Commands

i) Data structure

Byte 1:   0xFF
Byte 2: Command Type
Byte 3: Data Length n
Byte 4: Data Type
Byte 5: Data byte 1
Byte 6: Data byte 2
.

Byte x: Data byte n

ii)Description

Byte 1: Always 0xFF.

Byte 2: Command Type
0xAA: (SET) Update system with data.
0xBB: (GET) Extract data from system.
0xCC: (DO) Reserved.

Byte 3: Contains number of data bytes in the stream [n].   Range: 0 - 255

Byte 4: Indicates the data type.

The data bytes start at Byte 5.

The data types (Byte 4) are as follows:

For Command Types SET and GET:

0 - TITLE1
1 - TITLE2
2 - TITLE3
3 - TITLE4
4 - TITLE5
5 - TITLE6
6 - TITLE7
7 - TITLE8

8 - TIMEDATE

9 - HISTORY
10 - FSSEQLIST
11 - SPARE
12 - RECLIST
13 - ENCAMERA
14 - ENALARM
15 - DWELLMULTISCREEN
16 - DWELLFULLSCREEN
17 - ALARMTIMEOUT
18 - ALARMINP
19 - MACROLINK
20 - BAUDRATE
21 - DISPLAYTD
22 - DISPLAYTITLE
23 - PBFORMAT
24 - ALARMMODE
25 - TDFORMAT
26 - LANGUAGE
27 - EXTSWITCH
28 - NORRECSPEED
29 - ALMRECSPEED
30 - MACRO1
31 - MACRO2
32 - MACRO3
33 - MACRO4
34 - MACRO5
35 - MACRO6
36 - MACRO7
37 - MACRO8
38 - MACRO9
39 - MACRO10
40 - MACRO11
41 - MACRO12
42 - MACRO13
43 - MACRO14
44 - MACRO15
45 - MACRO16

46 - TITLE9
47 - TITLE10
48 - TITLE11
49 - TITLE12
50 - TITLE13
51 - TITLE14
52 - TITLE15
53 - TITLE16
54 - RESERVED
55 - RESERVED
56 - RESERVED
57 - RESERVED

58 - ENABLACTIVITY
59 - UP_ACT_SETTINGS
60 - UP_ACT_GRID
61 - UP_ALM_AND_VDL
62 - DN_ACT_SETTINGS
63 - DN_ACT_GRID_1
64 - DN_ACT_GRID_2
65 - DN_ACT_GRID_3
66 - DN_ACT_GRID_4
67 - DN_ACT_GRID_5
68 - DN_ACT_GRID_6
69 - DN_ACT_GRID_7
70 - DN_ACT_GRID_8
71 - DN_ACT_GRID_9
72 - DN_ACT_GRID_10
73 - DN_ACT_GRID_11
74 - DN_ACT_GRID_12
75 - DN_ACT_GRID_13
76 - DN_ACT_GRID_14
77 - DN_ACT_GRID_15
78 - DN_ACT_GRID_16
79 - DN_TIMED_MACRO
80 - REC_LOCK
81 - VCR_TYPE

82 - SWITCH_EDGE
83 - NETWORK_ADDRESS

For command type DO;
0 - Reserved

UPLOADING DATA BYTES

When a message of type 0xBB is sent to the system, it will respond by sending a **0xff** start byte, followed by the requested information, followed by a **0xff** stop byte.

CHANGING AND ACCESSING INDIVIDUAL PARAMETERS

a) Changing Camera Titles

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 13;
buffer[3] = TITLE1 to TITLE16;
buffer[4] - buffer[16] = The title:-
                (12 ASCII characters + NULL
terminator);

b) Changing the time and date

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 12;
buffer[3] = TIMEDATE;
buffer[4] = Month MSB;
buffer[5] = Month LSB;
buffer[6] = Day MSB;
buffer[7] = Day LSB;
buffer[8] = Year MSB;
buffer[9] = Year LSB;
buffer[10] = Hour MSB;
buffer[11] = Hour LSB;
buffer[12] = Minute MSB;
buffer[13] = Minute LSB;
buffer[14] = Second MSB;
buffer[15] = Second LSB;

c) Request alarm history list

buffer[0] = 0xff;
buffer[1] = 0xBB;
buffer[2] = 0;
buffer[3] = HISTORY;

d) Changing the Full Screen Sequence list

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 30;
buffer[3] = FSSEQLIST;
buffer[4] - buffer[33] = BINARY list of 30 numbers .
        Allowable numbers (1 - 16)

e) SPARE

f) Changing the record list

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 30;
buffer[3] = RECLIST;
buffer[4] - buffer[33] = BINARY list of 30 numbers .
        Allowable numbers (1 - 16)

g) Enabling or disabling certain cameras

buffer[0] = 0xff;
buffer[1] = 0xAA;

buffer[2] = 16;
buffer[3] = ENCAMERA;
buffer[4] - buffer[19] = BINARY list of 16 numbers -
        digits (0 - Disable,1 -Enable)

h) Enabling or disabling certain alarms

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 16;
buffer[3] = ENALARM;
buffer[4] - buffer[19] = BINARY list of 16 numbers -
        digits (0 - Disable,1 -Enable)

i) Changing the Multiscreen Dwell time

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = DWELLQUAD;
buffer[4] = BINARY dwell time in seconds (1-99);

j) Changing the Full Screen Dwell time

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = DWELLFS;
buffer[4] = BINARY dwell time in seconds (1-99);

k) Changing the Alarm ON time

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = ALARMTO;
buffer[4] = BINARY alarm time in seconds (1-99);

l) Alarm input configuration

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 16;
buffer[3] = ALARMINP;
buffer[4] - buffer[19] = BINARY list of 16 numbers -
        digits (0 - Normally Closed,1 - Normally Open)

m) Changing the macro link values

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 16;
buffer[3] = MACROLINK;
buffer[4] - buffer[19] = BINARY list of 16 numbers -
        digits (1 - 16)

n) Changing the Baudrate of the Remote channel:

