

# Telematrix®

## UBS2000 Reference Manual

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# Telematrix®

## Operating & Programming Guide

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## Camera Selection

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**Manual Selection**

Any of the available cameras may be selected for display on any monitor by a simple key sequence entered on the keyboard.

A "prompt" is displayed on the top, left-hand side of the control monitor:

```

1 MAIN CAFE          17-08-98
1K                   16 24 48
Prompt ↑

```

The number 1 shown in this example indicates the destination of any selected camera will be monitor 1.

**To route a camera to the monitor shown at the prompt:**

- Type the camera number on the numeric keypad\* and press ENTER. The chosen camera will appear on monitor 1.

**To change the destination monitor shown at the prompt:**

- Type the required monitor number on the keypad\* and press MON.

The prompt will now display the new destination monitor to which all subsequent selected cameras will be routed. For example, pressing 4 followed by MON, will change the prompt to:

```

1 MAIN CAFE          17-08-98
4K                   16 24 48

```

indicating that any valid camera number entered will now be routed to monitor 4. If a valid request is made, the monitor will switch to the selected camera. If an attempt is made to select a camera not present on the system, then the message **INVALID** is printed on the control monitor.

*\*Any errors may be corrected at this stage by entering zeroes until the incorrect number is erased and then re-typing the correct number.*

**Autosequence**

When a monitor is set to AUTOSEQUENCE, the monitor will automatically switch to a pre-programmed sequence of cameras, pausing on each for a pre-programmed number of seconds.

(See Autosequence Programming).

**To switch on autosequence:**

- First ensure that the monitor required to autosequence is shown at the control monitor prompt. (See above)
- Press "AUTO" on the keyboard - the prompt will change to **1KAUTO** (assuming monitor 1 is selected).

The colon (:) after the camera number on the selected monitor will change to an asterisk (\*) to signify autosequence mode and autosequence will begin.

**To switch off autosequence:**

EITHER:

- Repeat the above operation

OR:

- Manually select a camera for that monitor as described above

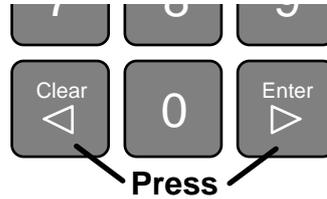
When autosequence is terminated, the asterisk adjacent to the camera number will revert to a colon.

---

## Programming

---

Programming of the Telematrix may be carried out directly from the main keyboard (i.e. the keyboard connected to monitor 1 output card). This is accomplished by pressing CLEAR and ENTER simultaneously:



The control monitor will now display the following menu:

```

0=RESET  1=TIME/DATE  2=AUTOSEQ
3=C. IDENT 4=ALARMS  5=BASE
6=N/A    7=UTILITIES  8=RANGE
    
```

Options may be selected by pressing the appropriate key on the numeric keypad or the menu may be cancelled by pressing the clear key.

---

### Option 0 - Reset

---

Option 0 is usually only used when configuring the Telematrix (or a CPU card) for the first time or for re-initialising following a severe system crash etc. When selected, the following message is displayed:

```

LOAD DEFAULT VALUES ?
1 = YES, 0 = NO OR CLEAR TO CANCEL
    
```

If inadvertently selected, pressing CLEAR will abort the option and return to normal operation.

Press '0' followed by ENTER for a simple reset (i.e. similar to powering down and up)

Alternatively, press '1' followed by ENTER to invoke the following:

```

LOADING DEFAULTS... and the system will reset.
    
```

Any previously stored autosequence steps will be lost (see option 2) and a default sequence of 5 seconds dwell and a simple sequence of 28 steps will be loaded for each monitor. All text items will be set to 'on' (see option 3) and all input groups will be made available to all monitors (see option 8). The RS232 protocols will be reset to their default values (option 7, sub option 1).

---

### Option 1 - Time/Date

---

The Telematrix calendar/clock may be set by selecting option 1 from the set-up menu. (If inadvertently selected, this function may be cancelled by pressing CLEAR without affecting the time or date).

To set the time and date:

Press 1 on the numeric keypad, the following message is displayed:

```

UBS2000 V5.0
NEW DATE:
    
```

Enter the date in the form DDMMYY, for example for date 1st January, 1993, press 010193. After each pair of digits are entered a hyphen is automatically inserted and, following the sixth digit, the display will change to:

```

UBS2000 V5.0
NEW DATE: 01-01-93 TIME:
    
```

Enter the correct time in the form HHMMSS using the 24 hour clock format, for example for 3:07pm, press "150700" (remember to use leading zeroes where necessary). On pressing the sixth digit the display will revert to normal.

---

## Option 2 - Autosequence

---

An autosequence program is a series of steps that dictate the selection and order that cameras will be displayed in a repetitive sequence. Each of the cameras are entered into memory in the required order directly from the keyboard. If less than 28 cameras are required in the program then a zero is inserted to signify the end of the sequence. Each of the eight available monitors may be individually programmed from the master keyboard. The sequences may be revised and edited at any time and will remain in memory until re-programmed.

### To edit an autosequence program:

Select option 2, AUTOSEQ - the following prompt is displayed:

```

AUTO-SEQUENCE SET-UP
MONITOR 

```

- Enter the monitor number of the autosequence to be edited followed by ENTER. (Any invalid entry will be ignored).

*(Pressing CLEAR at any time will abort autosequence programming and resume normal operation).*

*The message **DWELL(5)**  will appear.*

- DWELL is the number of seconds that each camera is to be displayed before switching to the next in the sequence. The number inside the brackets is an example and may differ, it denotes the previously stored value. Enter the required dwell time in seconds followed by ENTER. Alternatively, if you wish to retain the previous value simply press ENTER.

*The message **STEP 1(3)**  will appear.*

- Once again, the number inside the brackets is an example, it denotes the number of the camera previously selected for step 1, if you wish to change this, enter the number of the required camera followed by ENTER or alternatively, simply press ENTER to retain the previous value.

*The message **STEP 2(1)**  will appear.*

- Repeat the above operation until the required sequence or the maximum of 28 steps have been entered. If less than 28 steps are required, enter a zero as the final step.

*The message will revert back to **STEP 1(3)** .*

- The new sequence may now be reviewed by pressing ENTER after each step is displayed or may be altered if required as described above. The final step (entered as a zero), is denoted by an asterisk:

e.g. **STEP 13(\*)**

- Pressing ENTER will once again allow the sequence to be reviewed and edited or a new number may be entered in place of the asterisk to extend the sequence (if less than 28 steps). Once a satisfactory sequence has been entered, press CLEAR to revert to normal operation.

---

## Option 3 - Camera Identification Text

---

Each camera connected to the system is identified by a unique number which may be displayed at the top left of the monitor. Additionally, a 15 character alpha-numeric text string (camera I.D.) may also be displayed adjacent to the camera number. Both of these items may be programmed to be visible or hidden for each individual camera. In fact all text including the time and date display may be selectively programmed in this manner so that each camera may show camera number, camera I.D. and time and date or any combination of the three.

### To program the camera I.D. proceed as follows:

1. Ensure that the camera to be programmed is selected on the control monitor. If this is not so, exit the set-up mode by pressing CLEAR. Select the camera and re-enter the set-up mode.

2. Select option 3 by pressing 3 on the numeric keypad.

*The menu will now disappear and each of the text items - camera number, I.D. and time and date may appear if enabled.*

3. Camera number, Camera I.D. and Time/date may now be enabled or disabled by pressing 1 to 3 respectively on the numeric keypad. These keys exhibit a toggle action, i.e. pressing 3 will enable the time/date if it is disabled, or disable it when enabled etc.

*Note: Pressing 2 will disable the i.d. text but will not erase it, a subsequent press will re-instate all 15 characters.*

4. A block cursor should appear at the first character position of the text string if this feature is enabled. (If not enabled, press 2 on the numeric keypad as described above).

