16-way Colour
Duplex Multiplexer

Instruction Manual

Version 1.1
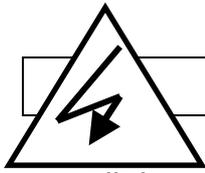
Warning Notes
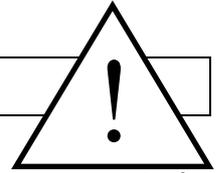
- All the safety and operating instructions should be read before the CCT287 is operated.
- All the safety and operating instructions should be retained for future reference.
- Ensure all operating instruction and warning notes are complied with at all times.
- Do not use strong or abrasive detergents when cleaning the CCT287.
- There are no user-serviceable parts inside. Please contact a qualified engineer for servicing and maintenance.
- Do not expose the CCT287 to water or moisture and do not try to operate it in wet areas.
- Please make sure that both ends of the power lead are plugged in.
- Do not drop foreign objects through the CCT287's case or expose it to moisture.
- Do not attempt to disassemble the CCT287.
- Contact a qualified engineer if the following situation happens:
  - The power lead or plug is damaged.
  - The CCT287 has been exposed to rain or water.
  - The CCT287 does not operate normally by following the operating instructions.
  - The CCT287 falls to the ground or its cover is damaged.
- When replacement parts are required, make sure that the service engineer has used replacement parts specified by System Q Ltd or that these parts have the same characteristics as the original ones. Unauthorized substitutions may result in fire, electric shock, or other hazards.
- Use only with a mounting accessory recommended by System Q Ltd.
- Never push objects of any kind into the case of the CCT287 as they may touch dangerous voltage points or short cut parts that could result in a fire or electric shock.
- If an outside cable system is connected to the CCT287, be sure that the cable system is grounded so as to provide some protection against voltage surges and built-in static charges.
- To prevent electric shock, do not remove screws or the unit's cover.
- All normal precautions to avoid component damage due to electrostatic discharge should be taken during installation and operation.

Contents

1. General Information

The CCT287 multiplexer allows simultaneously recording of multiple full-sized camera pictures on to one VCR tape to provide more comprehensive recorded surveillance than a quadsplitter or switcher unit.

The unit has multiple display options full screen, quad, 9-camera, 16-camera as well as a full screen switching mode allowing flexible surveillance of more than one camera whilst all the cameras connected to the unit are being recorded.

The multiplexer addresses the requirement to view and record multiple cameras through the application of state of the art digital video processing technologies. Intelligent software algorithms have been developed to achieve advanced functions whilst maintaining a user-friendly interface.

