Installation Guide

TX1500 Models covered

TX1500 Matrix	Expandable Matrix system and telemetry controller (16-96 camera, 8 monitor) Software version 2.02
TX1500/KBD	3-axis joystick system keyboard
TX1500/AL16	16 input alarm card, up to 6 cards per system giving 96 alarm inputs
TX1500/BBUS-IF	RS232/485 interface to allow control of Tx1500 via PC or 3rd party equipment

Building Block Video Ltd.,
17 Apex Park
Diplocks Industrial Estate,
Hailsham, East Sussex, BN27 3JU UK.
Tel: +44 (0)1323 842727
Fax: +44 (0)1323 842728
Support: +44(0)1323 444600
Web Site: http://www.bbvcctv.com

Contents

UNPACKING

Inspect the packaging for signs of damage. If damage has occurred, advise the carriers and/or the suppliers immediately. Unpack the units carefully and check that all the items are present and correct.

SAFETY PRECAUTIONS

All normal safety precautions as laid down by British Standards and the Health and Safety at Work Act (or the relevant National safety legislation if installing in a country outside the U.K.) should be observed, and servicing should be referred to qualified service personnel.

SYSTEM COMPONENTS

Each complete system will comprise of at least the following:

1 x TX1500 video matrix enclosed in a 19" sub rack.
1 x TX1500/KBD system keyboard or TCommand Touch Screen keyboard

2 * RJ45 straight patch cables
2 * RJ45 breakout boxes with self adhesive mounting pad

2 * 9Vdc 500mA power supply (1 for the matrix and 1 for the keyboard)

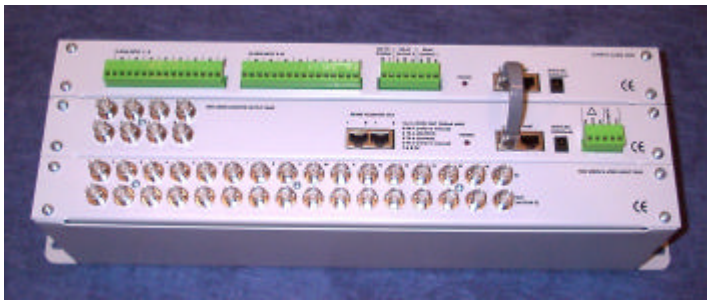


Fig 1. Picture showing a TX1500/16/8 matrix with fitted optional 16 alarm inputs.

Fig 2. Standard TX1500/KBD System Keyboard

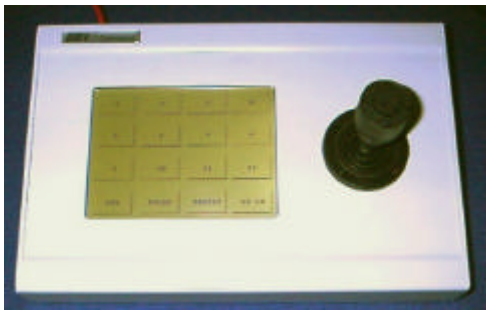


Fig 3. Optional TCommand Touch Screen Keyboard

DESCRIPTION

The TX1500 is a video matrix and telemetry control system offering control of up to 96 cameras from 4 control positions. 8 monitor outputs are provided as standard. Monitor 1,2,3 & 4 are control monitors with on screen display and monitors 5,6,7 & 8 are spot monitors.

Up-the-coax telemetry receivers can be controlled when viewed on monitors 1,2,3 & 4. RS485 linked receivers and domes can be controlled when viewed on any monitor.

Control of the full range of BBV coaxial telemetry receivers and dome interfaces is provided as standard. BBV's new generation of RS485 controlled telemetry receivers, RX457 and RX557, can be driven by the built in RS485 telemetry port. Protocol converters are available to allow RS485 control of selected domes.

The RS485 can be either daisy chained from receiver to receiver or to simplify wiring an 8 port RS485 StarCard can be used allowing a star-wiring configuration. When wired as a star, a fault on a single leg allows the remaining receivers to operate.

TX1500 COMPONENTS

A TX1500 system comprises of several different types of card enclosed in a subrack or mounted remotely. The subrack can be fitted to a 19" rack via supplied ears that can be mounted on the front or rear face of the subrack. By fitting the ears on the back of the subrack, it can also be wall mounted.

Sub racks are available in 3,5 and 7 U heights. Alarm cards, BBUS-IF and StarCards are supplied in 1U sub racks as standard although multiple units can be supplied in larger sub-racks if specified at the time of order.

The following table shows the maximum number of camera inputs for each subrack and product codes for standard units that use each subrack size.

Subrack Size	Maximum Cameras	Product Codes of units that are supplied
3	32 (1 monitor board, 2 x 16 camera input)	TX1500/16/8, TX1500/32/8
5	64 (1 monitor board, 4 x 16 camera input)	TX1500/48/8, TX1500/64/8
7	96 (1 monitor board, 6 x 16 camera input)	TX1500/80/8, TX1500/96/8

The matrix communicates with keyboards, alarm cards and BBUS/Interfaces via a 4 wire multi-drop RS422 protocol named BBUS. BBUS devices can be linked using Cat 5 patch cables when mounted local to the TX1500 and via a good quality twin twisted pair screened data cable when mounted remotely. Examples of cables are Belden 8132, 8162, 9829, 9842 or equivalent.

A complete matrix system will comprise of at least the video matrix to allow switching of video onto 8 monitor outputs and a keyboard or BBUS-I/F for control. BBV up-the-coax telemetry receivers can be controlled directly using a single coax connection to each camera position. RS485 control of the BBV RX457 (AC) receiver and RX557 (DC) receiver is also provided.

An 8 output RS485 starcard is available to simplify RS485 installations and an optional protocol converter allows control of an expanding range of other manufacturers' dome cameras.

Site alarms and contacts are handled with the alarm card that provides 16 inputs. Each input must be volts free, normally closed contact that opens on alarm activation. Up to 6 alarm cards can be linked into the TX1500 system either local or remote offering 96 alarm inputs. An alarm disable input is provided on each alarm card. Providing a closed contact on the disable input will prevent the alarms on this card from being processed.

Off site control, via video/data transmission equipment, and local control from PC and other equipment is made possible by using the TX1500/BBUS-IF interface. As far as the TX1500 is concerned the interface is seen as another keyboard. The interface can be driven using either the TX1000 or TX1500 control protocol via either RS232 or RS422/485.

PRODUCT CODES

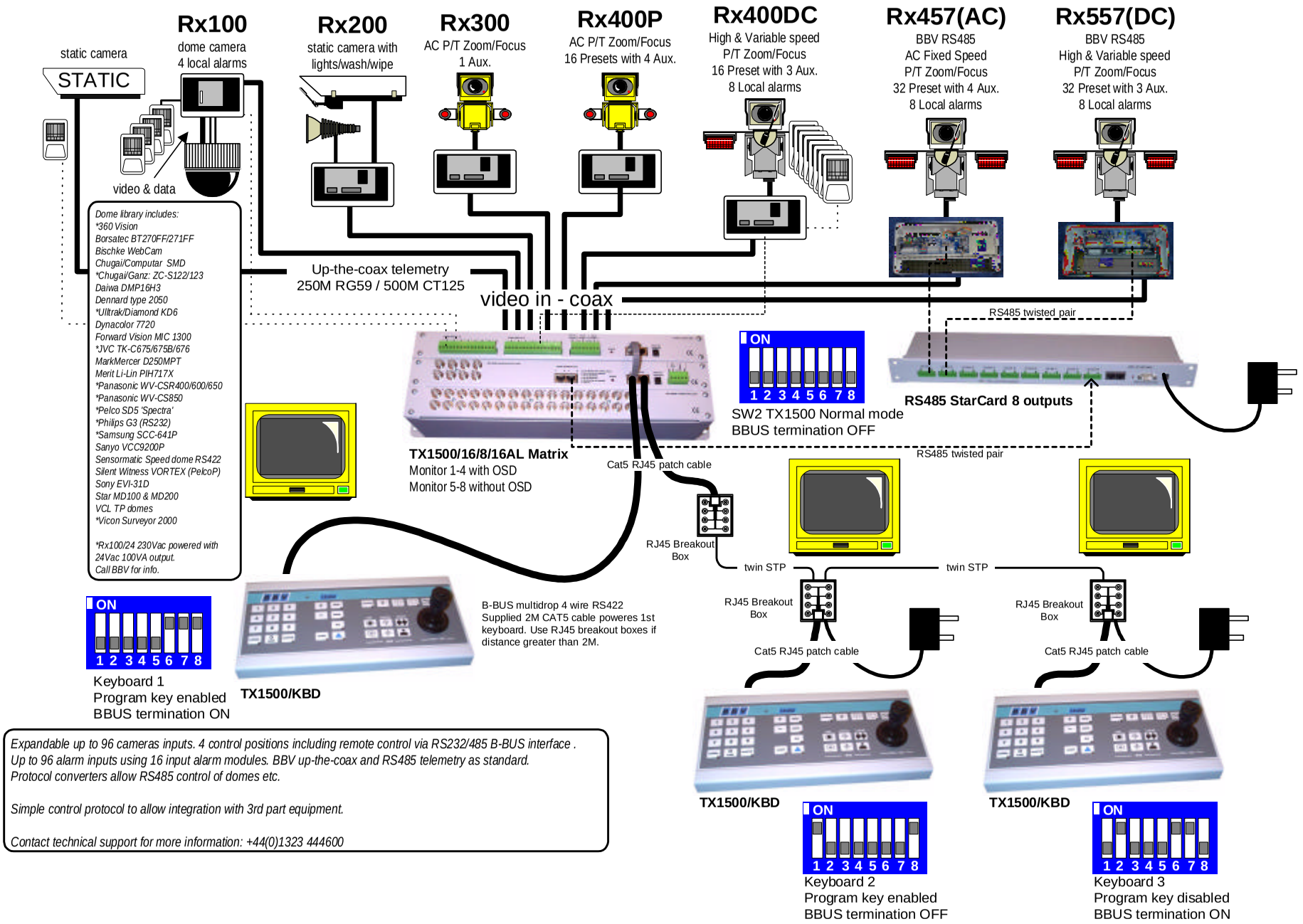
TX1500/16/8	16 camera, 8 monitor matrix inc keyboard (supplied in 3U subrack)
TX1500/32/8	32 camera, 8 monitor matrix inc keyboard (supplied in 3U subrack)
TX1500/48/8	48 camera, 8 monitor matrix inc keyboard (supplied in 5U subrack)
TX1500/64/8	64 camera, 8 monitor matrix inc keyboard (supplied in 5U subrack)
TX1500/80/8	80 camera, 8 monitor matrix inc keyboard (supplied in 7U subrack)
TX1500/96/8	96 camera, 8 monitor matrix inc keyboard (supplied in 7U subrack)

TX1500/KBD	keyboard with 3-axis joystick
TX1500/AL16	16 input alarm card, volts free normally closed inputs
TX1500/BBUS-IF	BBUS Interface to allow control from a PC or other 3rd party equipment
STARCARD	StarCard with 8 x RS485 outputs to allow star wired telemetry
STARCARD/CONVERTER	As STARCARD with in built protocol conversion to allow control of domes etc.

System Expansion Products

TX1500/EXP16(17-32)	16 video input card to expand from 16 to 32 cameras
TX1500/EXP16(33-48)	16 video input card to expand from 32 to 48 cameras
TX1500/EXP16(49-64)	16 video input card to expand from 48 to 64 cameras
TX1500/EXP16(65-80)	16 video input card to expand from 64 to 80 cameras
TX1500/EXP16(81-96)	16 video input card to expand from 80 to 96 cameras

TX1500/3U-SUBRACK	3U system subrack – 32 cameras maximum
TX1500/5U-SUBRACK	5U system subrack – 64 cameras maximum
TX1500/7U-SUBRACK	7U system subrack – 96 cameras maximum



Expandable up to 96 cameras inputs. 4 control positions including remote control via RS232/485 B-BUS interface .
Up to 96 alarm inputs using 16 input alarm modules. BBV up-the-coax and RS485 telemetry as standard.
Protocol converters allow RS485 control of domes etc.

Simple control protocol to allow integration with 3rd part equipment.

Contact technical support for more information: +44(0)1323 444600

BBUS CONTROL BUS

The TX1500 'talks' with all keyboards, alarm card and control interfaces via a polled 4 wire multidrop RS422 control bus named BBUS.

All the units are equipped with standard RJ45 connectors allowing cat 5 patch cables to be used to connect over short distances. On the larger sites RJ45 break out boxes are used to link between cat 5 cables and good quality screen twin twisted pair data cable via screw terminals. Suitable types are the following Belden cables: 9842, 9829, 8162, 8132.

The breakout box is as follows:

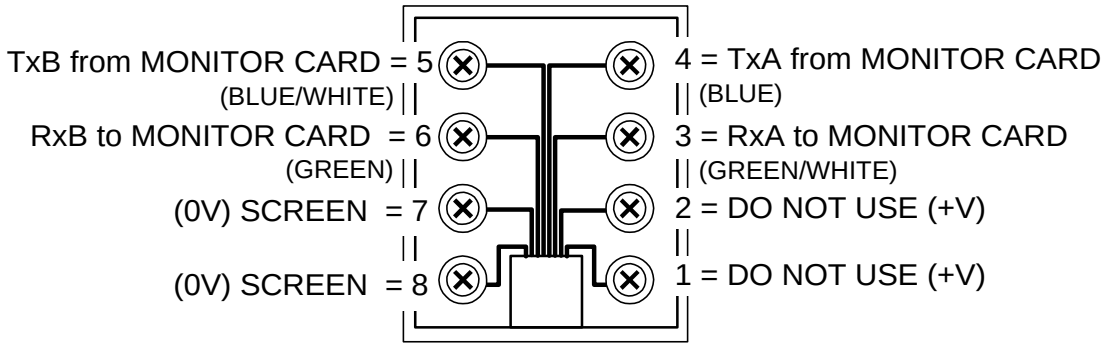


Fig 5. BBUS - RJ45 breakout box connector, MONITOR CARD end of keyboard cable.