5. The LH telemetry keys may now be used to edit the 15 character text string as follows:

PAN RIGHT	Moves the block cursor 1 position to the right.
PAN LEFT	Moves the block cursor 1 position to the left.
TILT UP	Increments the character under the cursor (e.g. A → B)
TILT DOWN	Decrements the character under the cursor (e.g. B → A)
ZOOM IN	Increments the character under the cursor by 5 (e.g. A → F)
ZOOM OUT	Decrements the character under the cursor by 5 (e.g. F → A)
FOCUS	Pressing both keys simultaneously erases the text.

6. Once the required format and/or text string has been entered, press CLEAR to exit the procedure.

7. Repeat steps 1 thro 6 for all cameras.

### Example

To program camera 1 to display camera number, camera I.D. "ENTRANCE" and no time and date:

- Select Camera 1 on Monitor 1.
- Enter set-up mode by pressing CLEAR and ENTER simultaneously.
- Select option 3, (Camera I.D.) by pressing 3 on the numeric keypad.
- Check if camera number is displayed. If not, press 1. (Switch camera number on)
- Check if block cursor displayed. If not press 2. (Switch camera I.D. on)
- Check if time/date displayed. If so, press 3. (Switch time & date off)
- Clear any previous camera I.D. by pressing both focus buttons simultaneously.
- Press ZOOM OUT four times followed by DOWN. The letter E will now be in the first position. Press RIGHT to move to the second position.
- Press ZOOM OUT twice followed by DOWN twice. The letter N will now be displayed in the second position. Press RIGHT to move to the third position.
- Continue the above procedure using the ZOOM buttons for coarse selection and the UP/DOWN keys for fine selection, until the word "ENTRANCE" is assembled.
- Press CLEAR to terminate the function.

### Order of characters

! " \$ % & ' ( ) \* + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < =  
> ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

---

## Option 4 - Alarm response

---

In the event of alarm input activation, the Telematrix may be programmed to respond in one of two modes. These modes affect the way alarm activation is handled.

### Mode 1

This mode allows the user to select a camera to be associated with each alarm input zone and a single output (1 to 64) to which all alarm cameras will be routed. This monitor would be normally blanked in the absence of an alarm activation. In the event of alarm activation, the system will switch the alarm monitor to the camera associated with the activated alarm. A message 'ALARM - ZONE X' will be printed on the alarm monitor (where X is the number of the affected alarm zone). The picture will remain for the pre-determined number of seconds.

If subsequent alarms occur during this time, each picture will be sequenced at approximately 1 second intervals. After the prescribed period, the alarm monitor will revert to a blank screen.

### Mode 2

This mode is similar to mode 1 except that the alarm monitor is not blanked and may be operated as any normal output.

In the event of an alarm activation the monitor will respond as described for mode 1 but instead of switching to a blank screen, it will revert to the camera that was being displayed before the event and resume auto-sequencing if this was in operation.

### Alarm Response Set-up

When option 4 is selected, the following message is printed:

```

ALARM RESPONSE SET-UP
ALARM MONITOR(5)

```

*(The number inside the brackets is an example and may differ, it denotes the previously stored value.)*

- Press the number of the output that is to be used to display alarms followed by ENTER or simply press ENTER to retain the previous value.

*The message **MODE(1)** appears.*

- Press the required mode (1 or 2) followed by ENTER.

*The message **TIME(20)** appears.*

- Enter the duration (in seconds) that you require the alarm pictures to be displayed followed by ENTER.

*The message **ZONE** appears.*

- Enter the number of the first zone to be programmed followed by ENTER.

*The message **ZONE=1 CAM(1)** appears.*

*(In all cases, the number shown in brackets is an example and may differ).*

- This message is indicating that an activation of alarm zone 1 is set to cause camera 1 to be switched to the alarm monitor. If you wish to change this, enter a new camera number followed by ENTER or simply press ENTER to retain the previous stored value, (1 in this example).

*The message **ZONE=2 CAM(5)** appears.*

- Repeat the previous instructions for this and the remaining zones, entering the number of the camera required for each individual zone. After zone 64 has been completed, the system will revert to normal or you may press CLEAR at any time to end the session.

---

### Option 5 - Base

---

This option is used only in multiple rack systems where the required monitor outputs exceeds eight. Each rack must be set to a unique base number from 1 to 8. Base 1 labels the outputs as monitor 1 to monitor 8, base 2 labels outputs monitor 9 to 16 etc. Software version 5 requires that only base 1 be set on installation - subsequent racks being automatically set via the RS232 communication link.

#### To set the base number on all racks:

- Ensure that the RS232 link is connected and correctly configured (option 7, sub-option 1 or load defaults using option 0).

*The following message appears*

```
SET TO BASE 1 ?  
ENTER = YES   =   CLEAR = NO  
□
```

- Press ENTER to accept

The rack to which the keyboard is connected will be assigned base 1 and subsequent racks will be set according to the physical RS232 link order.

---

### Option 6 - Presets

---

*(Available only when preset telemetry receivers and requisite preset pan/tilt head and/or lens are fitted at the camera position).*

Up to sixteen pan, tilt, zoom and focus settings may be programmed to each camera position and recalled directly from the keyboard or in response to alarm activation. Option 6 enables the current PTZF settings as displayed on the master monitor (monitor 1) to be stored as one of these presets.

#### To program a preset:

1. Select the camera to be programmed on monitor 1 from the master keyboard.
2. Enter set-up mode by pressing CLEAR and ENTER simultaneously.
3. Select option 6, (Presets) by pressing 6 on the numeric keypad.

*The message PRESET SET-UP MODE will appear on monitor 1*

4. Press the appropriate pan, tilt, zoom and focus buttons on the L.H. telemetry keys of the master keyboard until the desired view is displayed.
5. Store this view in one of the preset locations 1 to 16 by entering the preset location number on the numeric keypad followed by 'Auto-survey SET'. e.g. To store in location 14, press 1,4,SET.
6. Repeat steps 4 and 5 for any other required presets (maximum 16 per camera).
7. Terminate the set-up routine by pressing CLEAR on the keyboard or alternatively, select another camera on monitor 1 and continue repeating steps 4 and five until all cameras are programmed with the required presets.

---

### Option 7 - Utilities

---

When selected, option 7 presents a sub-menu of the form:

```
0=RETURN 1=RS232 2=MPX 3=TEST
```

#### Sub-option 0 - Return

This option returns to the previous menu.

#### Sub-option 1 - RS232

This option is used to set the RS232 serial interface parameters. The parameters are entered in the form of three values, CONTROL WORD, MSB and LSB. The control word defines the word length, parity and number of stop bits and is constructed thus:

**128+LENGTH+STOP+PARITY**

where      LENGTH is either 2 (7 bits) or 3 (8 bits)  
            STOP is either 0 (1 stop bit) or 4 (2 stop bits)

PARITY is 0 (no parity), 8 (odd parity) or 24 (even parity)

**examples:**

- 8 bits, 1 stop, no parity                      Control word = 128+3+0+0 = **131**
- 7 bits, 2 stop, odd parity                    Control word = 128+2+4+8 = **142**
- 7 bits, 1 stop, even parity                  Control word = 128+2+ 0 +24= **154** (default)
- etc.

Baud rate is defined by entering MSB and LSB values in accordance with the following table:

Baud Rate	MSB	LSB
300	1	160
600	0	208
1200	0	104
2400	0	52
4800	0	26
9600	0	13

The parameters default to 9,600 baud, 7 bits, 1 stop, even parity when defaults are loaded from option 0.

**Sub option 2 - MPX**

The CPU multiplex input socket, (where fitted), may be connected for synchronisation to a time lapse VCR. The falling edge of the VCR switching signal may be used to switch the picture on any of the monitor outputs. The selected output will switch in turn to each of the inputs programmed in the Autosequence set-up (option 2 above). Sub-option 2 is used to define the monitor output. (Default is 4, loaded by option 0).

**To set the multiplex output:**

- select sub-option 2

*The following message is displayed:*

**MULTIPLEX CONTROL SET-UP**  
**MPX MONITOR(4) ▣**

- Enter the number (1 to 8) of the required output followed by ENTER, or simply press ENTER to retain the previous value (monitor 4 in the example shown).