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = BAUDRATE;
buffer[4] = BINARY number
        (0 - 1200   1 - 2400   2 - 4800   3 - 9600)

o) Enable or disable the display of the time and the date

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = DISPLAYTD;
buffer[4] = BINARY number (0 - disable,1 - enable);

p) Enable or disable the display of the titles

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = DISPLAYTITLE;
buffer[4] = BINARY number (0 - disable,1 - enable);

q) Changing the Playback format

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = PBFORMAT;
buffer[4] = BINARY number
      (0 - ZMX decode,1 - System 8000,2 - DM
Compatible);

r) Changing the alarm mode

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = ALARMMODE;
buffer[4] = BINARY number
        (0 - Latched,1 - Transparent,2 - Timed Out);

s) Changing the time and date format

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 2;
buffer[3] = TDFORMAT;
buffer[4] = BINARY number - Time format
        (0 - 12hour,1 - 24hour);
buffer[5] = BINARY number - Date format
        (0 - mm/dd/yy,1 - dd/mm/yy,2 -yy/mm/dd);

t) Changing the menu language

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 2;
buffer[3] = LANGUAGE;
buffer[4] = BINARY number - Language
(0 - Eng, 1 - 4 = per Eproms supplied);

u) Enabling or disabling the external VCR switch

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = EXTSWITCH;
buffer[4] = BINARY number - (0 - Disable,1 - Enable);

v) Setting the normal record speed

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = NORRECSPEED;
buffer[4] = BINARY number - (1 - 13);

w) Setting the alarm record speed

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = ALMRECSPEED;
buffer[4] = BINARY number - (1 - 13);

x) Creating a macro sequence

buffer[0] = 0xff;

buffer[1] = 0xAA;
buffer[2] = number of bytes starting from buffer[4];
buffer[3] = MACRO1 to MACRO16;
buffer[4] - buffer[x] The macro sequence keys

The numerical values of the keys are as follows:

```
    Record        = 1
    Play          = 2
    Live          = 3
    Alarm         = 4
    Freeze        = 5
    Zoom          = 6
    Sequence      = 7
    Multiscreen   = 8
    '1'      = 9
    '2'      = 10
    '3'      = 11
    '4'      = 12
    '5'      = 13
    '6'      = 14
    '7'      = 15
    '8'      = 16
    '9'      = 17
    '10'     = 18
    '11'     = 19
    '12'     = 20
    '13'     = 21
    '14'     = 22
    '15'     = 23
    '16'     = 24
    Setup = 25
    Select              = 26
    RESERVED                  = 27
    RESERVED                  = 28
    Macro Special 1 = 29 /* Activate Alarm Output 1*/
    Macro Special 2 = 30 /* Reset Alarm Output 1   */
    Macro Special 3 = 31 /* Pause Macro for 1 second
*/
    Macro Special 4 = 32 /* Pause Macro for 5 seconds
*/
    RESERVED                  = 33
    Mon_B Key      = 34
    Camera Power Key = 35
    Wash Key       = 36
    Auto Pan Key   = 37
    Lights Key     = 38
    Wipe Key       = 39
    Preset Key     = 40
    Focus Far Key  = 41
    Focus Near Key              = 42
    Iris Close Key  = 43
    Iris Open Key   = 44
    Zoom In Key     = 45
    Zoom Out Key    = 46
    Telemetry_Key   = 47
    Left Arrow Key  = 48
    Right Arrow Key = 49
    Up Arrow Key    = 50
    Down Arrow Key              = 51
    Up Left Key     = 52
    Down Left Key   = 53
    Up Right Key    = 54
    Down Right Key  = 55
    Macro Special 5 = 56 /* Activate Alarm Output 2 */
    Macro Special 6 = 57 /* Reset Alarm Output 2 */
```

The last byte of the macro   buffer[x] = 58; Macro_End
The number of bytes in the macro may not exceed 32.

y) Enable activity detection

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 16;
buffer[3] = ENACTIVITY;
buffer[4] - buffer[19] = BINARY list of 16 numbers -
         digits (0 - disable, 1 -enable)

z) Request activity settings

buffer[0] = 0xff;
buffer[1] = 0xBB;
buffer[2] = 0;
buffer[3] = UP_ACT_SETTINGS;

aa) Request activity grid

buffer[0] = 0xff;
buffer[1] = 0xBB;
buffer[2] = 0;
buffer[3] = UP_ACT_GRID;

ab) Request alarm and videoloss status

buffer[0] = 0xff;
buffer[1] = 0xBB;
buffer[2] = 0;
buffer[3] = UP_ALM_AND_VDL;

ac) Download activity grid

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 32;
buffer[3] = DN_ACT_GRID_1 to DN_ACT_GRID_16;
buffer[4] - buffer[35] BINARY digits corresponding to
zones.
         Two bytes per row, 16 rows. (1 - active, 0 -
off)
**NOTE: This message must be used with caution.
Delays of 100ms must be inserted between
consecutive camera grids.**

ad) Downloading Timed Macro Information

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 6;
buffer[3] = DN_TIMED_MACRO;
buffer[4] = Event number (1 - 20)
buffer[5] = Day (0 - 8) 0 -> Disabled
buffer[6] = Hour (1 - 12)
buffer[7] = Minute (0 - 59)
buffer[8] = AM/PM (0 - AM, 1 - PM)
buffer[9] = Macro Number (1-16)

ae) Setting the Record Lock

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = REC_LOCK;
buffer[4] = 0 - OFF, 1 - ON

af) Setting the VCR Type

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = VCR_TYPE;
buffer[4] = 0 - Type A,1 - Type B

ag) Setting the Vext Pulse active edge

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = SWITCH_EDGE;

buffer[4] = 1 - Negative Edge,0 - Positive Edge

ah) Setting the Network Address

buffer[0] = 0xff;
buffer[1] = 0xAA;
buffer[2] = 1;
buffer[3] = NETWORK_ADDRESS;
buffer[4] = Binary number (0-255)

UPLOADING DATA

a) Alarm history list

When the "Request Alarm History List" message is
received by the system, it will respond by sending an
ASCII string for every alarm event in its alarm history
list. The string is formatted as follows:

> dd.bmm/ddbhh:mm:ss<CR><LF>

dd - alarm event number (0 - 99)
b - space character
mm - month
dd - day
hh - hours
mm - minutes
ss - seconds
<CR><LF> - Carriage return /line-feed pair

b) Activity settings

Six bytes are uploaded:

i) Sensitivity, (1 - 10)
ii) Relay, (0 - none, 1 - relay 1, 2 - relay 2, 3 - both)
iii) Link to Alarm, (1 - 16)
iv) False Alarm Rejection, (0 - low, 1 - medium, 2 - high)
v) Size Discrimination, (1 - 255)
vi) Record Rate, (0 - none, 1 - 2x, 2 - 4x, 3 -
interleaved)

c) Activity grids

16 x 32 bytes are uploaded. 1st 32 bytes are zones
from camera 1, 2nd 32 bytes from camera 2, etc.
(Two bytes per row, 16 rows)

d) Alarm and videoloss

4 bytes are uploaded. The 1st 2 represent the alarms in
the system (MSB,LSB).
The next 2 bytes represent the videoloss status (MSB,
LSB).