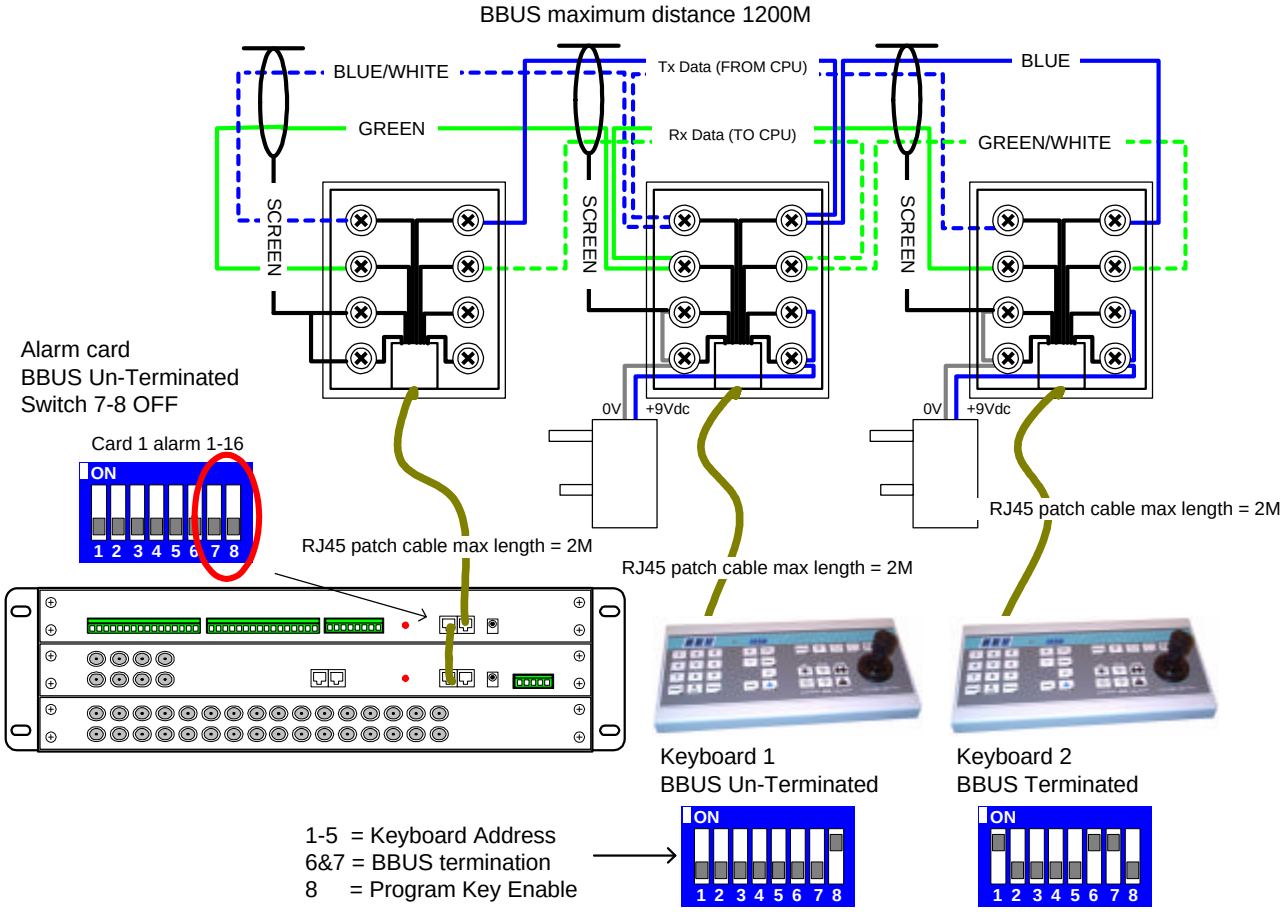


Fig 6. Keyboard BBUS wiring

Keyboard 1 is not at the end of line so BBUS termination is OFF (switch 6,7 OFF). It is addressed as 1 and the PROGRAM key is enabled (switch 8 ON), allowing menu access and preset programming.
Keyboard 2 is at the end of the line so BBUS termination is ON (switch 6,7 ON). It is addressed as 2 and the PROGRAM key is disabled (switch 8 OFF), preventing menu access and preset programming.

SYSTEM BBUS WIRING EXAMPLES

The following diagrams show examples of various wiring schemes.

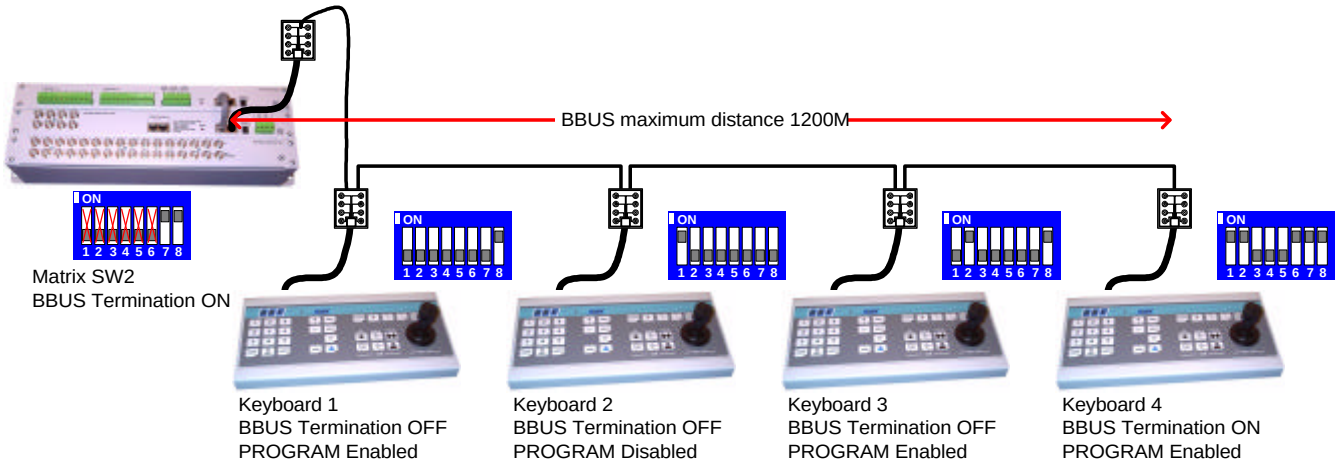


Fig 7. Example with all keyboards daisy chained from the TX1500 matrix using a single BBUS leg.

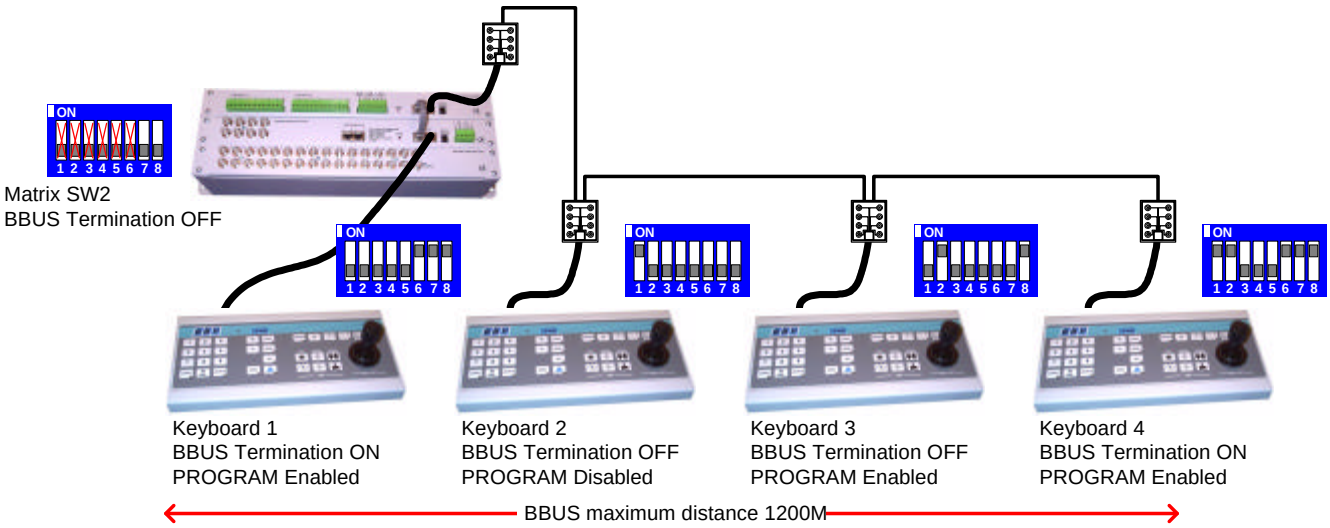


Fig 8. Example with all keyboards daisy chained from the TX1500 matrix using two BBUS legs.

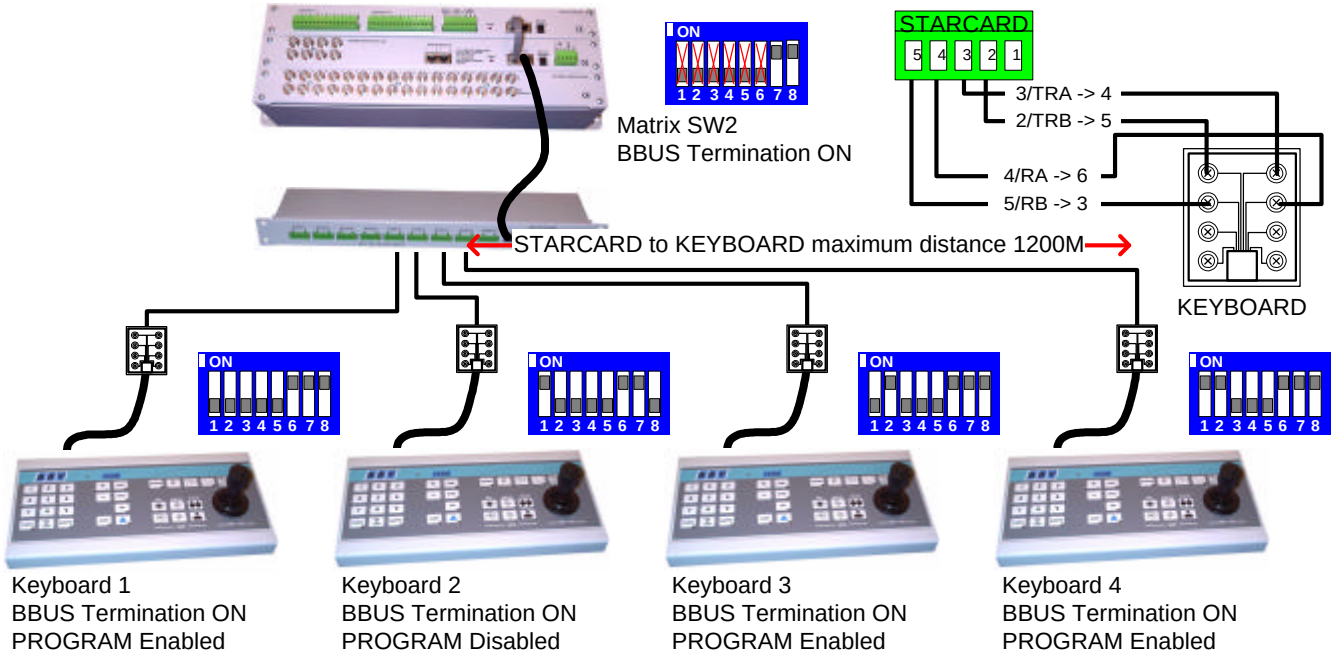


Fig 9. Use of a STARCARD to allow star wiring of keyboards.

RS485 TELEMETRY OUT

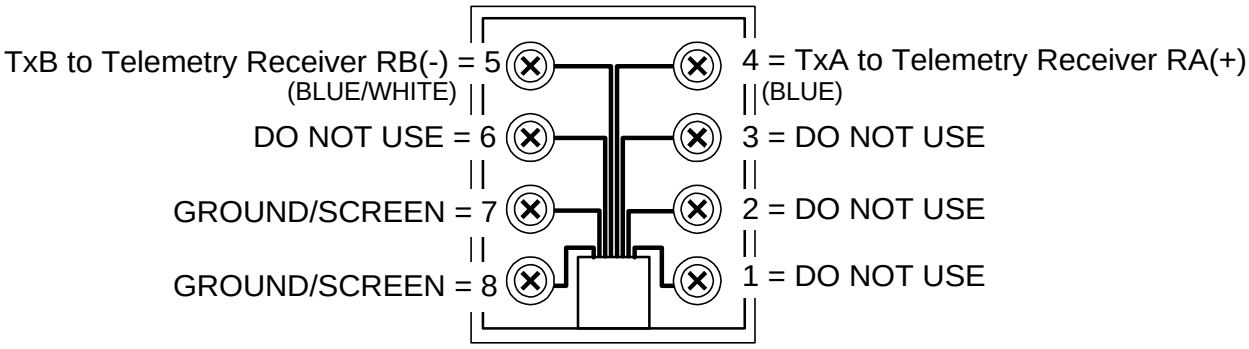


Fig 10. TELEMETRY – RJ45 breakout box connector.