**Sub option 3 - Test**

This option disables the camera failure alarm detection software and is used for test purposes only. The option may only be released by power-down or default reset.

**Option 8 - Range**

Each of the monitor outputs normally have access to all available inputs. However, option 8 allows some or all of the outputs to be restricted such that any attempt to access unauthorised inputs is greeted with the message **ACCESS DENIED**. The range of access may be set up in groups, with a maximum of eight groups per output.

**To set monitor access ranges:**

- Select option 8

*The following message is displayed:*

**SET INPUT GROUPS**  
**MONITOR 1 GROUP A (1-23) ▣**

The values in brackets are examples that may differ and may be replaced by an asterisk (\*).

- Enter the number of the first camera in the group followed by ENTER.

*a hyphen will appear adjacent to your entry*

- Enter the last camera in the group followed by ENTER.

*The display will change to:*

**MONITOR 1 GROUP B** ~~(45-45)~~ **□**

- If you wish to enter further groups, repeat as above until a maximum of 8 groups (group A to group H) have been entered. If less than eight groups are required, enter zero as the first camera of the group followed by ENTER. (If the first camera of group A is entered as a zero, the monitor will have unrestricted access to all inputs. This is indicated by an asterisk in the brackets).

*The display will change to:*

**MONITOR 2 GROUP A** ~~(\*)~~ **□**

- Repeat the above procedure until all monitors are programmed or press CLEAR to end the session.

### Example

The following limited access is required:

Monitor	Inputs
1	All
2	1-12, 23, 27-48
3	All
4	1-24, 26-40
5 - 6	All

### The above may be programmed as follows:

1. Select option 8 - Range
2. Press 0 (zero) followed by ENTER (Monitor 1 is given access to all inputs)
3. Press 1, ENTER, 1,2, ENTER (Monitor 2, Group A defined as 1 - 12)
4. Press 2,3,ENTER,2,3,ENTER (Monitor 2, Group B defined as 23)
5. Press 2,7,ENTER,4,8,ENTER (Monitor 2, Group C DEFINED AS 27 - 48)
6. Press 0,ENTER (Terminates Monitor 2 programming)
7. Press 0,ENTER (Monitor 3 is given access to all inputs)
8. Press 1,ENTER,2,4,ENTER (Monitor 4, Group A is defined as 1 - 24)
9. Press 2,6,ENTER,4,0,ENTER (Monitor 4, Group B is defined as 26 - 40)
10. Press 0,ENTER (Terminates Monitor 4 programming)
11. Press 0,ENTER,0,ENTER (Monitor 5 and 6 are given access to all inputs)
12. Press CLEAR (Return to normal operation.)

# Telematrix®

## Hardware Configuration & Application Notes

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## UBS2000 Telematrix® Hardware Configuration

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One of the main advantages of the Telematrix system is the relative ease in which both large and small matrix systems may be conceived and assembled from a selection of only five basic components.

### 1.0 The Components

The five main components forming the Telematrix are the **Enclosure**, the **CPU Card**, the **Input Card**, the **Output Card** and the **Input Device** (keyboards etc.). Cards simply slide into the enclosure on nylon card guides and are secured by two small screws. Keyboards are connected by a flexible 4 core telephone lead and plug into the Telematrix using standard BT plugs.

#### 1.1 The Enclosure

The enclosure is fitted with a power supply unit and 13 slot motherboard. This component can be supplied as a stand alone cabinet with a ventilated lid and protective rubber feet, or as a standard 3U, 19 inch rack mount frame.

The thirteen card positions are each capable of accepting a variety of card modules from the Telematrix range. All card positions are identical such that any of the available cards may be fitted in any position.

#### 1.2 The CPU Card

A CPU card is basically a microprocessor unit that forms the heart of the system. It controls the camera switching and telemetry operations as well as providing an interface to the user and peripheral devices such as video recorders etc. Options include RS232 interface (X2010) and extended memory (X2015). Only one CPU card may be fitted in each system.

CPU cards have an X20 prefix to their part number.

#### 1.3 The Input Cards

As the name implies, these cards handle input to the Telematrix. A single input card will accommodate up to eight standard CCIR video signals (X2300) and, optionally, 16 alarm inputs (X2310). Each additional input card increases the video input capacity by eight to a maximum of 248 (see section 1.6 - Expansion) and are uniquely identified in the system by setting simple option links.

Input cards have an X23 prefix to their part number.

#### 1.4 The Output Cards

A standard output card (X2200) will provide a single video output for a CCTV monitor. The text overlay option (X2210) enables the monitor output to display the current time and date and user-defined camera identification information as well as various system data. Each card may also be equipped with its own telemetry transmitter\* (X2220) enabling each output to function as an independent control workstation, if required, when fitted with a separate keyboard. All cards are equipped with a socket that will accept one such keyboard.

Each output card adds one additional monitor output to the system and one keyboard input up to a maximum of eight. Output cards are numbered for identification by the setting of simple option links.

Standard output cards have an X22 prefix.

Another output card (X2600) may be used in place of one or two standard output cards. This card has neither text nor telemetry but may be used as a dual 4 way or single 8 way video distribution amplifier. Option links are used to identify both outputs, each of which may be set as the same (single, 8 way) or different (dual, 4 way), monitor output.

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\*The telemetry system employs NG Systems Field Insertion techniques compatible with all NG Systems telemetry products. In addition, **dual mode telemetry** is available **enabling the Telematrix to be readily integrated into existing installations** that use telemetry equipment of another brand.

### 1.5 Input Devices

The keyboard is the main user input device to the Telematrix. A single keyboard will provide complete control of all monitors including dual, simultaneous control of two telemetry transmitters if desired. Alternatively, up to 8 keyboards may be connected to a single matrix each one providing independent control of telemetry and camera switching. The keyboard connected to output card 1 is defined as the master keyboard since it is through this device that all programming and access control is set up.

The standard keyboard (X2110) has 40 keys including dual PTZ controls and is mounted in a slim line desktop enclosure with a rear-mounted key operated switch. It is also available in PCB only form, for custom mounting or may be supplied ready fitted to a 3U aluminium panel for rack mounting (special orders only).

Keyboards are supplied fitted with 5 metres of flexible 4 core telephone cable. This may be extended to a maximum of 20 metres if required, or for greater distances, an RS485 interface (X2130) is available for lengths of up to 300 metres.

All keyboards and accessories have an X21 prefix.

#### 1.51 Touch Screen Input

Another input device option is the Telematrix Touch Screen Interface. This is a combined colour monitor/keyboard which connects to the Telematrix as easily as a standard monitor and keyboard. (i.e. a single BNC plug and 4 way BT plug). The touch screen offers a user friendly method of selecting cameras from a colour graphic site mimic and full PTZ control directly on the displayed picture. Further details are available.

#### 1.52 Computer (PC) Input

A computer or terminal with an RS232 interface may be used to control the Telematrix using simple ASCII commands. With suitable programming, an existing PC installation may be connected to the CCTV system to form part of a larger integrated building management system.

### 1.6 Expansion

Although the Telematrix is capable of addressing up to 248 camera inputs, the physical constraints of a single enclosure present obvious restrictions. To overcome this, expander cards are available that enable several enclosures to be cascaded using easily wired plug-in cabling. A pair of expander cards (type X2500) effectively extends the backplanes of two racks.

The maximum number of monitor outputs is eight, although this may be extended to 64 by connecting up to eight matrices in parallel and fitting a special communication link to the RS232 port of each of the matrices. This technique, though effective, involves extensive cabling and should be avoided if at all possible.

---

## Section 2 - Choosing the Components

---

### 2.0 Enclosures

The number of enclosures required is determined by the total quantity of cards. This is calculated as follows:

All systems require 1 CPU card plus 1 output card for each required output. In addition, one input card is required for each batch of up to eight cameras. i.e. up to 8 cameras, one card only, 9 to 16 cameras requires two input cards etc. If the total amount of cards is less than thirteen, then only one enclosure is required.