A typical set-up...
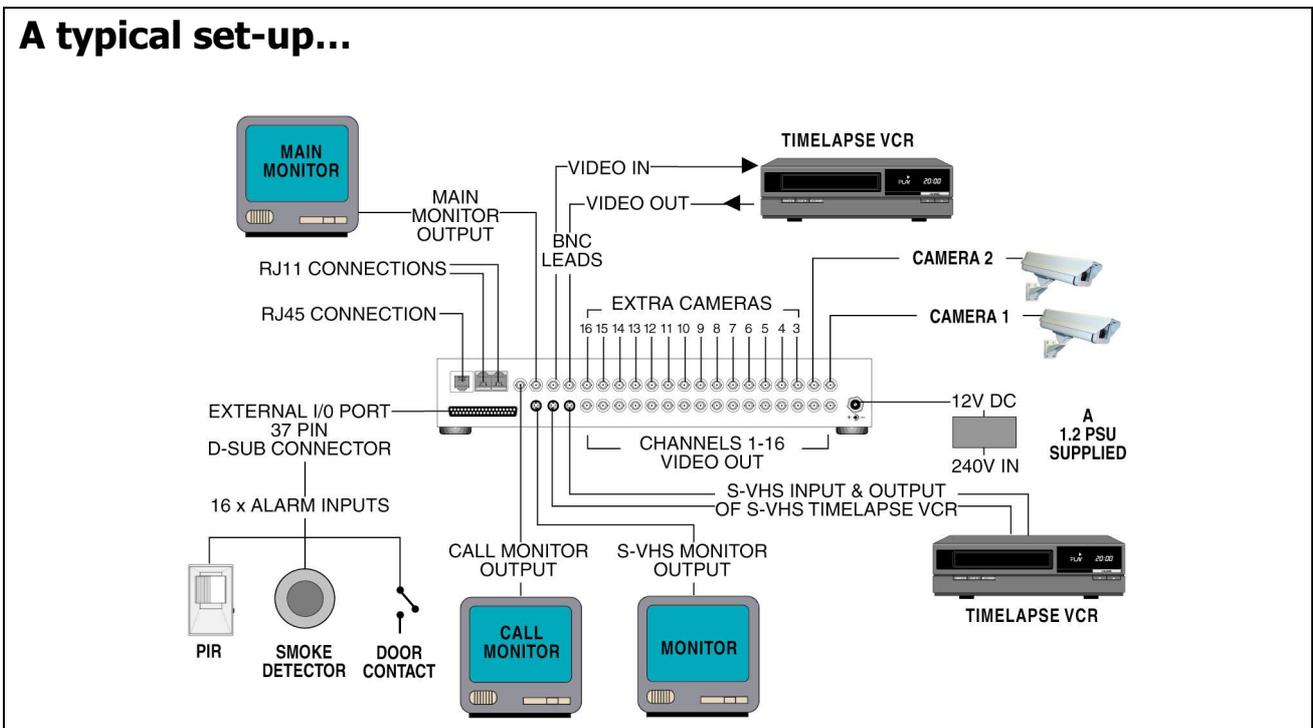
2. Features

- Duplex operation allows 2 time-lapse VCRs to be connected to the unit at the same time, one for recording LIVE pictures and the other for viewing recorded images.
- Outstanding picture quality (720x512 pixel display, 256 grayscale levels and 16 million colors).
- Compatible with B&W (EIA or CCIR standard) and color camera (NTSC or PAL standard) video sources.
- Loop through connectors are provided for each camera input, the internal 75-Ohm termination can be disabled using an on screen menu.
- Provides up to 30 unique fields per second for VCR recordings and monitor outputs.
- 192 selectable areas with adjustable sensitivity for video motion detection on each camera input.
- Alarm event log for up to 255 events including: Video loss, Motion detection and an Alarm Input.
- Two independent monitor outputs: "Main Monitor" used for displaying multiple camera images and "Call Monitor" providing full screen, live analog output.
- Brightness, contrast, saturation and hue adjustments for the main monitor output.
- Main monitor output, VCR input and VCR output are all equipped with BNC and Super-VHS connectors.
- Versatile multi-windows display format (4/9/16 window).
- Adjustable audible alarm warnings.
- On Screen Display (OSD) available for: date, time, alarm, and video loss indication, with up to 12-character camera titles.
- The operator can manually set the VCR recording time or select SYNC mode.
- Built-in color bar pattern generator for monitor calibration.

3. Installation

3.1 Basic Connections

- **Cameras**
- Connect the video lead from the camera to the appropriate "Camera In" BNC socket on the back of the multiplexer unit.
- **Main Monitor**
  Connect the video lead from the "Main Monitor" socket on the back of the multiplexer to the Video In connection on the monitor. Usually a BNC connection or a 4-pin mini-din for S-VHS use.
- **Power**
  Connect the DC 12V /1.2AMP adapter to the DC jack on the CCT287's rear.

3.2 Optional Connections

- **VCR**
  Connect the VCR in (BNC or S-VHS) and VCR OUT (BNC or S-VHS) connectors to the VCR's Video output and Video input respectively.
- **Call Monitor**
  Connect the 'Call Mon' BNC connector to the video input of a compatible video monitor.
- **RS485 Port**
  Feature not currently available, port is for future use.
- **RJ45 Port**
  Feature not currently available, port is for future use.
- **External IO Connector**
  For alarm inputs and outputs, connect the EXT IO board (supplied) to the 37pin DSUB on the rear panel of the unit. Full details in § 6.5.

4. Basic Operation

4.1 Front and Rear Panels

Direction Keys

Function keys

Camera Selection
keys 1-16

(RJ45)

(RJ11)

VCR OUT
BNC/SVHS

Camera Channels 1-16
& Video Loop throughs (BNC)

12VDC/ 1.2AMP

External I/O
Connector
(DSUB 37)