This port provides telemetry control via BBV RS485. Again a Cat 5 RJ45 patch cable and breakout box is used to connect the telemetry receivers via single twisted pair cable. It is possible to either wire the network in a daisy chained or star configuration using an optional RS485 star card.

RS485 wiring configurations are shown below and on the following page.

RS485 TELEMETRY WIRING CONFIGURATIONS

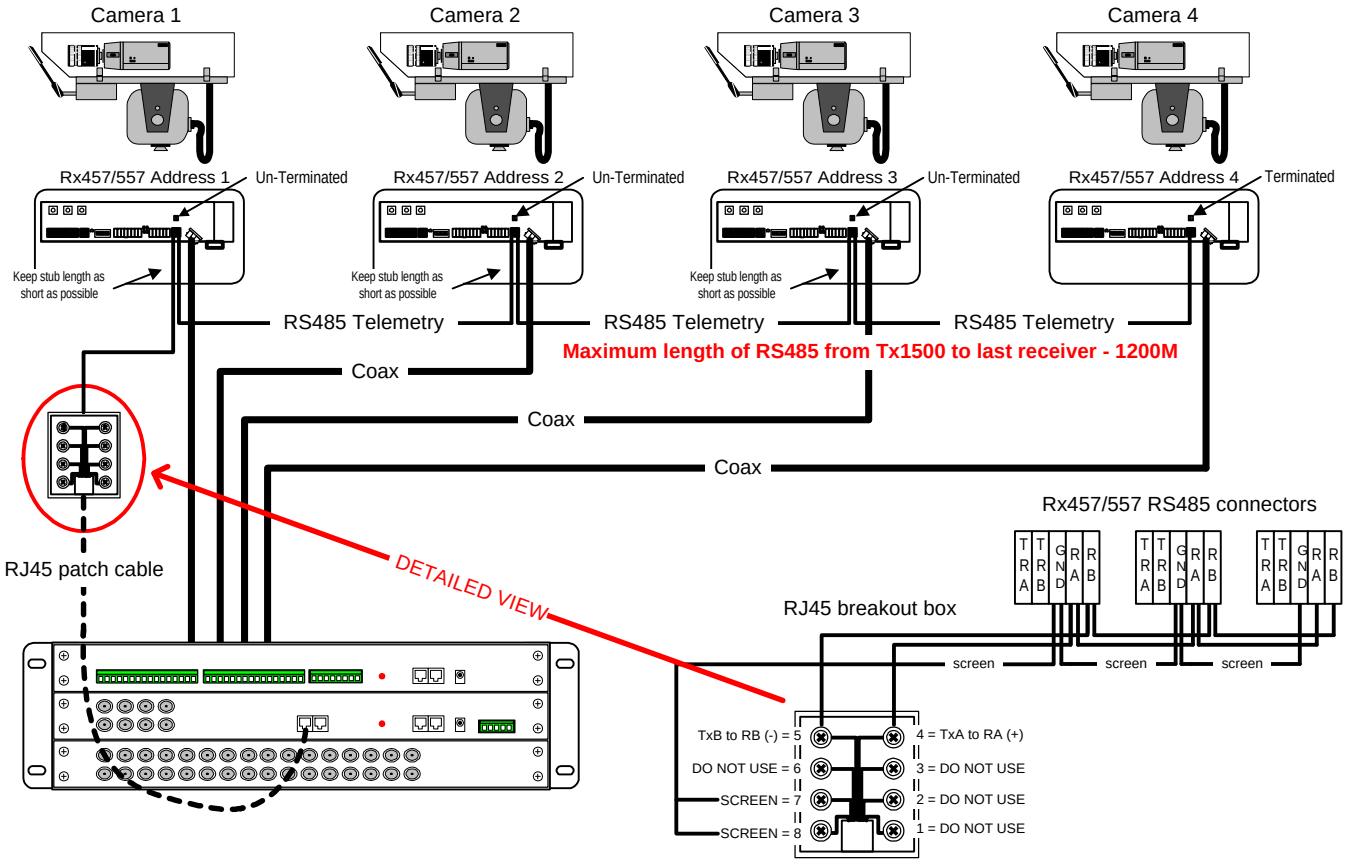


Fig 11. Daisy Chained RS485 Telemetry Wiring

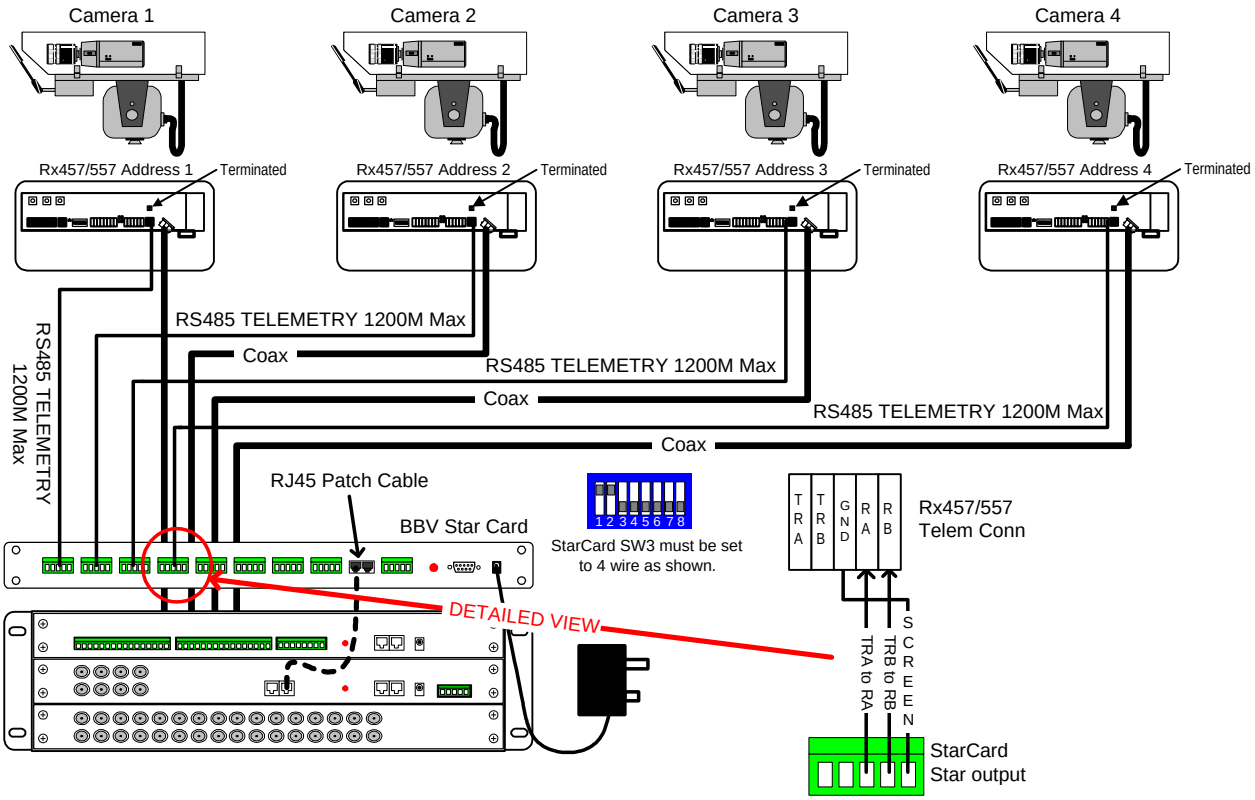


Fig 12. Star Wired Configuration using the optional BBV StarCard

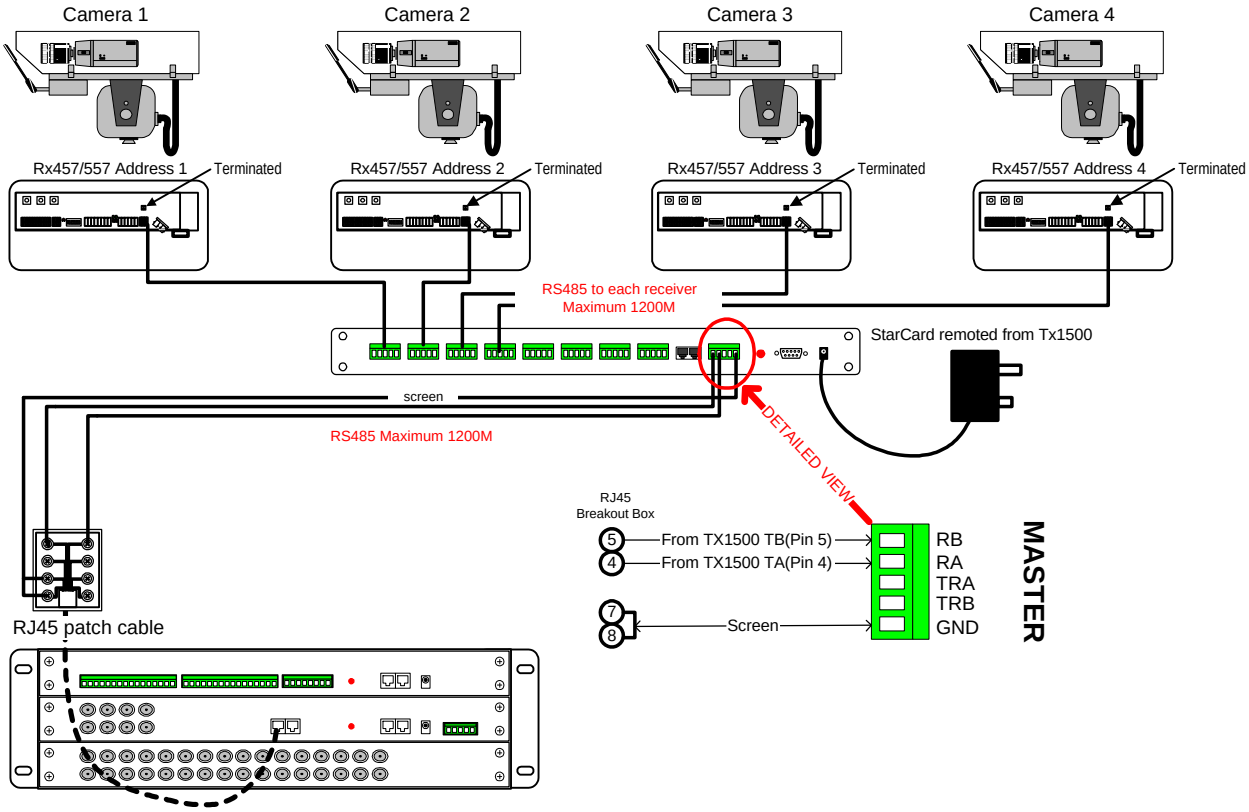


Fig 13. Use of StarCard mounted remotely, reducing cable runs

VIDEO INPUT CARD

The Video Input Card is used to connect 16 camera inputs to the TX1500. Systems larger than 16 cameras will use multiple cards. A board mounted DIL switch is used to set the card's camera numbers.

Each input has a corresponding looping output on the lower BNC connector. The camera inputs are passively terminated at 75Ω and auto de-terminate when a BNC plug is connected to the looping output. Up to 6 cards can be used to allow up to 96 camera inputs.

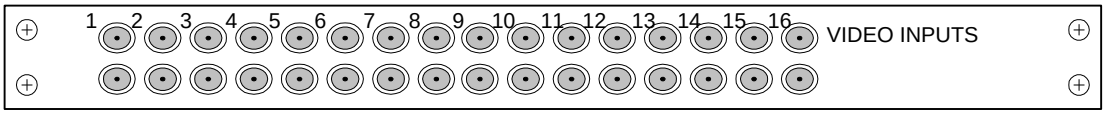
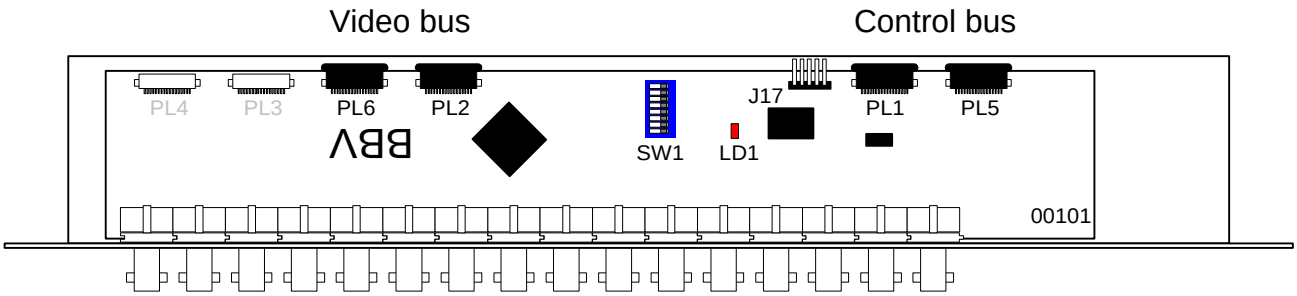


Fig 14. Video Input card Front Panel View



Top view of Tx1500 video input board PCB00101

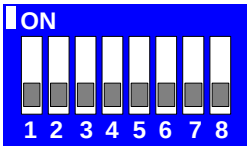
Fig 15. Video Input card internal view

The switchs for each card will be set at the factory however if the system is to be upgraded then please set the new card(s) switches as shown below.

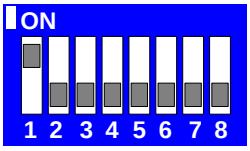
Unpredictable results will occur if more than one card has the switches set to the same address.