**example 1**     27 inputs, 4 outputs:     4 input + 4 output + 1 CPU = 9 cards

**example 2**     48 inputs, 6 outputs:     6 input + 6 output + 1 CPU = 13 cards

**example 3**     60 inputs, 7 outputs:     8 input + 7 output + 1 CPU = 16 cards

In example 1 and 2, only a single enclosure is required since the total number of cards is less than or equal to 13. Example three, however, requires two enclosures plus two X2500 expander cards to accommodate the sixteen cards. These would be arranged as follows:

Enclosure 1:     1 CPU card, 7 output cards, 3 input cards, 1 expander card

Enclosure 2:     1 expander card, 5 input cards

**2.1 CPU Cards X2000, X2010, X2015**

The CPU card (X2000) is necessary in all systems and is available with a standard RS232 interface (X2010) and extended memory (X2015).

The baud rate, parity and word length of the RS232 interface may be configured directly from the Telematrix keyboard. This interface enables the Telematrix to be controlled from other devices such as PCs, remote keyboards etc. The interface may also be used to control other devices such as VCRs and multiplexers.

Extended memory is required when the matrix is used with more than 7 input cards (56 inputs) in order to store the additional camera ident. text.

**2.2 Output Cards X2200, X2210, X2220**

The quantity of output cards is easily defined by the number of required outputs (monitors).

The type of output card for each monitor is determined by the requirement of text and/or telemetry control.

At least one output card (i.e. Monitor 1) *must* have the text option, in order that system settings can be displayed and edited from the Telematrix keyboard. It is advisable, though, to include the text option on all output cards to facilitate camera identification. Telemetry should be included if it is intended that PTZ cameras displayed on that monitor be controlled independently (See section 2.4 - Keyboards).

**2.3 Input Cards X2300, X2310**

The number of input cards is calculated on the basis that one input card will accommodate up to eight camera inputs.

If alarm inputs are required, an alarm input option is available (X2310) that will provide up to sixteen alarm inputs per card (maximum 64 alarms). The response to alarm inputs is user programmable and may be arranged to switch cameras to an alarm monitor or cause PTZ cameras to move to one of 16 preset positions etc.

It should be noted that each batch of 16 alarm inputs terminate on a D25 female connector. There is an unused panel position on the rear of the enclosure that will accommodate one such panel but further inputs will need to occupy unused card positions.

**2.4 Keyboards**

There must be at least one keyboard (or PC) connected to the Telematrix output card 1 (master).

The maximum number of keyboards that may be connected to the Telematrix is limited by the number of standard output cards fitted (maximum eight).

A single X2110 keyboard will operate two telemetry transmitters simultaneously. The left hand keys operate the PTZ functions of the camera displayed on the monitor card into which it is connected, whilst the right hand keys operate the PTZ functions of the next monitor.

e.g. a keyboard connected to monitor 1 will operate the PTZ of monitor 1 and 2. Similarly, one connected to monitor 2 will operate both monitor 2 and 3 etc.

**2.5 Other Input Devices**

All input devices may be readily intermixed e.g. X2110 on monitor 1, Touch screen on monitor 3, PC on monitor 4 etc.

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### Section 3 - Telematrix Application Example

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**3.0 Example of a typical application:**

Matrix requirements:

16	PTZ camera inputs
9	Fixed Camera inputs
1	Local control position with 2 control monitors
1	Remote control position with 1 control monitor and 1 "spot" monitor
25	Alarm inputs
1	VCR activated by alarm

### 3.1 Enclosure

The total number of cards for the above system:

**FOUR** input cards are required since this is the smallest multiple of eight that will accommodate all 25 inputs (16 PTZ + 9 static). A single output card is required for each of the **FIVE** outputs plus **ONE** CPU card makes a total of  $4 + 5 + 1 = 10$  cards.

Since this is less than 13 only one enclosure is required.

### 3.2 CPU Card

An RS232 output is required to control the video recorder but since there are less than 57 inputs an extended memory card is not required.

CPU Card required	<b>1</b>	<b>X2010</b>	RS232 interface
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### 3.3 Input cards

Four input cards are required to accommodate the 25 cameras, (this will leave a further seven inputs available for future expansion).

Two of the input cards need to be of type X2310 providing 32 alarm inputs and the remaining two need only be type X2300.

Input Cards required:	<b>2</b>	<b>X2310</b>	alarm inputs
	<b>2</b>	<b>X2300</b>	non alarm

### 3.4 Output Cards

Two output cards are required for the local control position, two for the remote control position and 1 each for the Touch Screen Monitor and VTR.

Local control position:

Monitor 1:	PTZ control with text	1 off	X2220
Monitor 2:	PTZ control with text	1 off	X2220

Remote control position:

Monitor 3:	PTZ control with text	1 off	X2220
Monitor 4:	Non PTZ, with text	1 off	X2210

Video recorder output:

Monitor 5:	Non PTZ, with text	1 off	X2210
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Output cards required:	<b>3 off</b>	<b>X2220</b>	Telemetry/Text
	<b>2 off</b>	<b>X2210</b>	Text only

### 3.5 Keyboards etc.

Each control position requires an X2110 keyboard. Since the remote position is approximately 200 metres from the Telematrix, this will also require an RS485 interface.

Keyboard equipment:	<b>2 off</b>	<b>X2110</b>	Keyboards
	<b>1 off</b>	<b>X2130A</b>	RS485 part A
	<b>1 off</b>	<b>X2130B</b>	RS485 part B

### 3.6 Matrix Component List

In summary, the above matrix will require the following items:

1	UBS2000	Enclosure with PSU
1	X2010	CPU Card with RS232
2	X2300	8 way input cards
2	X2310	8 way input cards with 16 alarm inputs
2	X2210	Output Cards with text
3	X2220	Output cards with text & telemetry
2	X2110	Keyboards
1	X2130A & B	RS485 Pair

In addition, the 16 PTZ cameras will each require a TR9 or TR11 Telemetry receiver.

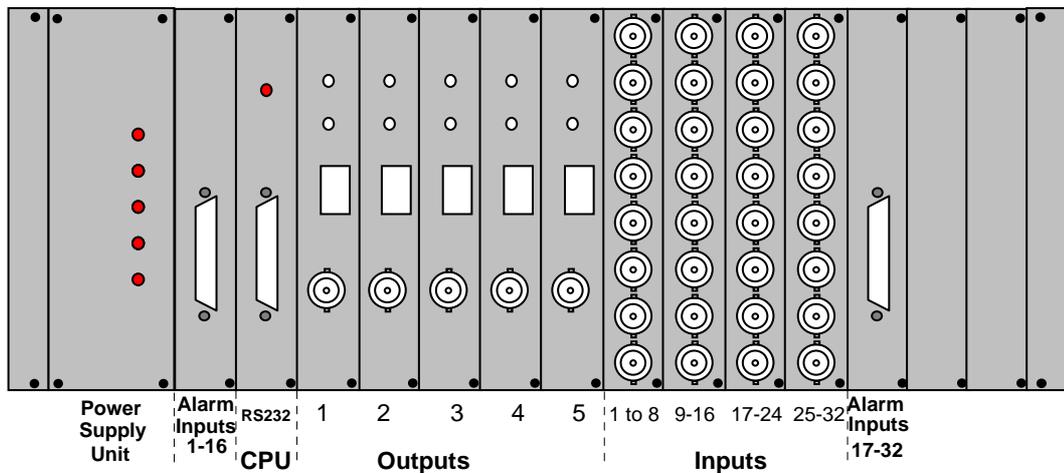


Fig 1. Suggested layout of cards in the Telematrix

#### Technical support

The Telematrix is designed to provide the CCTV system designer with a highly versatile easily-configured control system. It is important to understand the design concept of the Telematrix and NG Systems' technical support will readily assist with any problems or queries in the configuration of the Telematrix and its integration into a CCTV system. Alternatively, the Telematrix can be supplied readily configured to your requirements.