Main
monitor
BNC/SVHS

VCR IN
BNC/SVHS
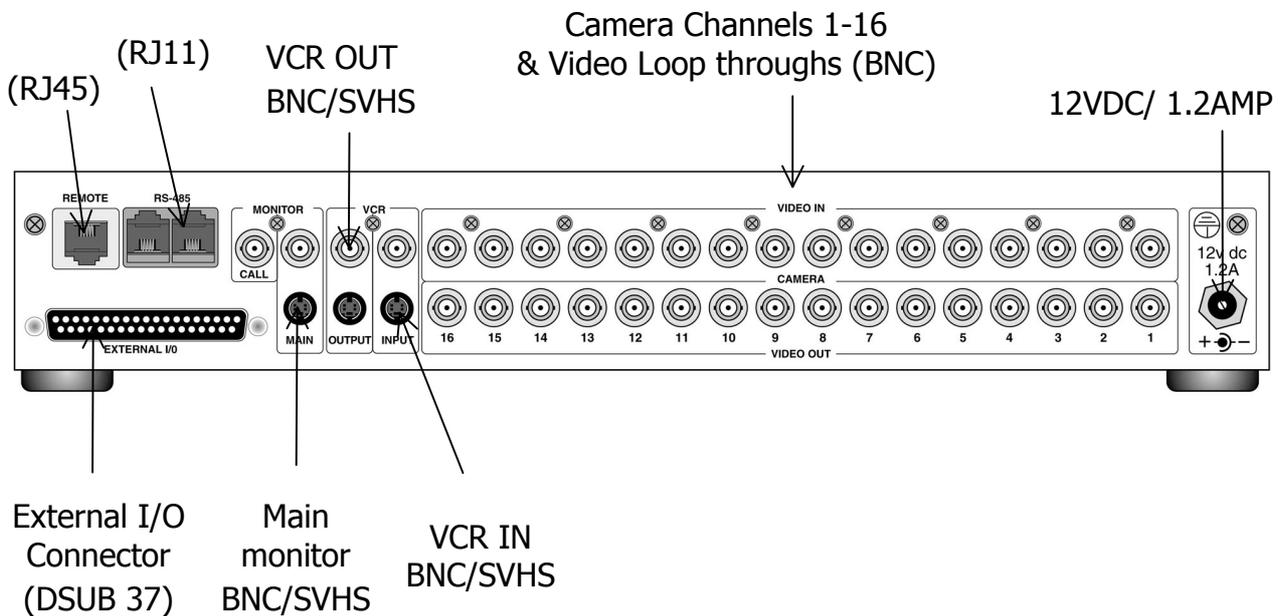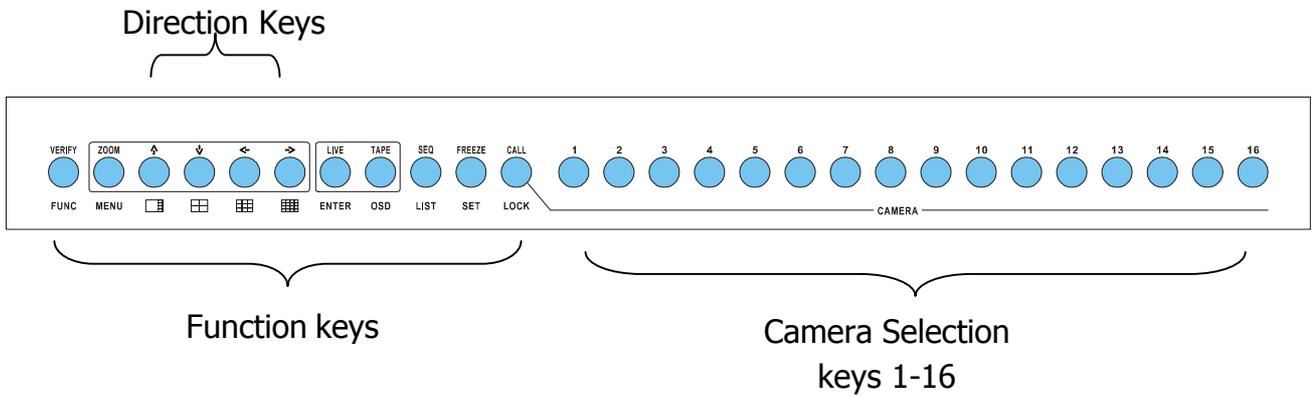
4.2 Function Key Descriptions

- **FUNC+MENU**

  Press the FUNC + MENU keys together to enter the on-screen menu. After making any changes to the menus, remember to save your changes.