SW1 Camera Range

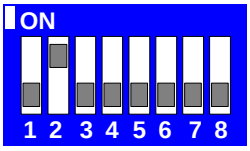
Camera 1 - 16



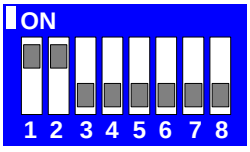
Camera 17 - 32



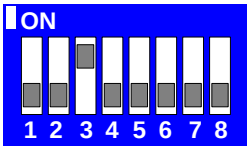
Camera 33 - 48



Camera 49 - 64



Camera 65 - 80



Camera 81 - 96

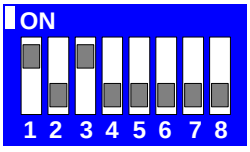


Fig 16. Video Input card SW1 address switch setting

EXPANDING AN EXISTING SYSTEM

The TX1500 can be expanded on site to a maximum of 96 camera inputs. The following table shows the number of 16 video input cards and subrack size required.

Camera Inputs	Subrack Size	Number of video input cards
16	3	1
32	3	2
48	5	3
64	5	4
80	7	5
96	7	6

Expanding a system is a simple task requiring the addition of one or more 16 video input cards. A larger subrack may be required to house the increased number of cards. If a larger subrack is required these can be ordered with the product codes. All the cards from the existing subrack must be removed and installed into the new subrack. Please ensure that you make note of all the connections to aid re-commissioning the system.

TX1500/EXP16(17-32)	16 video input card to expand from a 16 camera to 32 camera system
TX1500/EXP16(33-48)	16 video input card to expand from a 32 camera to 48 camera system
TX1500/EXP16(49-64)	16 video input card to expand from a 48 camera to 64 camera system
TX1500/EXP16(65-80)	16 video input card to expand from a 64 camera to 80 camera system
TX1500/EXP16(81-96)	16 video input card to expand from a 80 camera to 96 camera system

3U	TX1500/3U-SUBRACK
5U	TX1500/5U-SUBRACK
7U	TX1500/7U-SUBRACK

The new video input cards will connect with the existing cards using the supplied ribbon cables as shown in figure 23 later in this manual.

Set the video input card address switch to the corresponding camera range as shown on the previous page.

Once the new video input card/s have been installed in the new subrack, the matrix maximum camera must be increased in the SYSTEM BASICS screen of the menu. See later in this manual for details.

MONITOR OUTPUT CARD

This card provides the 8 monitor outputs, BBUS, RS485 telemetry and a relay output.
Internal switches are used during specific BBV tests that should not require on site adjustment.

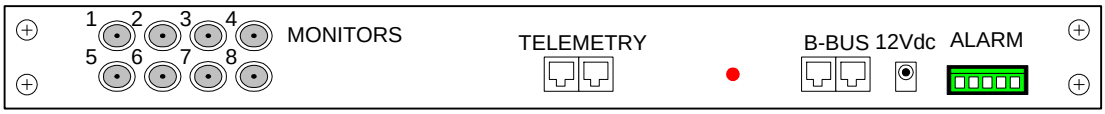


Fig 17. Monitor Output card Front Panel View

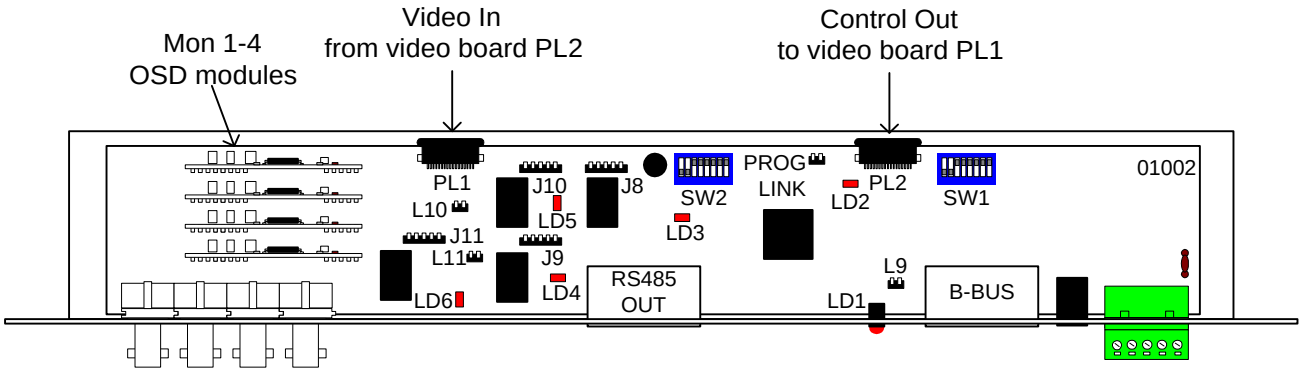


Fig 18. Monitor Output card internal view

Diagnostic LEDs
LD1 STATUS – Front Panel indication of system and BBUS operation. For diagnostic information please refer to page 16.

Internal LEDs,
LD2 – BBV debug use.
LD3,4,5,6 – ON whilst coaxial telemetry is transmitted to the camera which is being viewed on Mon 1,3,2,4

For normal operation the internal switches must be as shown below:

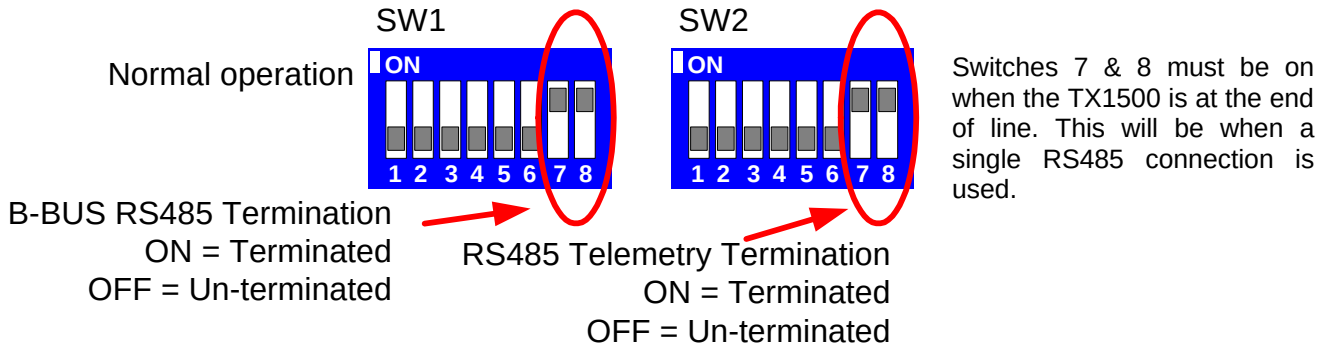


Fig 19. Monitor Output card SW1 and SW2 functions

Setting the switches as shown below will carry out a factory default. The procedure is to power off the TX1500, set the switches and then power on the TX1500. On screen instructions are displayed on monitor 1 output.

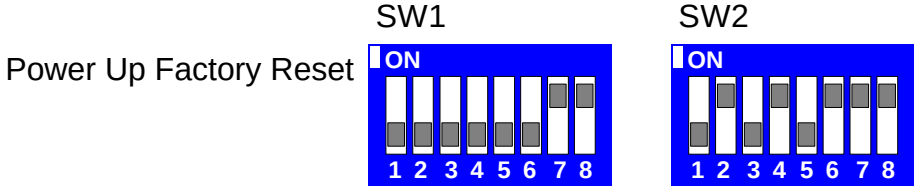
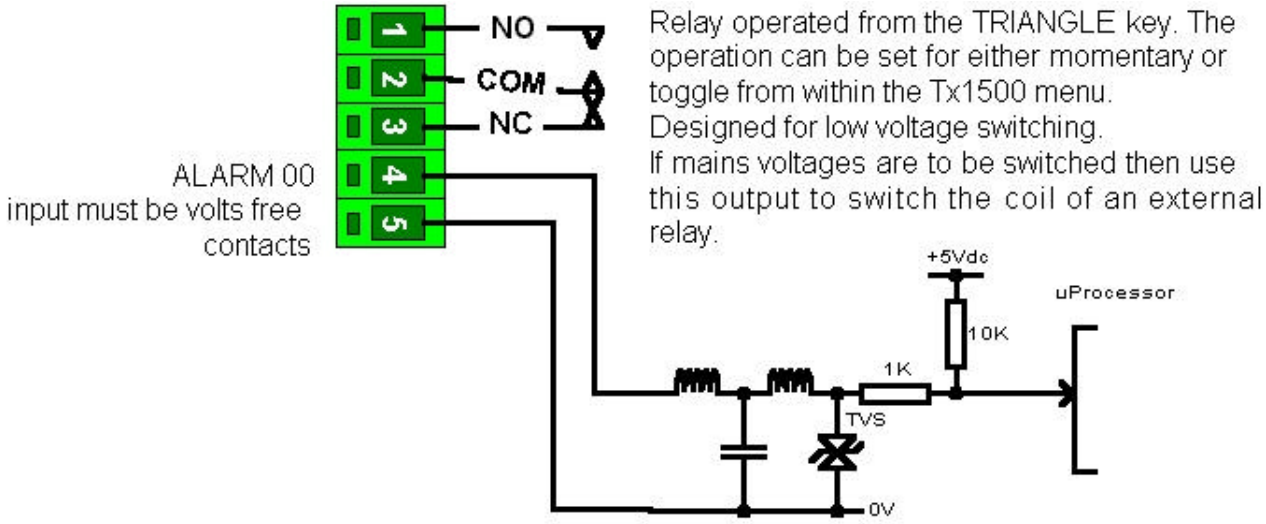


Fig 20. Monitor Output card SW1 and SW2 factory reset setting

The Power Up Factory Reset option will delete all TX1500 programming and should be used with extreme care. If unsure please contact BBV technical support for guidance. +44(0)1323 444600.

Fig 21. Monitor output card ALARM 00 input and TRIANGLE relay connections



Alarm 00 can be programmed to perform one of several tasks from within the alarm screen from the matrix setup menu.

When programmed as ALARM 00 an alarm is generated when the input goes from shorted to open. This input is always in AUTOMATIC mode regardless of the ALARM STACK setting in the alarm menu. This means that the alarm 00 action will be performed every time the contact changes to open.

96 CAMERA SYSTEM SUBRACK CARD CONFIGURATION

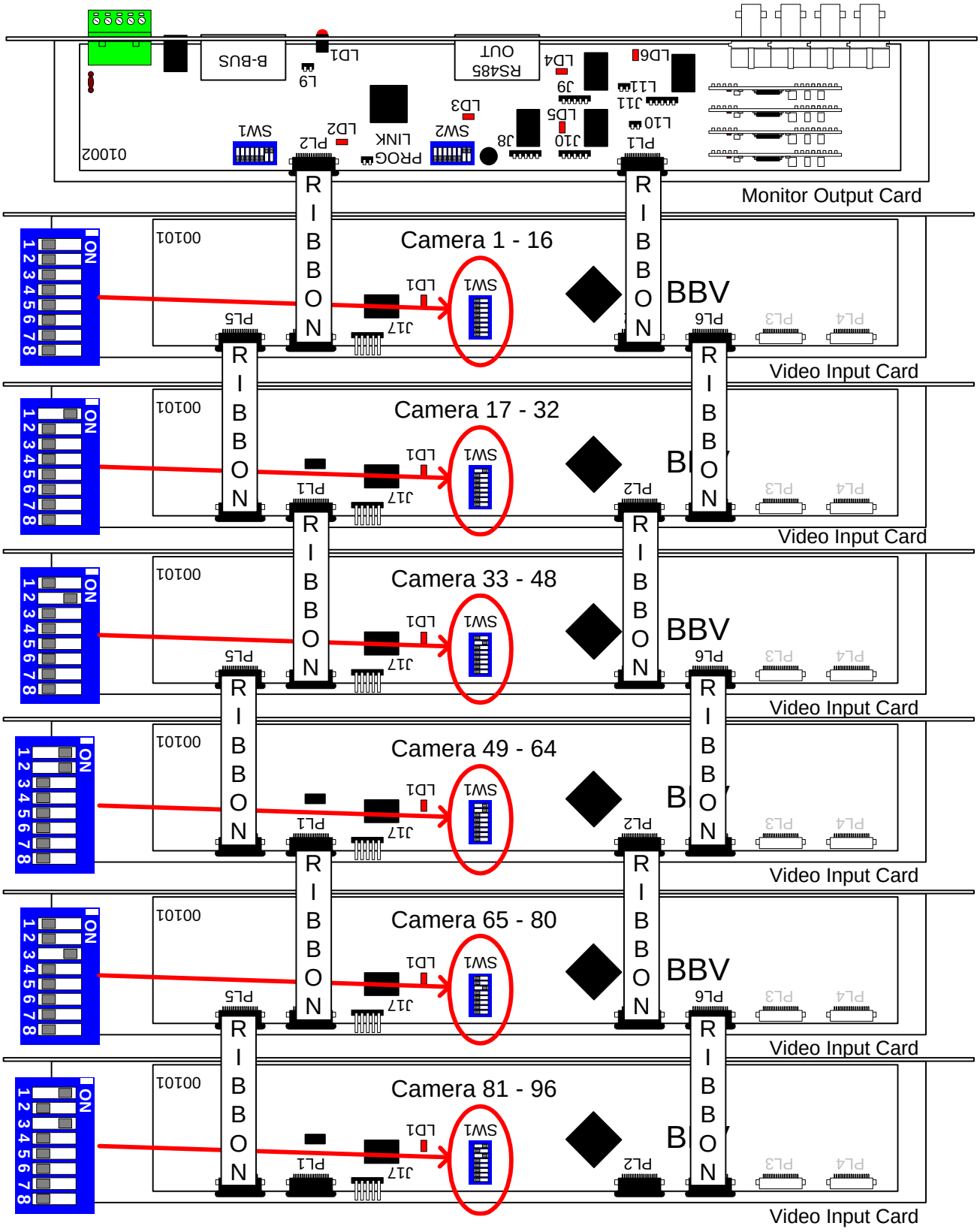


Fig 26. Wiring and switch settings for Video Input card and Monitor Output card.