**18 Kensington Industrial Park, Hall Street, Southport, Merseyside PR9 0NY England**

**Telephone 01704 500279 Fax 01704 535657**



# Telematrix®

## Card Configuration Guide

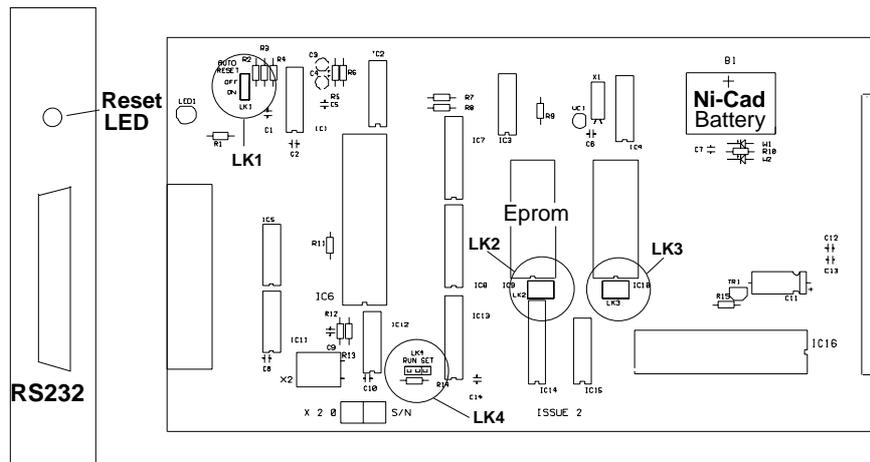
<b>X20xx CPU Card</b> .....	<b>21</b>
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**X20xx CPU Card**


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The CPU module is a microcomputer and forms the heart of the UBS2000 system. The board consists of the following:

- Central Processing Unit (CPU)
- Battery-backed Memory (RAM)
- Read Only Memory (EPROM)
- Battery-backed Real Time Calendar/clock
- RS232 Interface (X2010 only)

The CPU and memory section form the microcomputer which controls all of the other boards by virtue of the program stored in the EPROM memory. The battery-backed memory provides storage for all of the programmable parameters such as Camera I.D., Alarm response information, Auto sequence settings etc.

The calendar and clock functions provide the time and date information for insertion on the monitor displays and is also battery backed to ensure time keeping is maintained during power down.

An industry standard UART chip type INS8250 provides the serial communications conversion required for the RS232C interface is fitted to X2010 boards.

#### Automatic reset (Watchdog)

In common with all microcomputer controlled equipment, the CPU card is susceptible to external electrically generated interference which in the most severe cases can cause the system to "crash", rendering all functions inoperable. To combat this, the CPU module incorporates a specially designed automatic reset (watchdog) circuit which detects abnormal operation caused by such interference and in the event performs an automatic reset. The watchdog may be disabled for test purposes by moving link 1 (LK1) to the upper position, but for normal operation link 1 should always reside in the lower position. Whenever the reset circuit operates it causes the reset LED to blink at approximately once per second.

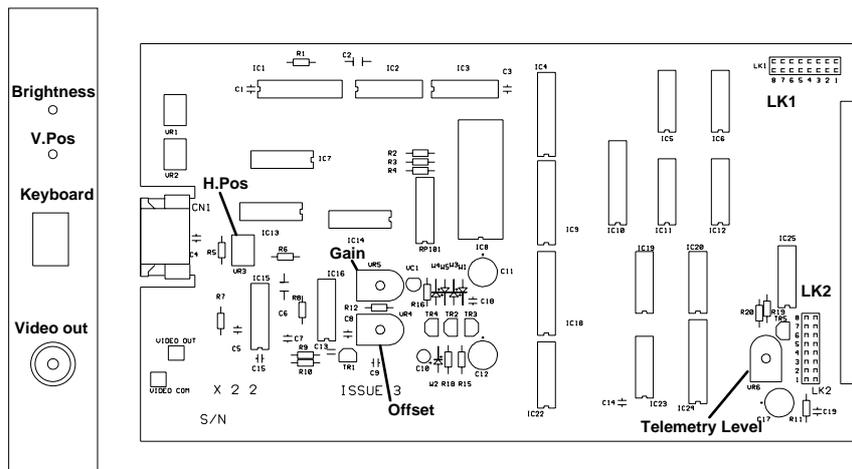
#### Memory chip link options

LK2 & LK3 are factory-set wired links, set in accordance with the size of EPROM and RAM memory chips fitted.

#### Program parameter protection

LK4 on the board is used to *write protect* the section of memory that stores various installer-programmed parameters such as alarm response, RS232 protocol, base setting etc. to prevent accidental or non authorised alteration. With LK4 in the "SET" position, these parameters may be altered, whilst with LK4 in the "RUN" position, the memory is write protected and cannot be altered.

## X22xx Output Card



The X22xx is a video output module with a keyboard input port, optional on-board character generation and field insertion telemetry transmitter. The X22xx is available in three forms:

1. **X2200** output card
2. **X2210** output card with text
3. **X2220** output card with text & telemetry.

### Features

- Wideband video amplifier with black level clamp
- 40 key, keyboard input port
- 93 character two-tone insert generator. (X2210 & X2220)
- 14 function, field insertion, Telemetry Transmitter. (X2220)

The character generator provides up to 93, two-tone characters (3 lines of 31 characters), which display the camera number and camera ident text string on the L.H. side and the time and date on the R.H. side of the monitor screen. Up to 8 output boards in any combination may be fitted to a single rack.

### Settings

Each board is individually addressed by setting LK1 and LK2 to an address in the range 1 - 8. The address chosen must be *unique* to each module and *both links must be set to the same value*.

### Adjustments

VR1 (text brightness) and VR2 (text vertical position) may be readily adjusted in situ with a suitable screwdriver or trimming tool. VR4, 5 & 6 are factory preset to set video offset, video level and telemetry level respectively and require the use of an extender card and oscilloscope for adjustment.

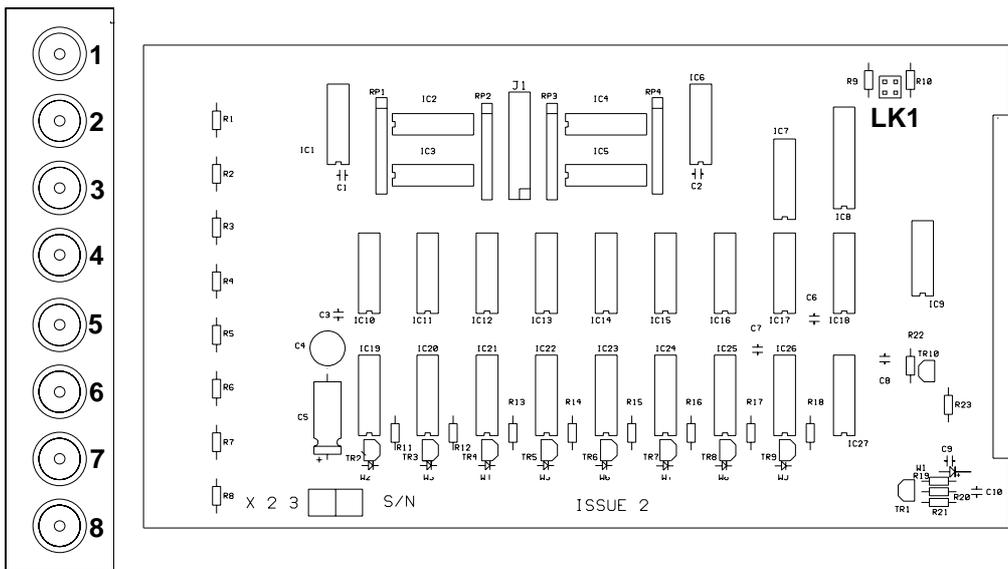
### Keyboard input

A 40 way keyboard may be connected to each output module allowing up to 8 keyboards (1 master and 7 slaves) to coexist on each system. The keyboard connected to output module 1 is designated as the master.

### Telemetry

The telemetry transmitter provides 14 function field insertion telemetry encoding permitting up to 8 fully independent transmitters to provide simultaneous control of each monitor.

**X23xx Camera Input Card**



The X23xx input module provides 8 video inputs to each card. Up to 31 input modules may be fitted to a single system producing a maximum of 248 inputs. Inputs are identified by assigning unique numbers to each of the eight sockets on each module by means of jumper links (LK1).