Appendix B
Flicker Adjustment

The mono multiplexer units do not require flicker adjustment.

For colour multiplexer units, do the following.

Before recording any cameras, the two decoder channels need to be calibrated to reduce flicker on playback.

Note
   You must use camera 1 for this set-up.

1) Display camera 1 full screen on Monitor-A.

   Camera-1 must be in full resolution mode (frame display) and not it half resolution mode (field display). The half resolution mode is indicated on the monitor by the presence of the **-** character to the left of the time and date display. Press the camera 1 key to toggle this feature on and off.

2) Normally the picture will flicker. Reduce the flicker by pressing the up or down arrow keys ⊙.

Note
   These are not repeating keys. Do not hold them down. They must be released each time you press them.

   These settings are stored in the battery backed up memory, however, every time a unit is reset using the RUN/CLR jumper, or by commanding a Factory Settings reset, this procedure must be repeated.

This page is intentionally blank.

This Manual

This manual provides operating instructions for the ZMX/BD/10, ZMX/BS/10MD and ZMX/CS/10 Multiplexers. It does not include programming instructions, which are provided in the Programming Instructions Manual

Section 1 provides important safety information.

Section 2 provides the operating instructions.

This page is intentionally blank.

Contents

1 Important Safeguards

This product is exclusively for use in CCTV applications and has no other purpose.

Read and Retain the Instructions - All the safety and operating instructions should be read before the unit is operated and should be retained for future reference.

Cleaning - Unplug the unit from the outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

Attachments - Do not use attachments not recommended by the product manufacturer as they may cause hazards.

Water and Moisture - Do not use this unit near water. For example, near a bathtub, wash bowl, kitchen sink, or laundry tub, in a wet basement, near a swimming pool, in an unprotected outdoor installation, or any area that is classified as a wet location.

Accessories - Do not place this unit on an unstable stand, tripod, bracket, or mount. The unit may fall, causing serious injury to a person and serious damage to the unit. Any mounting of the unit should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

Ventilation - Openings in the enclosure, if any, are provided for ventilation to ensure reliable operation of the unit and to protect it from overheating, these openings must not be blocked or covered. This unit should not be placed in a built-in installation unless proper ventilation is provided. Do not place directly on other hot equipment, because this may increase its operating temperature.

Power Sources - This unit should be operated only from the class 2 isolated power supply provided.

Plugs - This unit may be equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the plug.

Power-cord Protection - Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, and the point where they exit from the appliance.

Overloading - Do not overload outlets and extension cords as this can result in a risk of fire or electric shock.

Object and Liquid Entry – This equipment must be protected from the ingress of foreign materials. Never push objects of any kind into this unit through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the unit.

Servicing – There are no user-serviceable parts. Do not remove the covers as this may expose you to dangerous voltages or other hazards, including moving mechanical parts. Refer all servicing to qualified service personnel.

Replacement Parts - When replacement parts are required be sure the service technician has used the replacement parts specified by the manufacturer. Unauthorised substitutions may result in fire, electric shock or other hazards.

Safety Check - Upon completion of any service or repairs to this unit, ask the service technician to perform safety checks to determine that the unit is in proper operating condition.

Coax Grounding - If an outside cable system is connected to the unit, be sure the cable system is grounded.

Lightning - For added protection of this unit during a lightning storm, or when it is left unattended and unused for long periods, unplug it from the wall outlet and disconnect the cable system. This will prevent damage to the unit due to lightning and power-line surges.

1.1 Safety

If you have any problems then contact Baxall Limited.

WARNING
Installation is only to be carried out by competent, qualified and experienced personnel in accordance with the country of installation's National Wiring Regulations.

WARNING
Your multiplexer contains no user-serviceable parts inside.

WARNING
This unit contains a lithium battery whose expected life is in excess of five years. If your multiplexer looses its settings each time it is switched off then the battery needs replacing. In this instance return your multiplexer to Baxall Limited and we will replace the battery.

WARNING
There is a danger of explosion if the lithium battery is incorrectly replaced. Replace only with the same or an equivalent type recommended by the manufacturer. Dispose of unused batteries according to the manufacturers instructions.

WARNING
Do NOT use the 12V power leads in the RS-485 cable UNLESS it is to be used on a one-to-one connection between a unit with 12V power and a unit with no 12V power. For example, from a multiplexer directly to a keyboard that does not have its own power source.

In all other circumstances, such as multi-dropped multiplexers, do NOT use the 12V power leads in the RS-485 cable, use only the two wires for the actual 485 comms.

Refer to Baxall Limited before using your multiplexer in a medical and/or intrinsically safe application.

Do not exceed the voltage and temperature limits given in the specification. Only operate your multiplexer in a clean, dry, dust-free environment.

Note
The multiplexer's main function is to multiplex video and its secondary function is to provide alarms. For this reason, Baxall Limited recommend that you do not use your multiplexer as the main alarm system on your site but install a dedicated intruder/fire alarm where necessary.

2 Operating Instructions

The products described in this manual are:

- ZMX/BD/10 10-way, Monochrome Duplex Multiplexer
- ZMX/BS/10 10-way, Monochrome Simplex Multiplexer
- ZMX/CS/10, 10-way, Colour Simplex Multiplexer

You can check which particular model you have by looking at the label on the bottom right of the unit's front panel.

The models include many advanced features such as activity detection, alarm handling, zoom, an alarm history log, programmable macro function keys, a scheduler to automatically start macros at pre-set times, a simple Summer/Winter time change function, access to Rugby Clock time control, remote programming and remote control, and they can be set-up quickly using easy-to-use, on-screen menus.

With all of the models, the front panel contains all the operator control keys and indicators, while the video inputs, video outputs, alarm inputs and outputs, and the remote control connectors are on the rear panel.

The controls and indicators have been designed to be convenient and easy to use.

All the models have 12 V DC power and are supplied with external AC power supplies. The colour models can accept either colour or monochrome video inputs without any additional set-up.

In general, the operating instructions provided in this document apply to all of the above models unless stated otherwise.

This manual assumes that your multiplexer has been installed already and is working correctly. It provides you with all the necessary day-to-day operating instructions, with the exception of the use of the MENU system, which is described in the Programming Instructions manual. It is assumed that you are new to the concept of multiplexers.