MATRIX DIAGNOSTICS

The matrix STATUS led indicates system operation as follows:

Mainly OFF, 1 second ON	The matrix is powered with no keyboards connected. – If keyboards are connected then make sure that each keyboard address is unique between 0 – 3. Keyboards sharing an address will cause the matrix to ignore both keyboards.
Flashing Dimly	The matrix is powered with at least one keyboard connected. Use 58# to display the keyboard numbers that the matrix has detected on the BBUS.
OFF	Either the matrix is not powered or has an internal fault. If the power supply seems fine then please contact technical support for further assistance.

Several commands exist that allow on site diagnostics. These commands must be entered from keyboard 1 and display results on monitor output 1.

51# Display the matrix firmware version, number of resets and watchdog resets.
TX1500 Version shows the matrix firmware version number ie 2.2
resets shows the number of times that the system has lost power or the menu has been accessed.
watchdogs shows the number of times the matrix watchdog has reset the matrix. A high figure here can indicate that there may be interference or power fluctuations.

55# Coaxial telemetry on.
With normal operation, the coaxial telemetry is only transmitted to a receiver whilst a cameras is being controlled. After a short period the telemetry transmission is stopped. This is prevent interference to sync separators in DVRs etc. When trouble shooting telemetry problems the telemetry should be on all the time so the 55# command would be used and then the receiver CABLE and ERROR leds inspected. Pressing # again will stop the telemetry transmission.

56# Display the status of matrix switch SW1, the display shows a HEX number which corresponds to the switch settings for SW1. The number is displayed whilst the # key is pressed. Releasing the # key will clear the number from the screen.

Number displayed	SW1 switch
0	1 - 6 OFF
1	1 ON
2	2 ON
4	3 ON
8	4 ON
10	5 ON
20	6 ON

When more than 1 switch is ON then the number displayed will the sum of the values of all switches that are ON, ie. 1,2 ON, display shows 03, 1,2,3,4 ON displays 0F

Example numbers that could be displayed
0 = normal mode
1 = DIXONS mode – This is a special mode developed for DSG driving Mark Mercer RS485 telemetry directly from the TELEMETRY port and should not normally be selected.

57# Display the status of matrix switch SW2 as per 56#.
2A = SW2-2/4/6 ON = FACTORY INITIALISATION on a power up. This is used to clear any programming and load default values. Useful if the matrix has had a corrupted programming. Once powered up turn all SW2 switches OFF again to prevent the further accidental initialisations.

58# Display number of keyboards or BBUS/I-F with addresses connected to the matrix along with the software version of each keyboard or BBUS/I-F.

TX1500/AL16 - 16 ALARM INPUT CARD

Each alarm card provides up to 16 individual normally closed volts free alarm inputs. The card communicates via BBUS with the monitor output card. Power comes via either the BBUS interface when the alarm card is mounted in the TX1500 rack or via an external 9Vdc supply when mounted remotely. NOTE: Only 1 alarm card can be powered from the BBUS port.

The power led is used as a status indication and shows the following:
Mainly ON, flashing OFF when the MONITOR card polls it approx 2-3 times every second. (NORMAL)
OFF permanently – alarm card not powered or faulty.
ON permanently – Not polled by MONITOR card, BBUS cable faulty or ALARM card faulty.

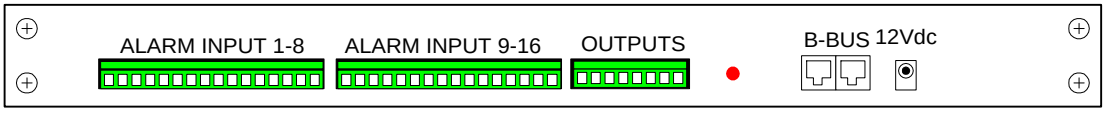


Fig 22. Alarm card front panel view

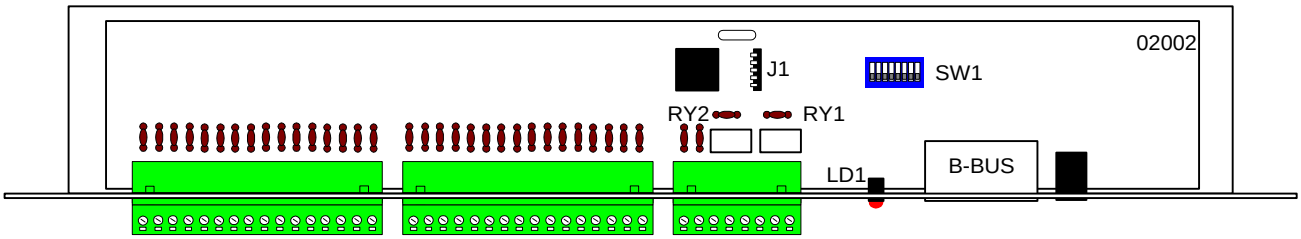
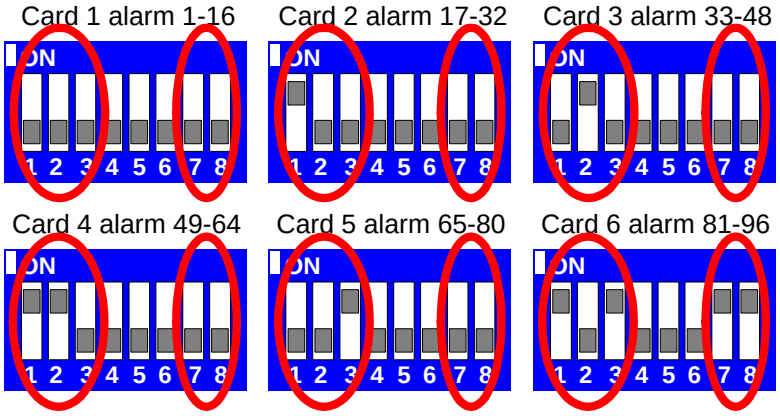


Fig 23. Alarm card internal view

SW1 is used to set the alarm card address as follows:



Switches 7 & 8
BBUS RS485 Termination
ON = Terminated
OFF = Un-terminated

Must be ON if the alarm card is at the end of line and OFF otherwise.

Alarm card 6 shown as end of line.

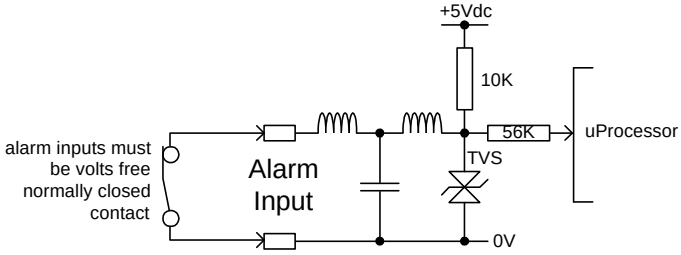
Fig 24. Alarm card SW1 address switch settings

The input stage of each alarm is as shown on this circuit fragment.

Each alarm card has two single pole change over relays labelled Relay 1 and Relay 2. These relays can be driven manually and also from alarm activations. The system relay numbers are assigned as follows:

Alarm Card	Relay 1	Relay 2
1	1	2
2	3	4
3	5	6
4	7	8
5	9	10
6	11	12

Fig 25. Alarm card alarm input circuitry



CONFIGURATION USING THE TX1500 MENUS

The menu system for TX1500 software version V2.02 is described on the following pages. The menu structure may differ slightly if using another software version although the navigation method is the same.

Out of the box the TX1500 is configured to control BBV coaxial telemetry on all cameras and all keyboards can control all the monitors and cameras.

The TX1500 menu system allows the unit to be configured to your customer's site requirements.

To prevent potential clashes from occurring only keyboard 1 can access the TX1500 system menu and only monitor 1 can display the menu.

To access the menu use keyboard 1 and ensure that monitor 1 is selected by pressed 1 MON. Press and hold the PROGRAM key for 2-3 seconds and the following screen will be displayed on the MONITOR 1 output. If the menu is not displayed then check that the program key is enabled on the keyboard by turning switch 8 ON.

Press for 2 seconds

The menu is displayed and the PROGRAM led is lit.


```
  Enter Pin Number

  * * * * * *

  + or - = Enter Key
  Joystick to Navigate
  Press clear to exit menu

Exit
```

Enter the six digit PIN using keys 0 – 9.

The default PIN is 999999

Use the joystick left and right if a digit is entered incorrectly.

The TX1500 Main Menu is displayed if the PIN is correct otherwise the TX1500 reverts to normal control.

```
TX1500 - Main Menu

System Basics
Access Tables
Alarm Menus
Sequences
Camera Types
Set Passwords
System Parameters

Exit    press + to select
```

To navigate through the menu, use the joystick and either the +/- keys to toggle a value or the numeric keys 0-9 if a value is required.

To exit the menu press the PROGRAM key at any point.

Each of the menu items will be described on the following pages

SYSTEM BASICS

```
System Basics

Maximum Camera number   10
Maximum Alarm number    16
Text on Monitors   1+2+3+4
Display Line             9
System Type            PAL


Return
```

This example screen shows the settings for a site with 10 cameras, 2 keyboards and a single alarm card with 16 alarm inputs.

Maximum Camera number:
This value is used to specify how many video inputs are connected to the matrix and prevent displaying blank screens when attempting to display non-existent cameras. Valid values are 01 - 96

Maximum Alarm number:
How many alarm inputs are connected to the matrix. This value should be 0 unless optional TX1500/AL16 alarm card/(s) are used.

Each alarm card has 16 alarm inputs therefore if 4 cards are used the maximum alarm number must be set to 64. The following table shows the maximum alarm numbers that should be used.

Alarm cards	Maximum Alarm number
0	0
1	16
2	32
3	48
4	64
5	80
6	96

Text on Monitors:
Monitor outputs 1 – 4 as previously described have the ability to display the camera number, monitor number and other messages. Text on these monitors can be disabled by using the + or – key to cycle through options. As an example a public display monitor in a retail installation can have the text disabled.

Display Line:
This allows the TX1500 status line to be moved up and down slightly on the screen to prevent the TX1500 text from being overwritten by the text from say a VCR etc. Use +/- to cycle through values.
0 – 10, 0 being the top of the screen and 10 the bottom of the screen.

System Type:
Sets the CCTV video standard as either PAL or NTSC. Use the +/- keys to select the standard that is appropriate. This is normally PAL in the UK.

Return:
Displays the TX1500 Main Menu again.

ACCESS TABLES

One of the advanced features of the TX1500 system is the ability to prevent specific cameras from being displayed on individual monitors and to prevent specific keyboards from moving cameras.

The Access Table screen is used to program which monitor or monitors each keyboard can control. A setting of 'Y' is used if the keyboard is allowed to control a monitor and 'N' to prevent control. As standard, all keyboards can control all monitors.

```
Access Table
Keyboard to Monitors

             1 2 3 4 5 6 7 8
1 Tx 1500 v6 Y N N N N N N N
2 Tx 1500 v6 N Y N N N N N N
3 Not Fitted N N N N N N N N
4 Not Fitted N N N N N N N N


Return
```

This screen shows the settings for a site with two keyboards. Each keyboard has it's own monitor and is locked out of controlling the other keyboard's monitor.

i.e.
Keyboard 1 can control monitor 1 ONLY
Keyboard 2 can control monitor 2 ONLY

Pressing the +/- keys will toggle the value of each monitor between Y and N.

NB: Keyboard 1 can always control monitor 1 as this is used to setup the matrix.

On power up the matrix interrogates devices on the BBUS and any keyboards or other control devices are displayed on this screen.

The possible methods of control are shown in the following table.

Displayed	Description
TX 1500	Standard TX1500 joystick keyboard
TCommand	Touch Screen keyboard
232 I/F	BBUS Interface allowing control from PC and from remote sites etc.

Allocating cameras to monitors and keyboards is programmed from the Camera Types screen.

ALARM MENUS

Alarm handling of the TX1500 is programmed in from the Alarm Menu screens.
Up to four actions can be carried out following each alarm activation. Eg four cameras could move to preset positions to triangulate onto an event.

On selection of Alarm Menus the following screen is displayed

```
You have 16 alarms
enabled and connected

Edit Alarm number  00
Input Action     Disable Alm
Alarm Beep Time    6 Seconds
Alarm Stack        Automatic
Relay 1 Time      60 Seconds


Return
```

This example shows a system with a single 16 input alarm card.

The TX1500 will display the total number of alarms that can be programmed based on the Maximum Alarm number set in the System Basics menu.

Input Action:
Sets the action for the ALARM 00 input on the matrix monitor board. Use +/- to cycle through the options.
No Action – ALARM 00 is not used.
Disable Alm – is used to disable all alarms when ALARM 00 is shorted to GND.
Alarm 00 – ALARM 00 is used as an alarm input in addition to the TX1500/AL16 alarm card inputs.