The number range of each module is set by the positioning of links on LK1 and by suitable selection of IC8 which is a specially programmed PAL (Programmable Array Logic). Eight different PALs are available, each providing four different address ranges thus:

- C1.....Inputs 1 - 32
- C2.....Inputs 33 - 64
- C3.....Inputs 65 - 96
- C4.....Inputs 97 - 128
- C5.....Inputs 129 - 160
- C6.....Inputs 161 - 192
- C7.....Inputs 193 - 224
- C8.....Inputs 225 - 248

Further address decoding is achieved by the setting of LK1 which provides an offset to the base address of the selected PAL.

**Examples:**

Input Range	PAL Type	LK1
1 to 8	C1	
9 to 16	C1	
17 to 24	C1	
25 to 32	C1	

Input Range	PAL Type	LK1
33 to 39	C2	
145 to 152	C5	
177 to 184	C6	
217 to 224	C7	

The X2310 is identical to the X2300 with the addition of 16, opto isolated alarm inputs are connected by a twenty way ribbon cable from J1 to a D25 female socket. All inputs are of the normally closed type and unused inputs should be connected to common to prevent false alarms.

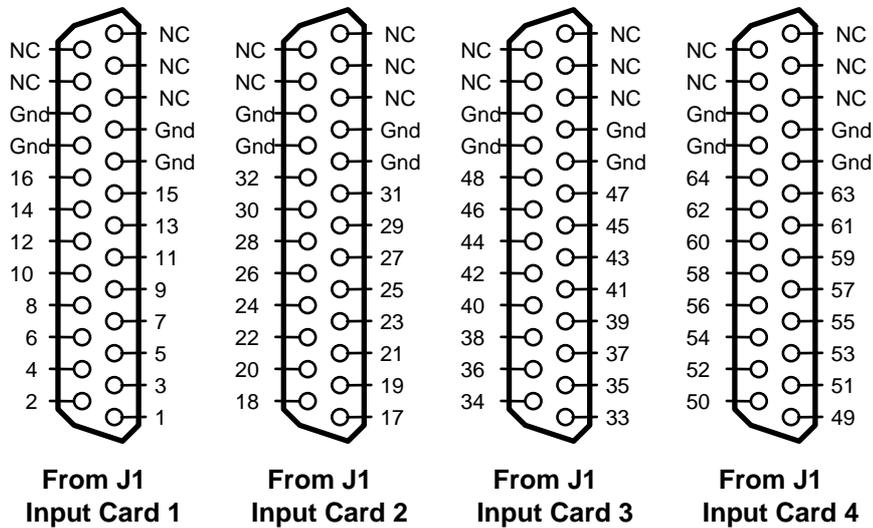
**Terminating Resistors**

Each of the inputs are terminated by a 75Ω resistor through a solder bridge to ground. The solder bridge provides a simple way to disconnect the terminating resistors when a high input impedance is required.

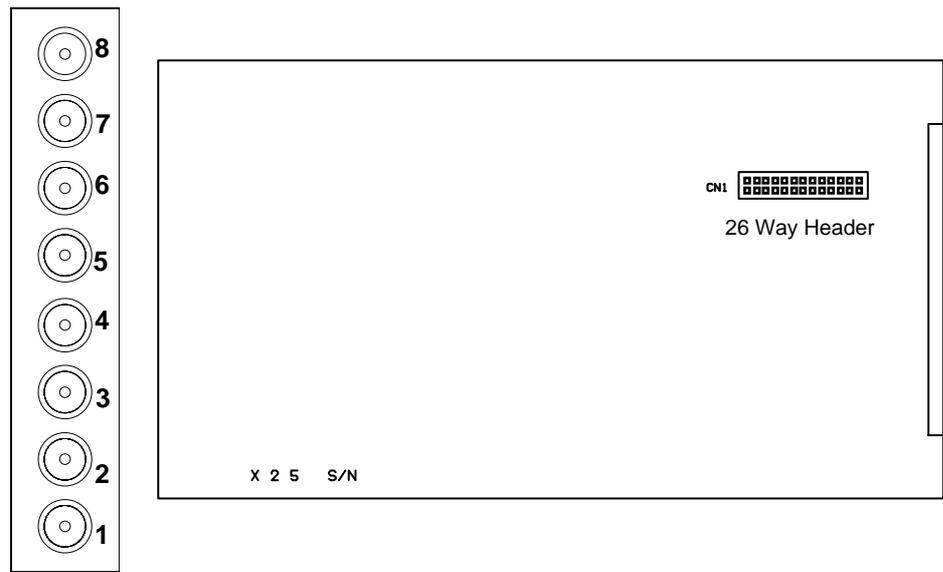
**Alarm connections**

The alarm connections for alarms 1 to 16 are brought from the board at J1 to the unused slot on the right of the PSU using a alarm connector cable part number X2211. This cable terminates to a 25 pin female D connector. For alarm inputs 17 - 32, 33 - 48 and 49 - 64, connectors need to be mounted in spare card slots.

**Alarm Input Connections on D25 Connectors**  
(Viewed from front of socket)



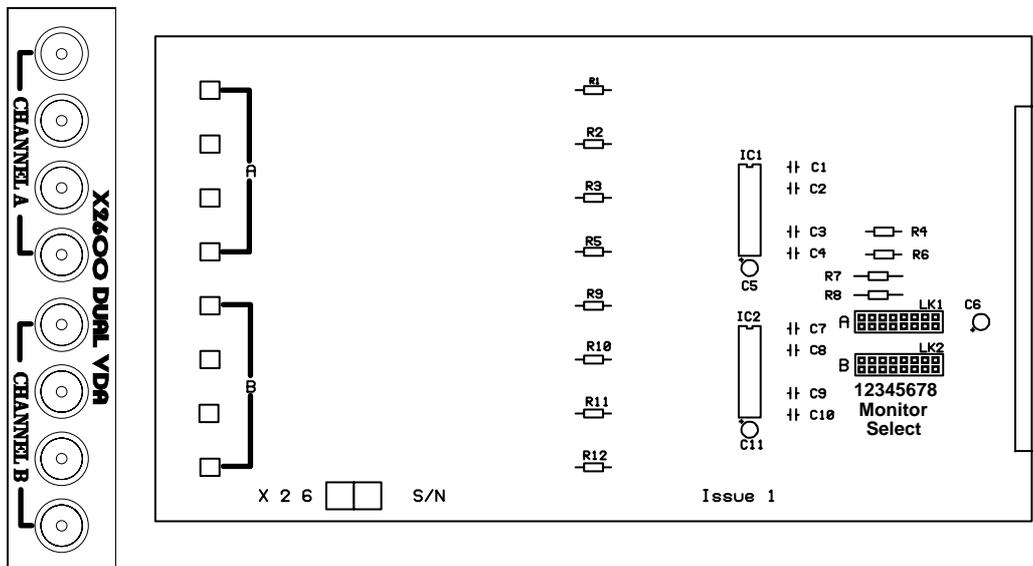
**X25xx Expansion Card**



Video Links

A pair of X25 cards provide a means of extending the back plane of two racks. The eight BNC sockets must be linked together (1 to 1, 2 to 2 etc), using suitable minimum length coaxial cables (not supplied). The 26 way header plug is fitted with an IDC ribbon cable assembly (supplied with each pair of cards).

**X26xx VDA Card**



This card may be used in place of one or two X22xx cards as either a single 8 way or dual 4 way video distribution amplifier.

**Configuration links**

Links LK 1 (channel A) and Lk 2 (channel B) are used to define the monitor number to be associated with each four way channel.

The four upper BNC sockets provide identical 1 volt p/p, 75Ω outputs for channel A which may be assigned as monitor 1 to 8 by positioning a single jumper link on LK1. Similarly, the four lower sockets provide outputs for channel B in accordance with the jumper setting on LK2. If both links are set to the same number, then all eight outputs will be identical (8 way VDA).