2.1 The Basics

Your multiplexer, depending on the model, has a maximum of 10 or 16 camera inputs. It has 10 or 16 alarm inputs (which are normally associated with each camera), two alarm outputs, two monitor outputs (Monitor-A and monitor-B) and VCR output and input connections.

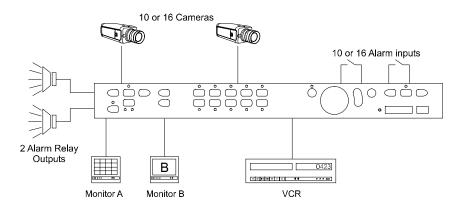A typical installation is shown in Figure 1.

Figure 1 Typical Installation

The multiplexer provides you with sophisticated facilities for surveillance monitoring, and it can record images from all of the connected cameras onto a single video recorder.

In Figure 1, Monitor-A is used for multi-screen, digital images, which can be frozen and zoomed. That is, you can choose to view more than one camera at once on the same screen, you can freeze the images, and you can select a camera and electronically zoom (x 2) into it. Monitor-B is a full-screen, live, analogue output, which cannot be frozen or zoomed. Monitor-B is sometimes referred to as a 'Spot' monitor in the security industry.
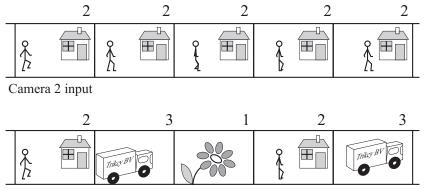
The alarm inputs are normally associated with each of the cameras. When an alarm has been activated, this can be indicated on the monitor screen. At the same time, an LED on the unit's front panel can be made to flash, and a buzzer sounded. Depending on the way your system has been programmed, you may need to press the alarm button to acknowledge it, or it might cancel itself either after a fixed period or when the alarm device is deactivated. When an alarm does occur, Monitor-B always switches to full screen display of the associated camera, and if there are multiple alarms, Monitor-B will sequence between the associated cameras. Monitor-A, on the other hand, will behave differently, depending which mode the multiplexer is operating in and which model is being used. For more information on the handling of alarms, refer to the Programming Instructions manual.

Multiplexing

The purpose of multiplexing is to reduce the number of VCRs and cassettes required on a site. A multiplexer gives a VCR output with the ability to record all the connected cameras to a single VCR.

Explanation of Multiplexing

A PAL compatible TV shows a series of 25 still pictures per second (known as frames, each made up of two fields) which give the impression of motion. Normally a VCR would record every frame. Multiplexing (time-division-multiplexing), as done by your multiplexer, means that the camera signals are combined as a single signal from all the cameras, 1 picture from each and then back to the first (see Figure 2). This gives a slightly more jerky image (a Charlie Chaplin effect) on playback and for example, loses 9 images in 10 for 10 cameras, but means that several cameras can be recorded on one VCR.

Camera 2 input

Cameras 1, 2 and 3 multiplexed to tape

Figure 2 Illustration of Multiplexing

Time Lapse VCRs

The time-lapse VCR reduces the number of cassettes required for a site. It also reduces the amount of time spent changing them and the amount of storage space required for them. Time-lapse VCRs record and play tapes more slowly by recording fewer images. The speed of operation for a normal VHS VCR is 3 hours. The table below gives examples of how many fields can be recorded on a 3 hour tape per camera in various time-lapse modes.

Time Lapse mode	fields per second with 1 camera	fields per second with 10 cameras	fields per second with 16 cameras
3 hour	50	5	3.125
12 hour	12.5	1.25	.78
24 hour	6.25	.625	.39
48 hour	3.13	.313	.2

Table 1 Time-lapse modes and recording quality

Features of your Multiplexer

To produce multi-screen displays and to multiplex cameras to tape, the multiplexer digitises the camera input signals in sequence. For the colour models, unlike other similar multiplexers, it uses 'Parallel Video Processing' which means that it does it more quickly. The camera update rate to tape is typically 2 to 3 times faster than its competitors. This makes the image less jerky by capturing the maximum of 50 unique fields-per-second to tape in the fastest time-lapse setting, which means that if an incident occurs, less information is lost.

2.2 Modes of Operation

Your multiplexer has three modes of operation, LIVE, RECORD and PLAY selected by using the LIVE, RECORD and PLAY keys (see Figure 3).
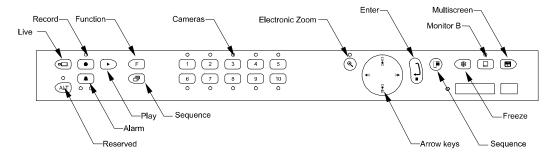
Figure 3 ZMX/CS/10 Front Panel

The operation of these modes depends upon whether your multiplexer is a **Simplex** model (ZMX/BS/10 or ZMX/CS/10) or a **Duplex** model (ZMX/BD/10).

Note
Selecting RECORD mode or PLAY mode does not start the VCR. The VCR must be started manually.

Differences Between the Operation of Simplex and Duplex Models

Simplex models can be operated in **one** of the three principal modes at any one time. Duplex models always operate in **two** principal modes simultaneously. The duplex model has dual digital video processors, and as a result it always has the multiplexed RECORD mode active in the background. You can, therefore, choose LIVE or PLAY mode while the unit continues to record.

Record Mode

RECORD mode provides output to the VCR in multiplexed format. Single images from up to 16 video input channels (depending on the model of multiplexer) are assembled to form a continuous multiplexed video signal, which can then be recorded onto a single VCR via the VCR OUT connector.

Note
During the RECORD mode on a **simplex** model, the MONITOR-A multi-screen output displays only an analogue, full-screen video of any of the input cameras. During this time, the Monitor-A output is identical to the Monitor-B output. RECORD mode can be locked ON in simplex models.

For more information on recording see the Programming Instructions manual.

Play Mode

PLAY mode plays back a previously-recorded multiplexed tape. Upon entering the PLAY mode, the multiplexer will automatically select a multi-screen display which shows you all the possible recorded images on Monitor-A. You can view the playback in full-screen or multi-screen formats, similar to LIVE mode formats. The unit automatically reconstructs each camera's identification, its status, and the date and time which was current at the time of recording and then displays it with the corresponding camera image.

In play mode you can also adjust the brightness and contrast of the display. Your multiplexer can decode Baxall and DM compatible recordings. You can select which in the menu system. The DEFAULT format decodes recordings from Baxall ZMX-IT and ZMX-Storm mulitplexers.