Alarm Beep Time:
Number of seconds that the keyboards 'beep' following an alarm input. Use +/- to cycle through the values.
0, 4, 6, 8, 10, 15, 20 Seconds

Alarm Stack:
The matrix alarm handling can be automatic, ie the system will drive cameras to presets as alarms occur or require an operator input before the alarm is actioned. Use the +/- to toggle between Automatic and Manual.
Automatic – Alarm activations are handled automatically
Manual – The ALARM key must be pressed to acknowledge an alarm activation

Relay 1 Time:
The number of seconds that the change over relay on the matrix monitor board is active following any alarm.
Use +/- to cycle through the various time delays. 10, 30, 60, 90, 120, 150, 200 or 250 seconds.

Enter the 2 digit alarm number you wish to program using the 0-9 keys. Eg enter 01 for alarm 1. The following screen will then be displayed. See the relay number mentioned on page 17.

```
Alarm  1
        kbd cam mon pre time
Action    1  01   1  01  30s

No Action 1  01   1  00  30s

No Action 1  01   1  00  30s

No Action 1  01   1  00  30s

Return    Exit next  prev
```

Each of the four actions can allow a camera to be moved to a preset position and for this camera to be displayed on a monitor output. In addition, if the monitor was sequencing before the alarm occurred, after '**time**' seconds the sequence is re-started.

If alarms are taken into the local alarm input of a telemetry receiver that supports local alarms, ie Rx100/Rx400DC/Rx457/Rx557, '**pre'** must be set to 00 as the preset will depend on the receiver alarm input. *(See the receiver manual for more details on local alarms.)*

This simple example shows alarm 1 moving camera 1 to preset 1 and display on monitor 1.

next and **prev** allow setting the alarm actions for the next and previous alarm inputs.

SEQUENCES

Each of the 8 monitor outputs of the TX1500 can sequence between all or specific cameras. Each camera can be individually added or removed from each monitor sequence to create a system where say in a retail environment public store monitors are prevented from displaying sensitive areas of the store whilst monitors in the security office can sequence all cameras.

Individual cameras can be added or removed from sequences in banks of 8 as shown on the following screen:

```
Sequence Setup Selection

Cameras 01 - 08
Cameras 09 - 16
Cameras 17 - 24
Cameras 25 - 32
Cameras 33 - 40
Cameras 41 - 48
Cameras 49 - 56
Cameras 57 - 96
Return
```

If a camera greater than the Maximum Camera Number is added to a sequence this camera will be ignored when the sequence is running.

Selecting Cameras 01 – 08 will display the following screen

```
monitor sequence setup
         cam 1 2 3 4 5 6 7 8
1  2 Second  Y Y Y Y Y Y Y Y
2  5 Second  Y Y Y Y Y Y Y Y
3 15 Second  Y Y Y Y Y Y Y Y
4 20 Second  Y Y Y Y Y Y Y Y
5 25 Second  Y Y Y Y Y Y Y Y
6 30 Second  Y Y Y Y Y Y Y Y
7 Full Rand  Y Y Y Y Y Y Y Y
8 Random     Y Y Y Y Y Y Y Y
Return      menu   Next8
```

Monitors 1 to 8 are shown with monitor 1 the top line and monitor 8 the bottom line.

The first item is the type of sequence or the dwell time if running a standard sequence. The screen on the left shows all the variants of sequences and dwell times.

Sequence types:

2/5/15… Second – standard sequential sequence with a dwell time before displaying the next camera.

Random – The cameras are sequenced as above from lowest to highest but with a random dwell time between each camera.

Full Rand – In Full Random the monitor will display a completely random camera for a random period of time. This is useful for public display monitors on shop floor to prevent shoplifters remembering the displayed sequence.

A camera will be in a specific monitor's sequence if a Y is displayed or be skipped if an N is displayed.
Use the + or – keys to toggle between Y and N.

Next8 will allow display of the next bank of 8 cameras.

CAMERA TYPES

These screens are used to set the type of telemetry for each camera and which monitor(s) and keyboard(s) are allowed to view and control each camera.

The cameras are again displayed in banks of 8 as shown on the following screen:

```
Camera Setup Selection

Cameras 01 - 08
Cameras 09 - 16
Cameras 17 - 24
Cameras 25 - 32
Cameras 33 - 40
Cameras 41 - 48
Cameras 49 - 56
Cameras 57 - 96
Return
```

Start at Cameras 01 – 08 to display the setup screen

```
Camera 01-08  Kbd  Monitor
              1234 12345678
01 BBV coax   YYYY YYYYYYYY
02 BBV coax   YYYY YYYYYYYY
03 Static     YYYY YNYYYYYY
04 BBV coax   YYYY YYYYYYYY
05 BBV 485 TP YNNN NYNNNNNN
06 BBV coax   YYYY YYYYYYYY
07 Not Fitted YYYY YYYYYYYY
08 Not Fitted YYYY YYYYYYYY
Return      Menu   Next8
```

This example shows Camera 1,2,4 & 6 with coax telemetry and able to be viewed on all monitors and controlled from all keyboards.

Camera 3 is a static camera that can be viewed on all monitors apart from monitor 2.

Camera 5 is driving via RS485 and can only be viewed on monitor 2 and controlled by keyboard 1.

Cameras 7 & 8 are not fitted.

The choices for camera type are:

BBV coax – Standard BBV up-the-coax telemetry (Rx100/200/300/400P/400DC)
BBV 485 TP – BBV RS485 telemetry also used when driving additional protocols via a StarCard/converter
Static – Telemetry is disabled
Not Fitted – The camera is not fitted and can't be viewed manually or in a sequence.

Other types may be selectable, please check with the BBV before choosing these.

BBV coax would be used to control the existing range of BBV up-the-coax receivers.
Rx100 for dome control. Rx200/300/400P for AC heads, Rx400DC for high/variable speed 24Vdc heads.
Remember the maximum distances that should be used: 250M of RG59 and 500M of CT125 grade cable.

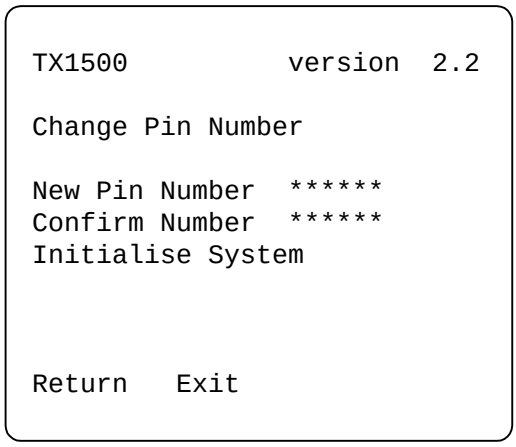
BBV 485 TP is used to drive the new advanced range of addressable BBV receivers that are controlled using two wire RS485. The RX457 is used when driving AC pan/tilt heads and the RX557 is used for high/variable speed 24Vdc heads. Both receivers offer additional features including an On Screen Display with an advanced menu system, 8 local alarm inputs, wide input supply, DIP switch addressable allowing either star or daisy chained wiring.

Selected 3rd party domes and telemetry receivers can be controlled via RS485 and a BBV STARCARD/CONVERTER. The camera type must also be set to BBV 485 TP.
Full details can be found on the BBV web site www.bbvcctv.com

Kbd: If a keyboard is allowed to control the camera select Y or if the keyboard can only view but not control the camera select N.

Monitor: Select Y if the camera can be displayed on each monitor or N if not. This allows cameras to be hidden from specific monitors/operators.

SET PASSWORD



The default menu password of 999999 can be changed using this screen.
MAKE A NOTE OF THE NEW PIN.

The matrix software version is displayed on the top of the screen.

Select the New Pin Number area and type the new PIN. Move to the Confirm Number area and retype the PIN. If the numbers match then a confirmation screen is displayed. Select EXIT to return to normal operation.

Initialise System:
Cause the entire matrix programming to be deleted and default settings used.
This function must be used with great care, as ALL programming will be lost.

SYSTEM PARAMETERS

Used to program additional settings as follows:

```
System Parameters

System Parameters 2

Menu Timeout      60 Seconds
Program Timeout   20 Seconds
Lockout Delay     10 Seconds
Relay 0 Action     Latching

Return
```

System Parameters 2:
Displays the 2nd page of system parameters.

Menu Timeout:
Number of seconds of inactivity before the menu is automatically exited. Use +/- to cycle through values.
15, 20, 40, 60, 80, 100, 120, 150, 180, 200 or 250 seconds.

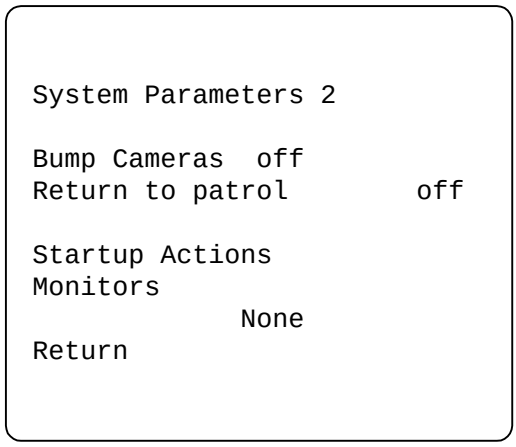
Program Timeout:
Number of seconds the keyboard will stay in programming mode after the PROGRAM key is pressed. This is designed to prevent preset positions from being overwritten accidentally. Use +/- to cycle through values.
15, 20, 40, 60, 80, 100, 120, 150, 180, 200 or 250 seconds. It is recommended that a short time is selected.

Lockout Delay:
Number of seconds that a PTZ control of a camera is locked out after the last movement command. Used to prevent two keyboards from 'fighting' for control of the same camera. Use +/- to cycle through values.
3, 5, 8, 10, 12, 15, 20, 30, 40, 60, 80, 100 or 250 seconds. 10 seconds would be an appropriate value.

Relay 0 Action:
Latching – Pressing the keyboard's TRIANGLE key will toggle the state of the monitor output card relay.
Momentary – The relay will switch whilst the TRIANGLE key is pressed and switch back again when the key is released.

SYSTEM PARAMETERS 2

Used to program additional settings as follows:



Bump Cameras:
This feature is used to select the keyboard(s) that will cause the current camera to be removed from other monitors when controlled manually. This is to prevent for example public display store monitors from displaying cameras that are following a suspect. Use +/- to cycle through options.
Off, Kbd 1, Kbd 2, **Kbd 1 + 2**, **Kbd 3**, **Kbd 4**, **Kbd 1 + 2 + 3**, **Kbd 1+2+3+4**

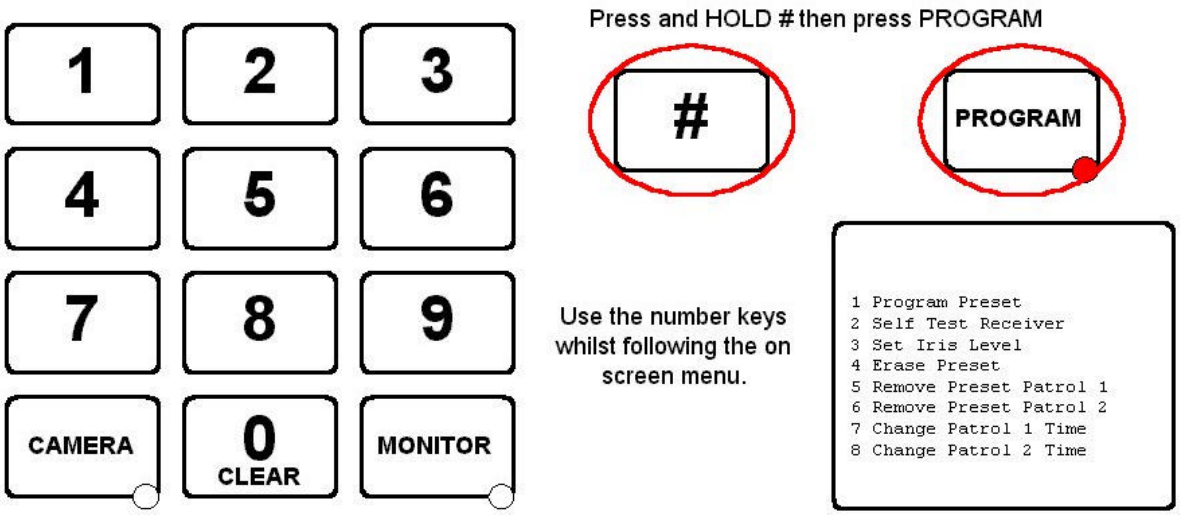
Return to patrol:
If set to on, the current camera will start a preset patrol 1 if supported when another camera is selected. This is useful for a system that has several cameras that should run preset patrols all the time that they are not controlled manually.

Startup Actions – Monitors:
When the matrix is powered up it is sometimes useful if monitors automatically sequence cameras. This option allows selected monitors to resume sequence should the system power fail and restore. Use +/- to cycle between the monitor choices.

None, **8**, **78**, **678**, **5678**, **45678**, **345678**, **2345678**, or **12345678.**

UP-THE-COAX RECEIVER SPECIFIC PROGRAMMING

To program specific features of Rx100/200/300/400P/400DC up-the-coax receivers, the camera type must be set to BBV COAX. Press and hold the '#' key and tap the PROGRAM key to display the options. The PROGRAM key must be enabled in the keyboard using SW1 switch 8 ON which is the factory default setting.



1 Program Preset
Enter 01 – 16 to program this preset position.
This is a legacy function to program a preset position and the preferred method is described on page 25.

2 Self Test Receiver
This will start the remote self test function, i.e. left/right/up/down etc on BBV up-the-coax receivers only.