- **FUNC+LIVE**

  Press FUNC + LIVE keys together to enter the engineer's on-screen menu. After making any changes to the menus, remember to save your changes. This menu is password protected to avoid unauthorized access. The password should be changed by the engineer and kept secure. The default password is 9999.

- **FUNC+TAPE**

  This is to control the unit's on screen display. Press these two buttons simultaneously to enter the menu to display or hide the time, date and camera titles.

- **FUNC+SEQ**

  Press FUNC + SEQ button together to display the alarm event log on the monitor screen. The log will display up to 255 events and list the camera, the time and what type of event was detected. You can scroll up and down this list using the directional arrow keys.

- **FUNC+DIRECTION Key**

  Press the FUNC + DIRECTION keys together, to change the quad mode.

- **LIVE**

  Press LIVE to view the "live picture".

- **TAPE**

  Press TAPE to view the "VCR playback picture".

- **SEQ**

  Press SEQ to view the camera images in sequencing mode.

- **FREEZE**

  This key will freeze the picture on display so that it is not refreshed. Press Freeze once to enter the frame mode. Press Freeze again to enter the field mode. Press Freeze again to quit the zoom function. Frame mode is suitable for more static images but if the picture contains moving objects, the image will be better (more stable) in Field mode.

- **CALL**

  Press CALL to set up the camera image that you wish to display on the call monitor, using the number keys to control the output of call monitor.

- **FUNC+1+2**

  Press FUNC+1+2 to reset the system.

4.3 Alarm History Log

The alarm events will be logged in the unit's non-volatile memory. By pushing the FUNC+SEQ keys, the alarm event log will be displayed as shown below.

The first column is the event number, followed by the date and time of the alarm and the 'type of alarm': A means Alarm Input, L means Video Loss, M means Motion Detected. The last column is the camera channel number of the alarm.

You may browse the list using the direction key; the LEFT/RIGHT key will scroll one page up and down, while UP/DOWN key will move the cursor one row up or down.

```
           Alarm Data List
001  01/06/20    15:51:43   L 0 1
002  01/06/21    02:23:30   M 0 2
003  01/06/22    18:33:09   A 0 3
004  01/06/23    03:43:22   L 0 4
005  01/06/24    09:23:34   L 0 5
006  01/06/24    16:34:14   A 0 6
007  01/06/25    07:10:20   M 0 7
008  01/06/26    12:33:34   L 0 8
009  01/06/26    19:34:23   L 0 9
010  01/06/28    03:33:45   L 1 0
           ---Continue---
```

5. OSD Menu

5.1 Date/Time display

Press the FUNC + MENU keys to view the time and date display as shown below.

```
2001/06/13  11:30:18

Position
```

- The first line displays the time & date. Press the Left or Right key to select the item you wish to alter and use the Up or Down key to adjust the number.

- Move the cursor to "Position" and press the LIVE key, the page will disappear. The display will then show the date/time. You may use the direction key to move it to your desired position.

  If you want to leave any menu page, press "FUNC" or press "MENU" to go to the next page.

Press the "FUNC" key and you will see the following display:

```
          Exit Menu
Save User Setting
Save Installer Setting
Exit Without Save
```
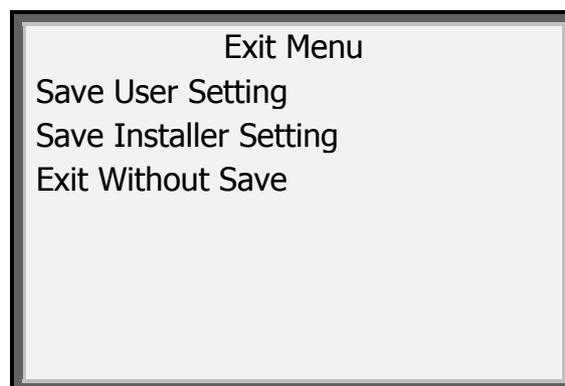
- Move the cursor to "Save User Setting" and press LIVE to save all of the changes you have made.

- Use the "Save Installer Setting" to save the changes made by the installer/engineer. These can only be made through the engineer's menu which is password protected.

● If you select "Exit Without Save", your changes will be lost.

5.2 Monitor

   Press "MENU" to move to the next page and you will see the "Monitor" page. This page allows you to adjust the video output from the multiplexer to the monitor. Items 1 ~ 4 will adjust the picture quality. You can use the left/right directional keys to adjust their values.

```
                Monitor
Brightness                  45
Contrast                    22
Saturation                  45
Hue                         51
Split Resolution          High
Call Monitor Dwell           5
Digital AGC                Dis


```

5.2.1 Split Resolution
If the monitor picture is suffering from a flicker of the video image due to sharp video, the Split Resolution can be set to 'Low' to eliminate it.