Note
It is important to remember that Monitor-B continues to display live, full-screen images during PLAY mode. Only Monitor-A displays playback images.

Live Mode

There are several different multi-screen display formats that can be selected by you on the Monitor-A multi-screen output during LIVE mode.

These are described in section Multi-screen Formats

Output To The VCR During Live Mode And Play Mode

During LIVE or PLAY mode, the signal on the unit's VCR output is different for simplex and duplex models. For duplex models, there is always a multiplexed video signal present on the VCR output for multiplexed recording. For simplex models, the VCR output only has multiplexed output when in record mode.

Videoloss

Your multiplexer monitors the video inputs for video loss. If it detects videoloss, it can sound the buzzer (if enabled, the default is OFF), flashes the videoloss LED (the right-hand LED under the ALARM key) and displays **VDL** text on the full-screen display and **V** in a multi-screen.

Note
After a camera is restored from video-loss, you should select it full-screen. This ensures the fastest recognition by the multiplexer that the camera is now connected.

The Menu System

More advanced operation of your multiplexer involves use of the menu system. Your multiplexer provides user-friendly, on-screen menus for entry of user data such as titles and for the selection of options (see the Programming Instructions manual for details).

Note
   The alarms are disabled while the menu system is active.

2.3 The Keys

The operation of your multiplexer is given below on a key by key basis. Figure 4 shows the location of the keys for a ZMX/CS/10. 16 way multiplexers have 16 rather than 10 camera keys.
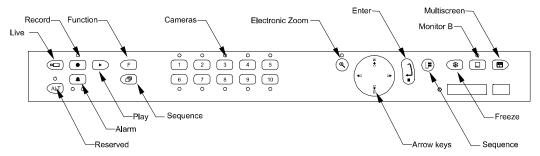

Figure 4 Key Locations

ALARM key

If an alarm occurs the keyboard buzzer sounds, the left-hand LED under the ALARM key flashes and **ALM** is displayed on the full-screen display and **A** in a multi-screen cameo.

Depending how your system has been set up, you may need to clear the alarm by pressing the ALARM key.

FREEZE key ✸

This key freezes the current image and **FRZ** is displayed on the full-screen and * on the corresponding multi-screen cameo while the image is frozen. Press it again to unfreeze the image.

Note
You must turn freeze off before you can select another camera. Freeze is not available in RECORD mode on simplex units.

ZOOM key ⊕

This operates a 2 times electronic zoom on the current image. **ZOOM** is displayed on the screen while the image is zoomed, and the ZOOM key LED is illuminated.

In a full-screen display press the ZOOM key once to activate and again to deactivate. In a multi-screen display, the first press changes the display to full-screen, press it again to zoom.

Use the ARROW keys to move around the zoomed display.

Multi-screen key ⊞

This key selects a multi-screen display (in LIVE and PLAY modes).

LIVE mode key ▭

This key selects LIVE mode which allows the viewing of LIVE cameras. During LIVE mode, the Monitor-A output and the VCR output are the same on simplex units.

Note
This key will not operate if your Multiplexer is locked in RECORD mode (simplex models only).

RECORD mode key ⊙

This key selects record mode. The LED above the key is lit when record mode is selected.

Note
1) On duplex units, RECORD mode is always active and there is no need to press the record key. Multiplexed recording will always continue even if LIVE or PLAY mode has been selected.
2) On a simplex multiplexer, Monitor-A always displays analogue, full-screen images whilst in RECORD mode. Press the SEQUENCE key to sequence the full-screen display.
3) Your multiplexer does not control your VCR. To record, start the VCR recording manually.

For simplex models, to leave RECORD mode at any time, press the LIVE or PLAY keys. If RECORD MODE LOCK is on then you cannot access LIVE or PLAY modes without switching it off in the menu system.

Note
Your Multiplexer may have a **Vext** connection to your VCR, in which case it automatically tracks the VCR recording speed (overriding any menu settings). Ask your site manager for more information.

If the connection is not **Vext**, ensure that the recording speed on the VCR and on your Multiplexer are the same. Use the menu system to change the speed on the Multiplexer.

PLAY mode key ⊡

This key selects PLAY mode. This key will not operate if your Multiplexer is locked in RECORD mode (simplex models).

PLAY mode will always stop any LIVE mode multi-screen displays on Monitor-A.

When playback is first started, the unit will automatically select a multi-screen display on Monitor-A, which can show all the cameras which were recorded on that tape. You can select one of several screen formats for display and also choose which cameras to display, in which position in a multi-screen display.

Note
Your Multiplexer does not control your VCR, to play start the VCR playing manually.

Play mode can decode in Default or Alternate modes. Default can decode any Baxall ZMX-IT and ZMX-Storm recording. Alternate can decode DM compatible recordings (NPX1, NPX+, DIAMOND, DIAMOND+, all GEM).

For a Default recording, the recorded time-lapse setting is displayed in the top right corner of the screen. You can change the tape format in the menu system (see the Programming Instructions manual).

If the cameras selected for display are not available or become unavailable during playback then **N/A** is displayed in the relevant screen's area.

Adjusting the Picture Brightness and Contrast During Playback

This setting allows you to optimize the playback image, although, it is preferable to adjust your installation so that it is not necessary. The Multiplexer initially sets the brightness and contrast when it is powered on.

To adjust the brightness and contrast of the playback image (these settings do not affect the live or recorded image).

1) Select PLAY mode and start playing a previously recorded multiplexed tape in the VCR.

2) Call up the camera you wish to enhance full-screen by selecting the appropriate CAMERA key.

3) Use the 4-way ARROW key rocker-switch to adjust the brightness and contrast. This adjustment will be applied to all the cameras when you go back to multi-screen.

The up arrow increases the brightness and the down arrow decreases the brightness. The left arrow reduces the contrast and the right arrow increases the contrast.

FUNCTION key ⌨F

This key, followed by a CAMERA key between 1 and 8, triggers one of up to eight macros, each having 32 key-strokes, which can be programmed into your multiplexer.

The functions are set up using the MENU system. Your Multiplexer is supplied without any programmed functions.

Note
   The functions do not operate, for simplex models, if your Multiplexer is locked in RECORD mode.

SEQUENCE key ⌨

This key starts or stops full and multi-screen sequences.

The sequence pauses on each camera for a **dwell-time** before moving to the next. You can set both the dwell-time and list of cameras included in the sequence in the MENU system.

CAMERA keys ⌨9

Press a CAMERA key to select a full-screen camera. This stops a sequence or a multi-screen display.