3 Set Iris Level
Used with Rx300 Rx400P and Rx400DC to set the iris override output if fitted.

4 Erase Preset
Used to erase a preset from an RX100, RX400P or RX400DC. Enter 01 – 16 to erase the preset position.

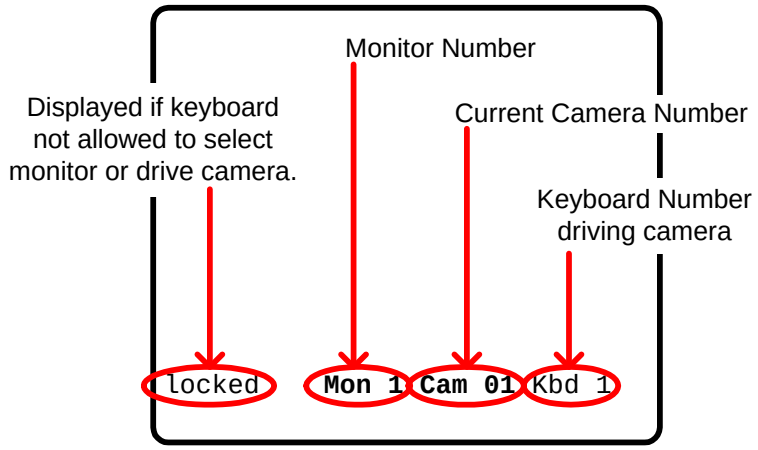
5 Remove Preset Patrol 1
Enter 01 – 16 to remove the preset from preset patrol 1 with RX100, RX400P and RX400DC receivers

6 Remove Preset Patrol 2
As above but removes the preset position from patrol 2

7 Change Patrol 1 Time
Used to set the dwell time for patrol 1. 01 = RANDOM, 02 = 12 seconds, 03 = 24 seconds etc up to 16 = 180 seconds when used with Rx100, Rx400P and Rx400DC receivers.

8 Change Patrol
As above but relates to preset patrol 2.

The menu will timeout and the PROGRAM key LED will turn OFF after several seconds to prevent accidental reprogramming of the receiver.



Monitor outputs 1,2,3 & 4 have an On Screen Display as shown on the left.

The Monitor number along with current Camera number is shown permanently.

Kbd is displayed whenever a keyboard is driving a camera.

'locked' is displayed when a keyboard attempts a dis-allowed operation.

Monitor outputs 5,6,7 & 8 are not equipped with On Screen Displays and are generally used as spot, park or public display monitors.

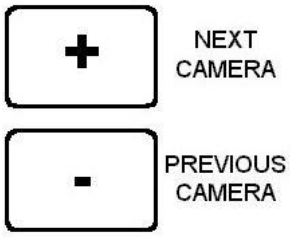
SELECTING A CAMERA

Use the number keys followed by the CAMERA key.

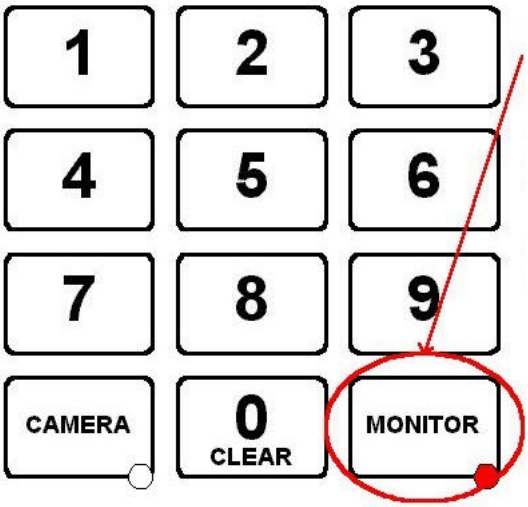
If the keyboard AND monitor are allowed to display the camera then the current monitor will now display this camera.

If not then the command is ignored.

Whilst the CAMERA key LED is ON the + and - keys can be used to easily switch to the next or previous camera.



SELECTING A MONITOR



Use the number keys followed by the MONITOR key.

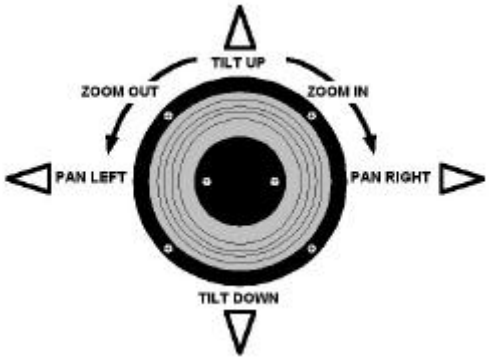
If the keyboard is not allowed to control this monitor then the command is ignored.

Otherwise the keyboard can now control the camera displayed on the new monitor

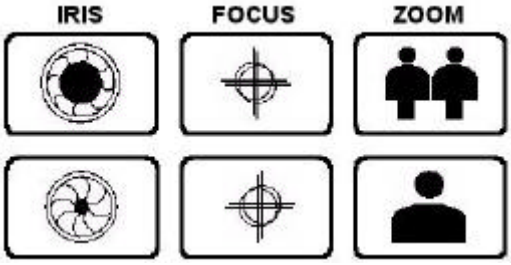
MOVING A CAMERA

JOYSTICK

The joystick is used to pan and tilt the camera and drive the lens zoom.
Moving the joystick left and right will pan the camera and moving the joystick up and down will tilt the camera. Rotating the joystick knob clockwise will zoom the lens IN and rotating the knob anti-clockwise will zoom the lens OUT. The joystick offers proportional speed control, i.e. the speed of the camera movement depends on how far the joystick is moved from the centre position.



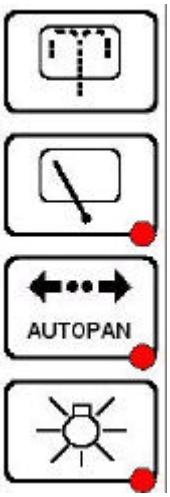
LENS KEYS



These keys are used to zoom and focus the lens and alter the iris if that function has been provided.

Press a key for the desired function and release to stop.

AUXILIARY OUTPUTS



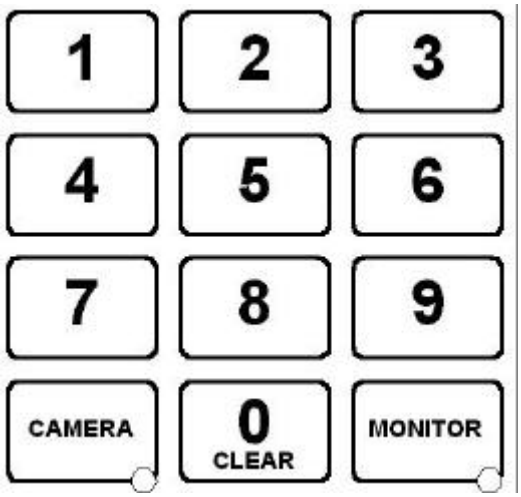
The WASH key is used to wash the camera housing's glass if the feature has been provided.

The WIPER key is used to toggle the camera housing's wiper ON/OFF

The function of the AUTOPAN key will vary depending upon the camera being controlled but mainly is used to make the camera either pan from end stop to end stop or to run a preset patrol. Moving the joystick left or right will turn autopan off.

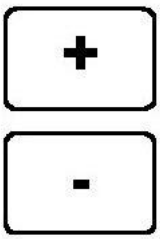
The LIGHTS key is used to toggle any lights ON/OFF

GOTO PRESET POSITION



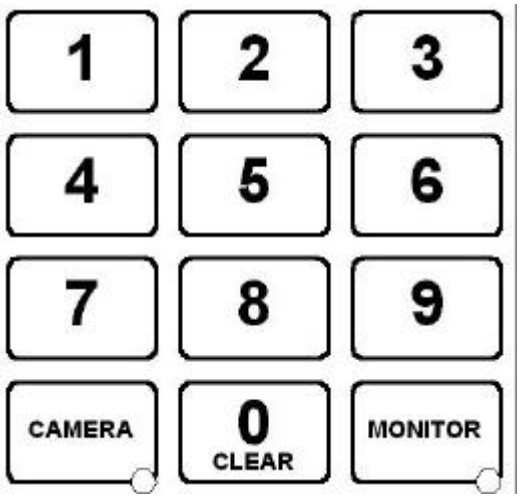
Use the number keys followed by the PRESET key.

Whilst the PRESET key LED is ON the + and - keys can be used to easily switch to the next or previous preset position.



Preset positions are only available on moving cameras that are equipped for presets. Most will accept presets 1 – 16 although the TX1500 supports preset positions up to 99. This should be checked with your installing company.

PROGRAMMING A PRESET POSITION

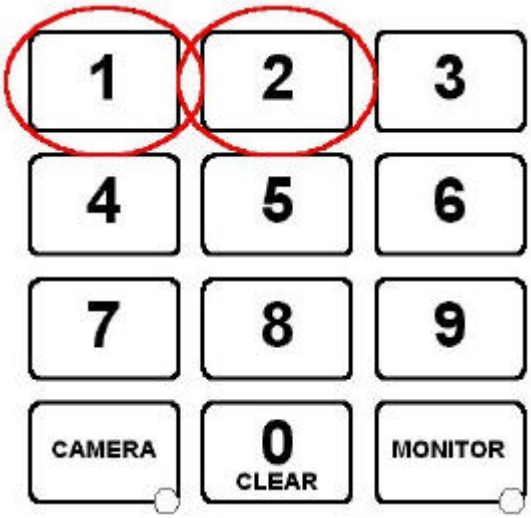


Press the PROGRAM key to turn the PROGRAM key LED ON. The unit is now in preset programming mode.

If the LED doesn't light then this keyboard has been prevented from programming presets by the installation company.

Use the number keys followed by the PRESET key to program the new preset position.

STARTING A PRESET PATROL



Press either 1 or 2 followed by the PATROL key.

The PATROL key LED will be ON whilst the current camera is running a preset patrol.

To stop the camera from patrolling simply move the joystick. The PATROL key LED will now be OFF.

As with presets, patrols are only available on moving cameras that are equipped for presets. Certain dome cameras may offer enhanced patrol features that will be covered in the product addendum sheet for each specific dome type.

STARTING A MONITOR CAMERA SEQUENCE

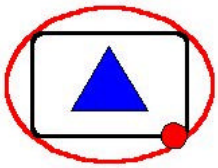
Pressing the SEQ key will start a camera switching sequence on the current monitor. The SEQ key LED indicates if the current monitor is running a sequence.

Each monitor can sequence individually and simultaneously.

The monitor sequence is programmed by the installation company using the system configuration menu.

To stop the sequence either press the SEQ key again to toggle the LED OFF or select another camera.

TRIANGLE / RELAY KEY



The TRIANGLE key is used to drive the TX1500 change over relay. The relay can be used for a variety of purposes. Your installation company will inform you of the specific function for your site.

The relays on each alarm card can also be switched as follows:

1 TRIANGLE – relay 1 alarm card 1	2 TRIANGLE – relay 2 alarm card 1
3 TRIANGLE – relay 1 alarm card 2	4 TRIANGLE – relay 2 alarm card 2
5 TRIANGLE – relay 1 alarm card 3	6 TRIANGLE – relay 2 alarm card 3
7 TRIANGLE – relay 1 alarm card 4	8 TRIANGLE – relay 2 alarm card 4
9 TRIANGLE – relay 1 alarm card 5	10 TRIANGLE – relay 2 alarm card 5
11 TRIANGLE – relay 1 alarm card 6	12 TRIANGLE – relay 2 alarm card 6

ALARM KEY

If the system has been configured for KEY PRESS alarms by the installation company, following a site alarm the ALARM key LED will be ON, the alarm monitor will display ‘alarm’ and the alarm keyboard will beep.

The alarm is acknowledged by pressing the ALARM key. The alarm monitor/s will display the camera/s programmed for this alarm.

TX1500/KBD - System Keyboard

Software: V6

The keyboard requires 9Vac/dc < 100mA supply.

An internal 8 way DIP switch is used to set the keyboard address, RS422 termination and PROGRAM key enable/disable.

Keyboard Number	SW1 Addr 1	SW2 Addr 2	SW3 Addr 4	SW4 Addr 8	SW5 Addr 16
1	OFF	OFF	OFF	OFF	OFF
2	ON	OFF	OFF	OFF	OFF
3	OFF	ON	OFF	OFF	OFF
4	ON	ON	OFF	OFF	OFF

Function	SW6 Rx Term	SW7 Tx Term	SW8 PROGRAM ENABLE
LAST UNIT	ON	ON	
MID UNIT	OFF	OFF	

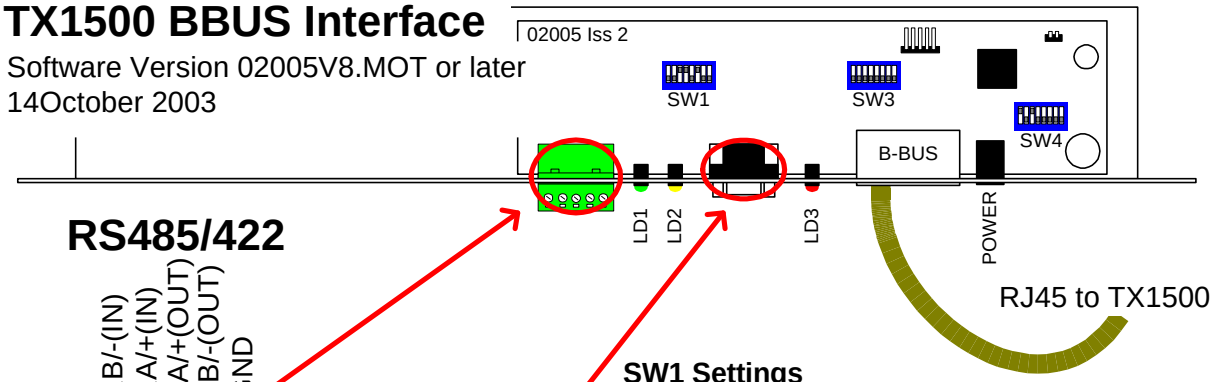
ENABLE PROGRAM			ON
DISABLE PROGRAM			OFF

Joystick Calibration Procedure
If the joystick is changed then this simple calibration procedure must be followed otherwise unpredictable pan/tilt/zoom results may occur.