5.2.2 Call Monitor Dwell
The call monitor will always switch full screen images of all installed cameras. This item allows you to set the Dwell Time between switching. The timer ranges from 1 to 255, which means the dwell time of each camera on the call monitor can range from 1 second to 255 seconds. You can the use left/right directional key to set the dwell time.

5.2.3 DAGC
DAGC (Digital auto gain control) is used to control the playback video level. If a weaker video signal occurs when the VCR playback is being watched through the multiplexer, this can be enhanced by enabling the DAGC. Use the directional keys ($\leftarrow \rightarrow$) to change the setting (enable or disable).

5.3 Alarm / Sequence

Press 'MENU' to go to the next page, the alarm menu.

```
            Alarm / Sequence
Internal Buzzer                    ON
Response Duration                  10
Video Loss Alarm                   Dis
Power ON detect                    OFF
Sequence_1 Dwell                    5
Sequence_2 Dwell                    5
Sequence_3 Dwell                    5
Load Installer Setting
```

5.3.1 Internal Buzzer

This allows you to activate or de-activate the audible buzzer on the unit when an alarm or video loss has been detected. Use the left/right key to select ON/OFF.

5.3.2 Response Duration

This allows you to set up the duration of the alarm buzzer and alarm output signal when an alarm has been detected. Use the Up/Down directional keys to change this value from 1~9999 seconds.

5.3.3 Video Loss Alarm

This allows you to enable or disable the Video Loss alarm facility on the multiplexer. When on, Video Loss is considered as an alarm event.

5.3.4 Power ON Detect

This item allows you to enable/disable the camera auto-detection facility when the power is ON. Use the left/right keys to select ON or OFF.

5.3.5 Sequence Dwell

Using the directional keys (↑ ↓), you can use the cursor to select Sequence_1 Dwell, etc, and the left/right keys (← →) to change the sequence dwell time. This value can range from 1 to 255 seconds for each page (Full, quad, 3X3).

5.3.6 Load Installer Setting

This item allows you to reset the "Installer's Configuration" from the on-board non-volatile memory. Move the cursor to "Load Installer Setting" and press LIVE, this multiplexer will reset to the original installer's setting.

5.4 System Set Up

Press 'MENU' to go to the next page.

	Camera Installed	Covert Camera	75 Ω	140% | 70%	NC NO	Lightning	Person
C H 0 1	ON	OFF	ON	8	NO	OFF	OFF
C H 0 2	ON	OFF	ON	8	NO	OFF	OFF
C H 0 3	OFF	OFF	ON	8	NO	OFF	OFF
C H 0 4	ON	OFF	ON	8	NO	OFF	OFF
C H 0 5	OFF	OFF	ON	8	NO	OFF	OFF
C H 0 6	ON	OFF	ON	8	NO	OFF	OFF
C H 0 7	ON	OFF	ON	8	NO	OFF	OFF
C H 0 8	OFF	OFF	ON	8	NO	OFF	OFF
C H 0 9	ON	OFF	ON	8	NO	OFF	OFF
C H 1 0	OFF	OFF	ON	8	NO	OFF	OFF
CHd11	ON	OFF	ON	8	NO	OFF	OFF
C H 1 2	OFF	OFF	ON	8	NO	OFF	OFF
C H 1 3	OFF	OFF	ON	8	NO	OFF	OFF
C H 1 4	OFF	OFF	ON	8	NO	OFF	OFF
C H 1 5	OFF	OFF	ON	8	NO	OFF	OFF
C H 1 6	OFF	OFF	ON	8	NO	OFF	OFF

- Camera Installed

    This function will enable or disable every camera input and its relative function. ON means that the camera is installed. OFF means that the camera is not installed. When OFF, the remaining functions will not be effective.

- **Covert Camera**

    This function will hide a camera's image from the monitor displays but the image will still be recorded. The ON setting means the camera will be hidden. Use the LIVE key to toggle between on/off.

- **Terminal Resistor** **75**Ω

    This function can enable or disable the terminal resistor for each camera. Set to ON when a loop through is not used, ie, the default condition. Set to OFF when a loop through is in use.