ARROW key

This key has a 4-way rocker action. Use it to move around the electronic zoom area, navigate in the menu system, or to change the contrast and/or brightness in playback.

MENU key

Press the MENU key once to enter the MENU system, then enter your password.

The default password is 🛈,🛈 , 🛈,

If this has been changed, use the CAMERA keys to enter password required (the password can also contain arrow keys).

Once you are in the MENU system, use the on-screen menus to navigate. For more information see the Programming Instructions manual.

To EXIT the MENU system at any time press the MENU key. Your Multiplexer stores your settings as you make them in non-volatile memory. This means that you can exit the MENU system at any time and you will not lose your settings, provided you have already selected OK where appropriate, and pressed the ENTER key.

ENTER key

This key makes selections in the MENU system.

MON-B Key

This key lets you use the multiplexer's keys to operate on Monitor_B. Text on Monitor-A indicates that Monitor-B is selected. The LED in the Monitor-B key will light, and while the LED is lit, any keys pressed will affect Monitor-B and not Monitor-A. Pressing the Monitor-B key again will switch off the LED and subsequent keys will operate on Monitor-A.

One Hour Adjustment For Summer/Winter Time Changes

Many countries adjust the time twice a year by an hour. A special function is installed on your Multiplexer to allow adjustment without entering the menu system.

In March/April the time can be advanced once only (by an hour) using the keyboard.

The same key-press will decrement the time once only (by an hour) in September/October.

To Increment/Decrement (dependent on month) the time:

Press the FUNCTION key Ⓕ followed by the SEQUENCE key ⬚.

Caution
> Take care not to operate this accidentally because it cannot be undone without entering the menu system.

2.4_Multi-screen Formats

Depending on the type of multiplexer you have, you can switch your multi-screen display between the following options using the multi-screen key. The individual areas of a multi-screen are called cameos.

Multi-screen				Notes
16-WAY	(4X4)			16-way multiplexers only
13-WAY	(1X12)			16-way multiplexers only
10-WAY	(2X8)			
9-WAY	(3X3)			
7-WAY	(3X4)			
QUAD	(2X2)			
PIP	(1 in 1)			
16-WAY (repeats from top of list)				

Note
> The following screen formats are not available in Playback mode:
>
> Mono models: PIP, 7-way, 10-way and 13-way screens
>
> Colour models: 7-way and 13-way screens

2.5 Monitor Outputs

Monitor-B

The Monitor-B monitor always displays analog live, full-screen images of the camera inputs, regardless of which mode is selected.

Monitor-A

While Recording

On a duplex unit, you can select LIVE or PLAY mode while recording is taking place. Hence you can select any desired Monitor-A multi-screen output on a duplex unit, while multiplexed recording takes place on the VCR output. Monitor-A images can be frozen.
On a simplex unit, Monitor-A only displays analog, full-screen images while RECORD mode is selected, and displays exactly the same output as on Monitor-B.

Record Speed Indicator

During recording, the multiplexer indicates the speed at which it is recording on Monitor-A. It uses the same time-format for the indicator as is generally used by time lapse VCRs. For example, **R024** will be displayed to indicate that the unit is **R**ecording in **24 hour** mode. (If the VCR switch input is active, then **R EXT** will be displayed.)
On a simplex unit, this indicator will only be seen in RECORD mode. On a duplex unit, this indicator will be visible in all modes.

Alarm Displays In Record Mode

On a duplex unit you can select LIVE or PLAYBACK modes while recording is taking place, and so the alarm displays will conform to the LIVE or PLAY modes of operation.

On a simplex unit in RECORD mode, the Monitor-B and the Monitor-A multi-screen outputs are the same, and both will automatically switch to a full-screen live display of a camera in alarm. Multiple simultaneous alarms cause the display to sequence between alarmed cameras, with a fixed dwell time of 1 second.

Note
During RECORD mode, the alarm image on a simplex unit cannot be frozen on Monitor-A.

Live Mode

If a multi-screen does not have all the cameras displayed, the system can sequence all remaining cameras in the last cameo.

You can also select a full-screen digital display of any of the input cameras and a sequenced display of full-screen cameras.

Sequencing In Cameos

Press SEQUENCE key while in Live multi-screen mode to automatically sequence all the undisplayed cameras in the lower right cameo.

Automatic Camera Location Memory

If you have set up the camera numbers and locations which are to be displayed in a particular multi-screen, then the unit will automatically save that selection and will display the same camera selection and locations each time that particular multi-screen is selected. (This is saved in volatile memory.)

For example, if cameras 9, 4, 7 and 2 are selected for the quad multi-screen, then whenever you select the quad multi-screen, those cameras will be displayed, and in the same quadrants as you originally selected.

Automatic Multi-Screen Format Memory

If you switch from a multi-screen display to a full-screen camera image, then when the MULTI-SCREEN key is next pressed, you will automatically return to the last multi-screen format that was being viewed.

For example, if you are viewing a 7-way multi-screen and switches the display to a full-screen display, then if the MULTISCREEN key is pressed later the Monitor-A display will switch directly back to the 7-way screen format.

Setting Up the Cameras In Monitor-A Multi-screen Displays

Any camera can be displayed in any position in the multiplexer multi-screen displays. The default multi-screen displays show the cameras in ascending order. In LIVE mode, you can display one camera in more than one position, while in PLAY mode each camera can be displayed once only on each multi-screen.

To make it simple for you to select any camera for display in any cameo in a LIVE multi-screen, the multiplexer uses the concept of **Active Cameos**.

An active cameo is simply an on-screen indication of which particular cameo will be affected by the next front panel keystroke. Active cameos are used mainly to give you a simple way of specifying which camera is to be displayed in which cameo, but other useful functions such as cameo freeze and zoom to full-screen are also available. To add a camera to an active cameo, simply press the appropriate camera key. The selected camera is added to the cameo and the next cameo in the multi-screen becomes the active one.

An active cameo will only be present if you specifically select active cameo mode.

HBZMXSIB/10/16SD-OP-1   Page 23

Selecting Active Cameo Mode

Press the ENTER key while displaying any multi-screen. The top left cameo will be the initial active cameo.

The active cameo is indicated by displaying the camera number and its title in flashing video.

Ending Active Cameo Mode

The active cameo mode will stay active for about 15 seconds after the last key is pressed, or until the ENTER key is pressed again to exit the mode. Active cameo mode will also stop immediately if a new multi-screen display is selected, or if you switch between LIVE, PLAY and RECORD modes.