# Telematrix®

## Telemetry Receivers

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## NG Systems Telemetry Receivers

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### TR4 - Housing Pan only/Wash wipe decoder

This receiver is available in pcb form, mounted on a small (105x89mm) angled aluminium chassis with a single fixing hole. They are intended for use with 24 volt, pan-only units, although they are capable of driving any 24 volt a.c. load (maximum 500mA) such as wash/wipe motors etc. Two momentary, plus one latched output provide for pan left, right and autopan functions respectively, are available at 24 volts a.c. All connections being made to the 12 way terminal strip at the top of the unit.

The unit itself is powered from a 24 volt transformer (available separately) and offers a stabilised 12 volt d.c. feed for driving CCD cameras.

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### TR9 - PTZ telemetry receiver

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The TR9 is capable of providing pan, tilt, zoom and focus control plus one latched function. The pan, tilt and latched functions are link-selectable for 240 volt mains or 24 volt a.c. derived from the on-board 24 volt transformer. A bi-polar 12 volt supply accommodates zoom and focus motors and a stabilised 12 volt/350mA d.c. output is provided to power a CCD camera.

This receiver is available in two sizes of IP56, p.v.c. enclosure one internal and one external. All connections are made by four plug-in terminal strips for ease of installation and maintenance.

A buffered video output is provided for camera set-up and focus adjustment etc. and individual push buttons on the receiver PCB facilitates testing of all nine functions. A special connector allows for remote operation of the receiver from a test handset (available separately).

Low supply voltage (24VAC) TR9 telemetry receivers are also available for use in intrinsically-safe environments.

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### TR11 Telemetry receivers

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The TR11 is identical to the TR9 except for the addition of two 240v/24v (or momentary outputs, auxiliary 3 and 4.

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### TR13 Telemetry receivers

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The TR13 is identical to the TR11 except for the addition of a further two momentary lens outputs auxiliary 5 and 6.

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### Feature Summary

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Model	Functions					Outputs		
	Lens	Pan	Tilt	Aux	Latched	12vdc	240vac	Video
TR4	0	2	0	0	1	yes	no	no
TR9	4	2	2	0	1	yes	yes	yes
TR11	4	2	2	2	1	yes	yes	yes
TR13	6	2	2	2	1	yes	yes	yes

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## TR9 (MK3) Telemetry Receiver

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### Status LED

The status LED provides the following indications:

LED Indication	Status	Comments
No illumination	Power absent	Check 12-0-12 volt ac feed and fuses F1 & F2
Continuous (flickering) illumination	Video Absent	Check camera power and connections etc
Regular uninterrupted flashing	Video present, no telemetry	Ensure matrix is switched to this input
Single flash, repeated each second	NG Systems telemetry received correctly	Normal operation using line-fed NG Systems encoding
Double flash, repeated each second (TR9 only)	Third party, FSK telemetry received (FSK version only)	Normal operation using line-fed FSK encoding
Triple flash, repeated each second (TR9 only)	RS485 Input detected	Normal operation using twisted pair encoding
Rapid uninterrupted flashing	Test Mode	Test mode entered. Only visible when button released

### Level Control

A level control is provided for fine adjustment of line-fed telemetry separation. This control is factory pre-set to approximately half rotation. No further adjustment is normally required although slight adjustment may be necessary under adverse conditions. Adjust for normal operation in accordance with above table.

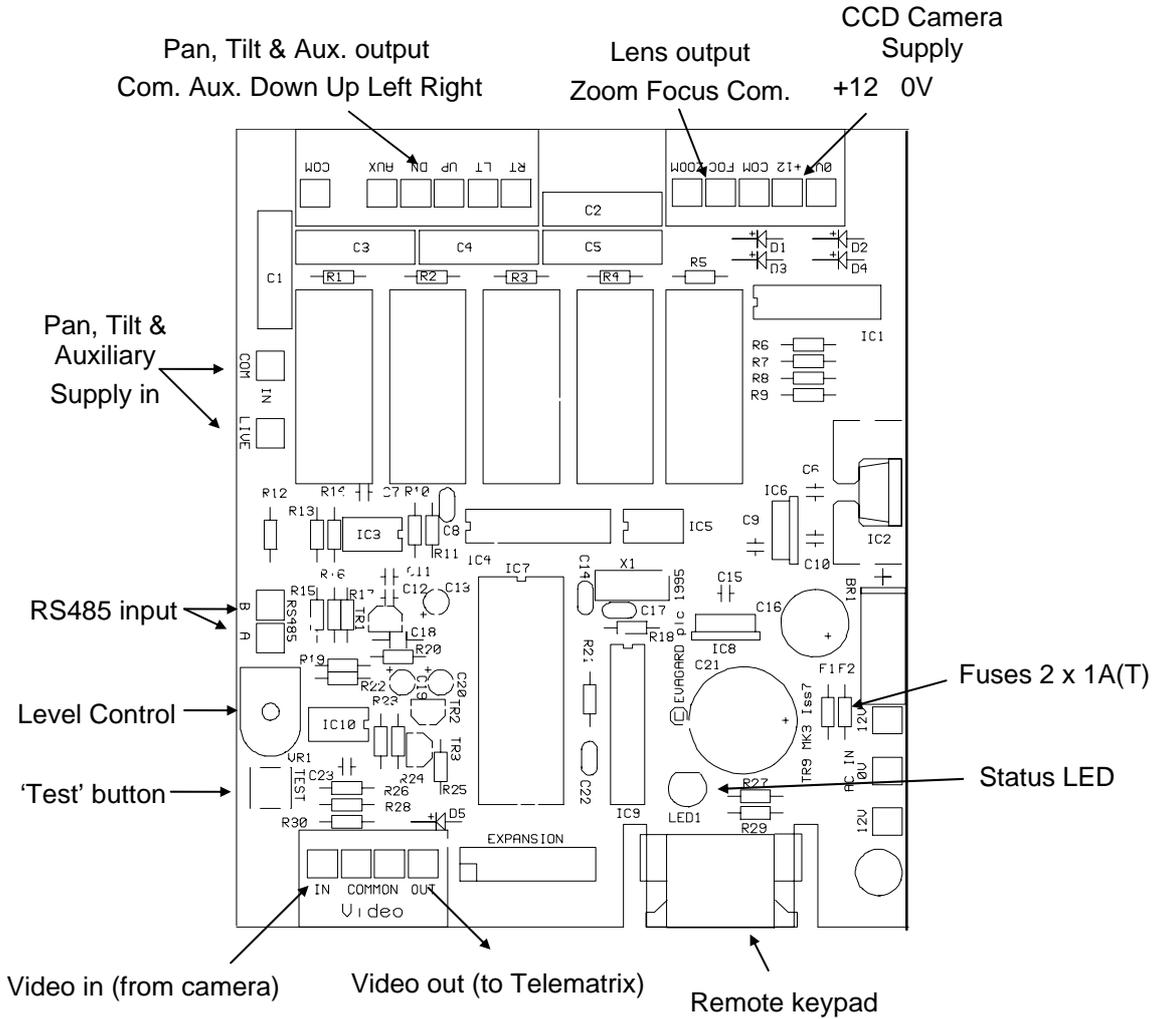
### Test button

This button may be used to test all eight of the PTZF functions. Test mode is initiated by holding down this button for a period of two seconds. Each of the outputs will be sequentially activated for a period of 5 seconds in the order Left, Up, Right, Down, Zoom in, Zoom out, Focus near and Focus far. (Any function may be skipped by pressing and releasing the button during it's activation.