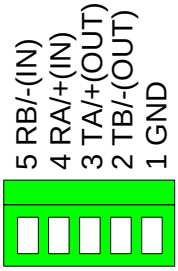
1. Power down the keyboard for 30 seconds to allow the internal capacitors to discharge fully.
2. Press and hold both the **1** and **TRIANGLE** keys and power up the keyboard.
3. The TRIANGLE led will then flash indicating that the keyboard is in calibration mode.
4. Press **5** to set the joystick zero position.
5. Move the joystick fully UP and hold in this position and press **2**
6. Move the joystick fully DOWN and hold in this position and press **8**
7. Move the joystick fully LEFT and hold in this position and press **4**
8. Move the joystick fully RIGHT and hold in this position and press **6**
9. Rotate the joystick knob fully clockwise (ZOOM IN) and hold in this position and press **ZOOM IN**
10. Rotate the joystick knob fully anti-clockwise (ZOOM OUT) and hold in this position and press **ZOOM OUT**
11. Calibration is then complete. Power down the keyboard for 30 seconds before powering up. Check that the TRIANGLE led is not flashing after power up if it is then power down again for 30 seconds.

TX1500 BBUS Interface

Software Version 02005V8.MOT or later
14October 2003

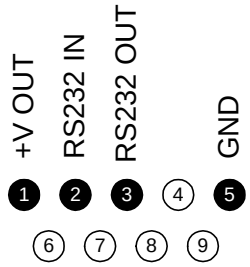


RS485/422



RS232

Chassis Mount DB9 Male



SW1 Settings

1/2 = BBUS termination
Must be ON only when the interface is at the end of line.
Default = OFF

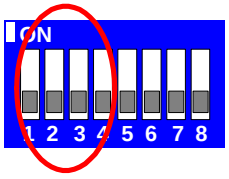
3/4 = RS485 termination
Must be ON only when the interface is at the end of line. Default = ON.

5/6 = RS232 or RS485 selection.

SW1/5	SW1/6	Input
OFF	OFF	None
ON	OFF	RS485
OFF	ON	RS232 (Default)
ON	ON	DO NOT USE

7 = MUST BE ON

SW3 - Mode



SW3/1 Select mode

OFF	BBUS Mode - RS232 control
ON	Remote keyboard mode Running Tx1500 keyboard over a RF link, fibre or other network.

LED guide

GREEN LD1

Flashes when the interface sends an LED status to the RS232 port.

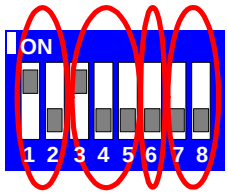
YELLOW LD2

Flashes when interface receives a command from the RS232 port.

RED LD3

BBUS comms status.
OFF = Unit de-powered
ON = Unit Powered but not communicating with the Tx1500.
Pulsing Very Fast = Comnunicating correctly.

SW4 Settings



1/2 = BBUS Address

SW4/1	SW4/2	Addr	Keyboard No
OFF	OFF	0	1
ON	OFF	1	2 (Default)
OFF	ON	2	3
ON	ON	3	4

3/4/5 = Default Monitor Selection

SW4/3	SW4/4	SW4/5	Monitor
OFF	OFF	OFF	1
ON	OFF	OFF	2 (Default)
OFF	ON	OFF	3
ON	ON	OFF	4
OFF	OFF	ON	5
ON	OFF	ON	6
OFF	ON	ON	7
ON	ON	ON	8

6 = Control Protocol Selection

SW4/5	Protocol
OFF	TX1000 (Default)
ON	TX1500

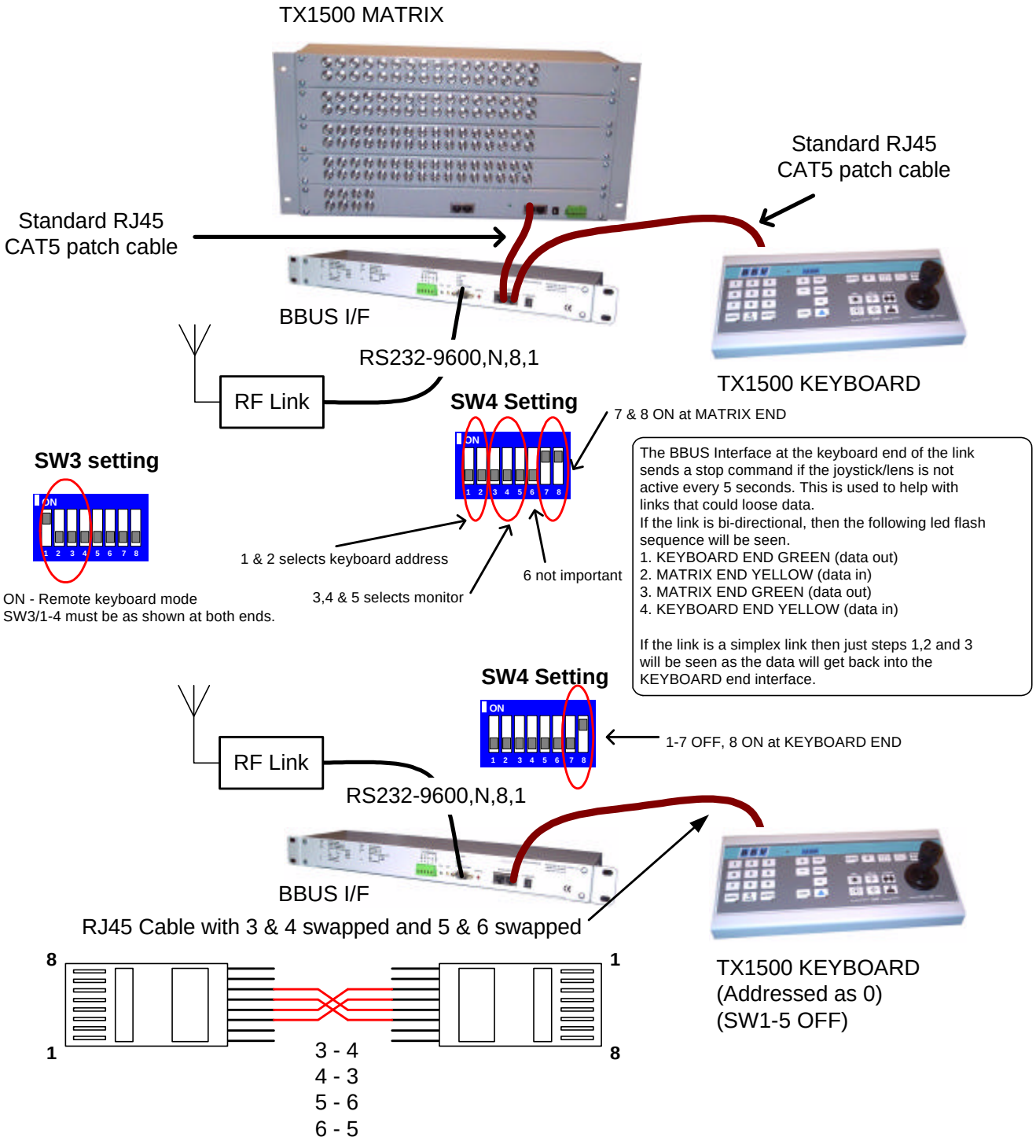
7/8 Remote Tx1500 keyboard modes

SW4/7	SW4/8	Mode
OFF	OFF	Normal mode (SW3/1 OFF)
ON	ON	Matrix End (SW3/1 ON)
OFF	ON	Keyboard End (SW3/1 ON)

7/8 Variable/Fixed speed when in normal mode

OFF	OFF	Variable speed
ON	OFF	Fixed speed - High Speed (8)
ON	ON	Fixed speed - Low speed (2)

BBUS I/F FOR REMOTE TX1500 KEYBOARD
The BBUS Interface must be fitted with 02005V7 software or later.

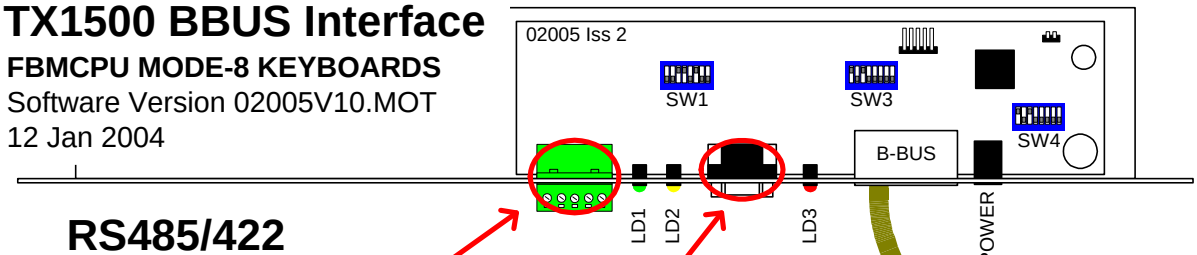


TX1500 BBUS Interface

FBMCPU MODE-8 KEYBOARDS

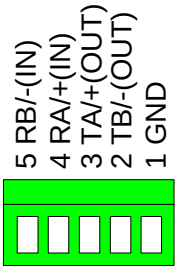
Software Version 02005V10.MOT

12 Jan 2004



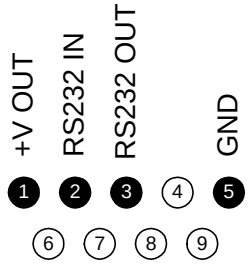
RJ45 to FBMCPU BBUS

RS485/422

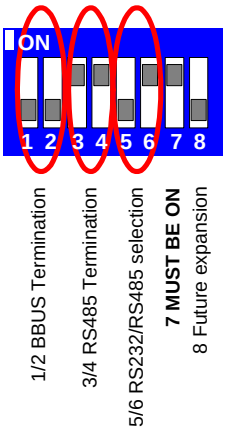


RS232

Chassis Mount DB9 Male



SW1 Settings



1/2 = BBUS termination
Must be ON only when the interface is at the end of line.
Default = OFF

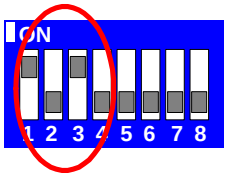
3/4 = RS485 termination
Must be ON only when the interface is at the end of line. Default = ON.

5/6 = RS232 or RS485 selection.

SW1/5	SW1/6	Input
ON	OFF	RS485
OFF	ON	RS232
ON	ON	DO NOT USE

7 = MUST BE ON

SW3 - Mode



SW3 Select mode
1-4 set the switches as shown to select FBMCPU mode which allows 8 keyboard addresses

LED guide

GREEN LD1

Flashes when the interface sends an LED status to the RS232 port.

YELLOW LD2

Flashes when interface receives a command from the RS232 port.

RED LD3

BBUS comms status.
OFF = Unit de-powered
ON = Unit Powered but not communicating with the FBMCPU.
Pulsing Very Fast = Comnunicating correctly.

This mode is to allow the BBUS/I-F to connect to the processor of our larger FBM matrix system. The FBM matrix allows up to 8 keyboard positions where the standard TX1500 mode allows 4 addresses.

If the BBUS/I-F is used with a TX1500 then DO NOT use this mode.

BBV products

Product	Description
TX300	Single camera desktop telemetry transmitter with coax & 20mA telemetry, Pan/Tilt/Lens & Lights
TX400	As TX300 inc Wash, Wipe, Autopan, 8 presets, preset patrol.
TX400DC	As TX400 including joystick for proportional Pan/Tilt control.
TX1000	8 or 16 camera, 2 monitor telemetry transmitter. Upto 2 keyboards and options for alarm inputs and 20mA telemetry.
TX1500	Mid size matrix 16 – 96 camera, 8 monitor. Up to 4 control positions (keyboard & remote control) options for alarms, remote control, coax and RS485 telemetry.

RX100	Dome Interface with options to drive a large library of dome cameras. Coaxial and 20mA telemetry.
RX200	AC receiver for Panner only heads or static cameras, Wash/Wipe/Lights. Coaxial and 20mA telemetry.
RX300	AC receiver for Pan/Tilt/Zoom/Focus/Iris Override and 1 Auxiliary output. Coaxial and 20mA telemetry.
RX400P	AC full function receiver. PTZFI 4 Auxiliary outputs, 16 presets. Coaxial and 20mA telemetry.
RX400DC	24Vdc high/variable speed receiver. 16 presets, 8 local alarm inputs, 3 Auxiliary outputs. Coaxial and 20mA telemetry.

RX450-550 RS485 series	RS485 controllable AC and DC receivers. These receivers are controlled using RS485 protocols as listed below. 230/110Vac supply. PTZFI, 32 presets, preset patrol, 8 local alarm inputs, 12V 500mA supply output. OSD for remote diagnostics. 3 Auxiliary outputs. Optional 24Vac supply.
RX450/550	Panasonic RS485 Protocol
RX451/551	Pelco P RS485 Protocol
RX452/552	VCL TP RS485 Protocol
RX453/553	Philips BI-PHASE Protocol
RX457/557	BBV RS485 Protocol

STARCARD	8 * RS485 output with option of protocol conversion STARCARD/CONVERTER