Key Functions During ACTIVE CAMEO Mode

Key	Function
Arrow key	Moves the active cameo around the multi-screen.
Camera key	Selects which camera to display in the active cameo. The active cameo will then automatically advance to the next logical cameo on the right so that you can easily enter camera numbers in several cameos without using the arrow keys.
FREEZE key	Freezes the cameo.
ZOOM key	Switches to a full-screen display of that camera. This will cancel active cameo mode.

Note

If the ZOOM key is pressed with no active cameo selected, then the display will switch full-screen to the camera displayed in the top left cameo.

Display formats are operating parameters, not menu selections, and so they are saved in volatile memory and not in battery backed-up memory.

Resolution of Full-screen displays (Colour models)

You can switch the resolution of digital full-screen displays from 'frame' displays to 'field' displays on Colour models. The lower resolution 'field' displays can result in less 'flickering' on some high contrast camera scenes.

To switch between 'field' resolution and 'frame' resolution on a full-screen display, press the camera number key of the camera which is already being displayed full-screen. The display will toggle its resolution each time the key is pressed.

Note

This is a global system setting, not a camera-by-camera setting.

Field Or Frame Indication (Colour Models)

A **-** will be displayed next to the time / date display of Camera 1 only to indicate that 'field' resolution has been selected. The indicator is removed if 'frame' resolution has been selected.

PIP Display - Size And Position

The PIP (pics-in-pics) display on Monitor-A can be displayed in one of three sizes (two for monochrome units), and it can be displayed in one of two positions.

Size Selection

The sizes can be 1/4, 1/9, or 1/16 of full-screen for Colour units, and 1/4 or 1/16 for mono units.

Position Selection

The PIP can either be displayed on the lower right hand side of the display, or else on the top left hand side of the display.

Changing The PIP Size And Position In LIVE Mode

The PIP size and position can be changed during LIVE mode by using the arrow keys. The up and down arrow keys will change its position, and the left and right arrows will change its size, left being smaller and right being larger.

Changing Positions And Colours Of Titles

Titles can be displayed either at the top or at the bottom of the camera view, or titles can be switched off. The titles can also be displayed as black, grey, or white characters. This feature is selectable for each camera during either LIVE or PLAY modes.

Select a full-screen view of that camera on Monitor-A, and then press ENTER to toggle the title position and Colour. You can select one of seven options for each camera.

The following cycle will be followed as the ENTER key is pressed:

Position	Colour
Top	black
Top	grey
Top	white
Bottom	black
Bottom	grey
Bottom	white
Do not display this camera title	
Top	black (repeats from top of list)

Note
1) This setting affects only the Monitor-A display. Text on the Monitor-B display is not moved.

2) In any Monitor-A display, all text except the time and date will move from the top to the bottom of the screen, and vice versa.

2.6 Setting The VCR Playback Speed

Note
The multiplexer does not control the VCR.

You must select the playback speed on the VCR, and not on the multiplexer. There is no related set-up required on the multiplexer during playback.

The multiplexer will automatically adjust its display to match the VCR playback speed.

Indicators

The on-screen indicator (**P024** for example, for 24 hour mode) tells you the speed at which the tape was recorded. It does not indicate the speed at which the tape is being played back. To find out the playback speed, you must look at the VCR's playback speed indicator.

The multiplexer will display the text **N/A** if a camera does not get updated from tape within a minimum time (**N/A** signifies that the camera is Not Available). This is a warning message, not an error message. This indicator warns you that the update rate is very slow or updating may have stopped. It warns that there may have been events that were not captured during the recording, or the tape data may be corrupted.

When Tapes Cannot Be Decoded

If the multiplexer cannot decode a tape which is being played back, the system will display a blank screen. The fields will not be decoded or separated.

PLAY Mode - Monitor-A Indications

During PLAY mode the on-screen text **'P'** indicates the current mode, PLAY mode.

The speed at which the data was recorded is displayed after the **P**, for example, **P003** or **P024**.

If the recording was made using the Camera Switch Input (R EXT), then the mode and speed indicator will read **'P EXT'**.

The **time and date** is displayed on-screen during PLAY mode. You should note, however, that this is the recorded time, not the current system time.

The indicator, **VDL,** will be displayed in the full-screen display or **V**, in the corresponding cameo in a multi-screen, if there was videoloss at the time that the recording was made.

Note

Any camera which is not detected on tape for 8 or more consecutive cycles during playback, and is not flagged as a video loss camera, will result in the warning message, **N/A,** signifying that it is Not Available. This is a warning message only, and can appear during playback on full-screen or multi-screen formats on Monitor-A.

Several circumstances can cause an **N/A** indication. These are:

1) The camera may not have been included in the record list at the time of recording.

2) The camera may have been disabled at the time of recording.

3) The images for that camera on tape have been corrupted and cannot be decoded at time of playback.

4) The VCR play speed is very slow.

The not available indicator, **N/A**, helps you to tell the difference between images which are not being updated during playback and images which are being updated from tape but have no movement within the image.

The alarm indicator, **A**, will be displayed with the corresponding camera image on Monitor-A if there was an active alarm at the time that the recording was made.

Play Mode - Changing Text Positions And Colours

The positions and colours of camera titles, and the colour of the date / time can be set separately for playback.

Note

The title colours in PLAY mode can be different to those in LIVE mode. The unit will keep a separate record of your selections for LIVE and PLAY modes.

2.7 Alarms

Alarm Handling Capability

Alarms will result in an automatic full-screen image of the camera in alarm on Monitor-A and Monitor-B. You can manually freeze the camera-in-alarm displayed on Monitor-A.
The alarms will activate an output relay, Relay 1. The alarms can be latched until accepted by the operator, or latched for a preset time, or can be set to follow the status of the alarm input (called transparent). The alarm latching is a system-wide setting, selectable by you.

Simple menu tables make it quick and easy for you to select the desired alarm action.

Alarm Displays In Live Mode

Monitor-A Full-Screen During Alarms

During alarms in LIVE mode, Monitor-A will automatically switch to a full-screen display of the camera in alarm. If multiple alarms are active, Monitor-A will automatically sequence between the alarm cameras at a fixed 1 second dwell. This dwell is not programmable.

Freezing Alarms On Monitor-A In Live Mode

You can freeze the camera in alarm on Monitor-A by pressing the FREEZE key.

Monitor-B Full-Screen During Alarms

During alarms in LIVE mode, Monitor-B will automatically switch to the camera in alarm. If multiple alarms are active, Monitor-B will automatically sequence between the alarm cameras at a fixed 1 second dwell. This dwell is not programmable. Monitor-B cannot freeze images.