### Remote Keypad

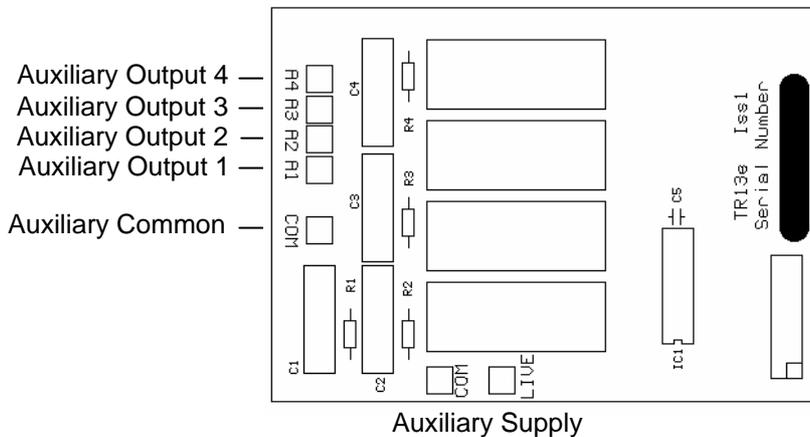
An engineer's remote keypad may be connected to this socket. All pan, tilt, zoom, focus and latch functions may be operated for test purposes. If an engineer's keypad is not available, a standard X2110 or X2120 keyboard may be used and operated from the L.H. telemetry (X2110) and Auto-Pan on/off keys. Telemetry is disabled whilst a keyboard is connected to this socket.

**TR9 MK3 Telemetry Receiver - board layout**



**Expander Board – TR11 / TR13**

The TR11 and TR13 are equipped with an expander board with either two (TR11) or four (TR13) additional momentary outputs, connected as follows:



## Telematrix® Touch Screen Control

### Operating Instructions

The NG Systems touch screen interface provides a convenient method of selecting cameras, operating the pan, tilt and lens controls and video cassette recorder (VCR) functions on the Telematrix®.

The touch screen monitor displays a mimic diagram of the site and it is from this that any of cameras may be selected. The lower portion of the screen is overlaid with seven printed symbols corresponding to VCR functions.

#### Camera Selection

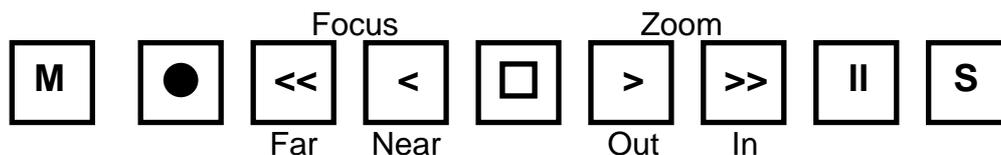
To select a camera, simply touch the relevant symbol. The diagram will be replaced by the chosen camera picture.

#### Pan and Tilt control.

The camera may be panned left or right by touching the left or right side of the screen respectively. Similarly, touching the top or bottom of the screen will operate the tilt functions. Diagonal movement is achieved by touching the appropriate screen corner.

#### Zoom and Focus control

For this purpose, the printed symbols on the lower part of the screen double as zoom and focus controls. The Rewind and Reverse Play symbols indicate the touch-sensitive focus points and the Play and Fast Forward symbols represent zoom in and zoom out points.



#### Recalling the Mimic Diagram

Whenever a video picture is being displayed on the touch screen monitor, whether from a camera or VCR, the mimic diagram may be recalled at any time by simply touching the centre of the screen.

## Set-up and Calibration

#### Powering up

The PC unit will take some seconds to boot up from the internal hard (or internal/external floppy) disk unit. During this time, the monitor will display will be unsynchronised. This is normal and will lock as soon as the PC runs the display driver program.

Once locked, the site graphics will be displayed and it should be possible to select cameras from the touch screen monitor.

#### Calibration

Each touch screen monitor is calibrated to match the software prior to shipping and should not require further re-calibration. However, if the monitor is replaced or software re-installed, it will be necessary to re-calibrate. This is a simple operation and should be carried out as follows:

*(This operation should be performed from the viewing and operating position normally assumed by the user)*

## Touch Screen Interface

- Ensure the display is showing the graphics diagram
- Press Ctrl/C (hold down Ctrl and press 'C') on the PC keyboard - the screen will clear and a cross will appear on the top left of the screen with the prompt 'Touch Cross'. (Press Esc at any time to abort)
- Touch the cross firmly and accurately at its centre. A beep will sound from the PC and the cross will appear on the top right.
- Repeat the operation for all four screen corners. As soon as the bottom left cross is touched, the screen will change to blue and a white box will appear around the seven printed graphics symbols.
- Follow the prompts, touching each of the graphics symbols firmly and accurately in turn. When the last one is touched, the calibration routine will terminate and normal operation will resume.

### **Software re-installation (Hard disk systems only)**

A back-up disk is provided with each system. This is not required for normal operation and should be kept in a safe place at the installation. (Not in the disk drive - this will prevent normal boot-up and will be vulnerable to damage). If re-installation is required, insert the disk, press reset on the front of the PC. When the machine boots, answer yes (Y) to the prompt "Install touch screen program ? " and press enter. Re-installation is automatic, when prompted remove the disk and re-boot (press reset or power down then up again).

## **Touch Screen Camera Symbol Editing**

Camera symbols may now be added, removed or repositioned on the touch screen graphics on site using the PC keyboard and touch screen monitor. *The following instructions refer to keys on the PC keyboard and touch screen monitor display.*

### **To enter Edit Mode**

Ensure the mimic diagram is showing on the touch screen monitor and enter edit mode by pressing ALT-E (hold down the ALT key then press 'E').

*The message:-*

**Edit Cameras? (Y/N)** *appears on the graphics screen*

Press 'Y' to enter Edit Mode (or press 'N' to return to normal)

The mimic background will change colour to indicate Edit Mode and Camera 1 will change to red, this is the 'Active camera'. The active camera may now be re-positioned or rotated as follows:

### **To move the active camera:**

Use the cursor keys ↑ ↓ ← → to move the active camera up, down left or right respectively by one pixel. Pressing the space bar will toggle the movement speed between 1 pixel (for fine adjustment) and 10 pixels (for coarse movement).

### **To rotate the active camera:**

Press 'R' - the active camera will rotate through 90 degrees on each press.

### **To change the active camera:**

Touch the required camera on the touch screen monitor. The selected camera will change colour to red and will become active.

### **To add a new camera:**

Press 'INSERT' (top left key in the block of six above the cursor keys) a new camera will appear at the centre of the screen and will become active. This camera will be assigned the next available number and may be re-positioned as described above. Movement speed will automatically be set to 10 pixels for coarse positioning. Press SPACE to toggle back to 1 pixel for fine adjustments.

**To delete a camera:**

Press 'DELETE' (bottom left key in the block of six above the cursor keys) the highest number camera will be deleted from the display and the next number down will become active.

**To save the new settings:**

Press 'S'

*The message*

**Save new camera positions? (Y/N) will appear.**

Press 'Y' to confirm (or 'N' to return to edit mode).

**To abandon the new settings and return to original:**

Press 'Esc' (top left key on keyboard)

*The message:*

**Abandon new camera positions? (Y/N) will appear**

Press 'Y' to cancel all editing and return to normal (or press 'N' to return to edit mode).

**NOTE: Calibration mode is now invoked by pressing ALT-C** (Hold down the ALT key then press 'C').

### Using the Touch Screen on the TM16

The touch screen system may be used on the TM16 Telematrix with version 9 touch screen software.

**Hardware Connections**

1. Connect the touch screen monitor input to Monitor 3 output of the TM16.
2. Connect the BT plug to keyboard socket 2 of the TM16.

**Software**

The original software supplied with the touch screen unit will not operate correctly with the TM16 due to the difference in the way cameras are selected on this matrix. The touch screen software needs to be aware of the type of matrix to which it is connected. For this purpose, a new routine has been added to enable the installer to inform the touch screen software of the type of matrix in use and the relevant monitor number to be controlled by the touch screen.

**To change the matrix type:**

Ensure the mimic diagram is showing on the touch screen monitor and press ALT-S (hold down the ALT key then press 'S').

*The message:-*

**Change Set-up? (Y/N) appears on the graphics screen**

Press 'Y' to alter the matrix type (or press 'N' to return to normal)

*The message:-*

**Matrix = TM16? (Y/N) appears on the graphics screen**

Press 'Y' to select TM16 or 'N' to select UBS2000

*The message:-*

**Monitor Number (1 - 8) ? appears on the graphics screen**

Enter '3' for use with the TM16 (this number is not used by the UBS2000)

The system will then return to normal operation.