Note
> The Monitor-B screen will not revert to its original fixed display after the alarm is cleared. It will continue to display the last alarm camera. However, if sequencing was active on Monitor-B before the alarm, then Monitor-B will continue to sequence after the alarm is cleared.

Alarm Displays In Play Mode

Regardless of the mode selected, Monitor-B will always display live images. Hence, during PLAY mode, live alarm inputs will cause live alarm displays on Monitor-B, not Monitor-A. Monitor-A will continue to display playback images.

Monitor-A During PLAY Mode - Recorded Alarms

In PLAY mode, the Monitor-A display will not automatically provide alarm displays based on recorded alarm status. Monitor-A will display the playback images from the VCR according to your selected formats, and will display the normal "A" alarm indicator only if a camera was in alarm at the time that a recording was made. CAUTION: If a camera which had an alarm at the time of recording is not selected by you for display, there will be no on-screen indication that the alarm occurred. Thus if you are looking for cameras in alarm during playback, ensure that all the cameras on tape are displayed by using a 10-way multi-screen.

Monitor-B During PLAY Mode

Monitor-B will continue to display live images, according to your selection. If a live alarm occurs during play mode, then Monitor-B will automatically switch to the camera in alarm. It will sequence at a 1 second dwell time for multiple cameras in alarm. After you have cancelled the alarm, Monitor-B will continue to display the alarm camera which was on the screen at the time that the alarm was cancelled, or will continue to sequence if sequencing was enabled.

Alarm LED And Internal Buzzer In PLAY Mode

The LED and internal buzzer alarm indicators will be activated only if a live alarm is active. Alarm status played back from a recorded tape has no effect on these indicators. The internal buzzer can be disabled via an internal hardware strap.

Alarm Displays In Record Mode, Simplex Models Only

During RECORD mode only, Monitor-A displays are always analogue full-screen, and is the same as Monitor-B's normal mode.

As a result, the simplex model cannot display a multi-screen image on Monitor-A during recording, and alarms cannot be manually frozen. If an alarm occurs during RECORD mode, Monitor-A will automatically switch to the live analogue full-screen display of the camera in alarm. If multiple alarms are active while recording, the simplex unit will automatically sequence between the alarm cameras at a fixed one second dwell.

Alarm Indicators

There is on-screen display of an **A** in each corresponding cameo of multi-screen displays and **ALM,** on any full-screen displays relating to cameras in alarm. The indications will be flashing.

An additional indication, in the form of an LED, is provided on the front panel, under the ALARM key. This LED will flash if any live alarm is active and has not been cleared.

An internal buzzer will sound while any live alarm is active.

Alarm Latching

There are three ways of latching alarms, which may be selected via the menu. These are:

1) Latched until the operator cancels it (Latched).
2) Not latched (Transparent).
3) Latched for a pre-set time (Timed Out).

Motion Indicators

Depending how your system has been set up, the indicator, **M**, may appear in each camera scene on Monitor-A multi-screens whenever motion has been detected. The indicator is not present on full-screen analogue displays. This motion indicator will stay on each active camera's display for at least 2 seconds after the motion has ceased.

Videoloss

Indications

You get the indication, **V,** displayed in each affected cameo of the multi-screen display and **VDL** on any corresponding, full-screen displays.

Videoloss Action In LIVE Mode

Monitor-A: If the camera is being displayed at the time that videoloss occurs, the camera image will be frozen. However, if sequencing is in progress, the display will be blanked when it is switched to a camera experiencing videoloss.
Monitor-B: Will be blanked while a camera with videoloss is selected.

Videoloss Action In RECORD Mode

When videoloss is detected, the affected camera is temporarily removed from the record list, and the coded digital data recorded with each field will be updated to indicate a videoloss situation on the affected camera. This videoloss status is then

shown during playback. The multiplexer system continues to monitor cameras which have videoloss and will automatically restore the cameras when videoloss ceases.

Freezing A Single Cameo

Using an 'active cameo' (see LIVE mode displays), you can freeze (or unfreeze) a cameo in a multi-screen display made up of many different cameras. This is useful when an event must be frozen for further investigation or for review by a supervisor, but the balance of the cameras must continue to be monitored.

Indicator

A * is displayed in each affected cameo of the multi-screen display and '**FRZ**' on any corresponding full-screen displays. The indication will be flashing.

Selecting VCR As An Input (VCR View)

You may need to view the video output of the VCR. Typically this is to check the VCR output or settings.

To select the VCR as an input, press the FUNCTION key (**F)** and then press the PLAY key.

To de-select the input, repeat the above procedure.

Note
   On simplex units, this function is not available during RECORD mode.

Summer / Winter Time Change

To adjust the clock by an hour for Summer / Winter time changes press the FUNCTION key and then press the SEQUENCE key.

In March and April, this will cause the time to be adjusted forward by one hour.
In September and October, this will cause the time to be adjusted back by one hour.

This function can only be used once in each period. For example, if you press FUNCTION + SEQUENCE during March, it will add an hour to the time. If FUNCTION + SEQUENCE is pressed again, then it will be ignored until September.

Adjusting The VCR Brightness And Contrast

The multiplexer provides a simple front panel adjustment to digitally adjust the contrast and brightness of the playback signal from the VCR. This can also be used to compensate for some VCRs which output a higher or lower video signal level than the standard.

To adjust the VCR signal contrast and brightness, select PLAY mode and then select the playback camera image to be enhanced full-screen on Monitor-A. Use the arrow keys to adjust the signal.

VCR playback Brightness

Use the up/down arrow keys ⊙ to adjust the brightness.

VCR playback Contrast

Use the left/right arrow keys ⊙ to adjust the contrast.

2.8__Macro Functions

Playing A Macro

A macro can be played back simply by pressing the FUNCTION key, **F,** followed by the macro number.

Indicator: While the macro is playing back, **Fn** and the macro number are displayed.

Stopping a Macro: A macro can be stopped during its playback by pressing the **F** key.

Your system may play some macros automatically, without your intervention (timed macros).

3 Function List

MACRO #	DESCRIPTION
1	
2	
3	
4	
5	
6	
7	
8	
F + Play	VCR VIEW. Selects the VCR as an input so that the VCR can be setup.
F + SEQ	SUMMER / WINTER TIME. Sets clock ahead 1 hour in March/April and back 1 hour in September / October

4 List Of Scheduled Functions

Day of week setup: Monday = _____

EVENT	DAY	TIME	MACRO TO RUN
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			