- **Gain Control**   **140%-70%**

  This is the gain control for each camera. There are 8 settings. 1 (darkest) to 8 (brightest). Move the cursor to change the value and then press LIVE.

- **Alarm Relay Input**

  There are two alarm input signals: Alarm NO and Alarm NC. Use the directional keys to toggle between the values and press LIVE to set.
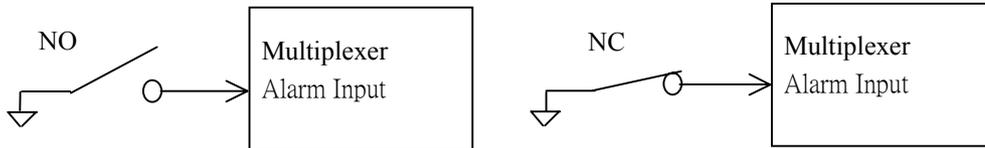
- **Alarm Input signal Set Up**

  This item allows you to enable or disable the alarm input signal detection. Use the directional keys to toggle between the values and press LIVE to set.

- **Motion Detection Set Up**

  This item allows you to enable or disable the motion detection function for each camera. Move cursors and press LIVE for change. Use the directional keys to toggle between the values and press LIVE to set.

5.5 Camera Title Set Up

Press `MENU' to go to the next page.

Each display window on the main monitor has a "Title" for the user to denote the location of that camera. The title can be turned on or off by pressing OSD key on the front panel. The default title for each camera is CH1 ~ CH16.

This menu allows you to enter special titles (up to 12 characters) for each camera. In the Camera " Title Set Up menu"

A. Use the Up/Down keys to select a camera and press the LIVE key to enter a character.

B. Use space character to delete the original character. After set up is finished, press MENU to save and enter the next page or press FUNC to escape.

Title Set Up	
CH01	CH1
CH02	CH2
CH03	CH 3
CH04	CH 4
CH05	CH 5
CH06	CH 6
CH07	CH 7
CH08	CH 8
CH09	CH 9
CH10	CH 10
CH11	CH 11
CH12	CH 12
CH13	CH 13
CH14	CH 14
CH15	CH 15
CH16	CH 16

5.6 Motion Detection

This menu allows you to configure the Motion Detection function on the multiplexer. Each camera's "Detection Area" and "Sensitivity" can be defined individually.

In the "MOTION" menu, the Motion setting indicates the level of movement that a camera can detect, ie, its sensitivity.

CH01~CH16 is the trigger level of each camera. If the detected motion amount is larger than the trigger level you set, the alarm processor will work. (If you wish to use this feature for a camera channel, remember to enable the motion detection for that camera). If the MOTION level is short, the sensitivity of motion detection is higher. This can be adjusted by the right/left direction keys.
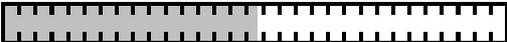
MOTION	
CH01	
CH02	
CH03	
CH04	
CH05	
CH06	
CH07	
CH08	
CH09	
CH10	
CH11	
CH12	
CH13	
CH14	
CH15	
CH16	

● **Detect Area**

This item allows you to set up the motion detect area.

In the "MOTION" menu, select the camera channel where you wish to set up the detection area and press the "Live" key. The following will be displayed:
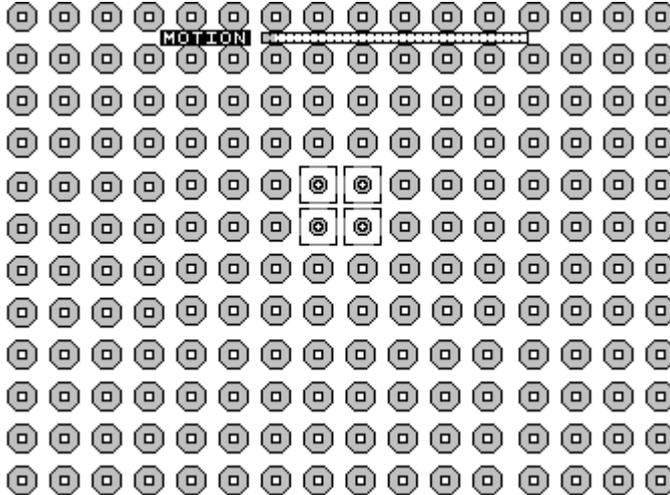
This screen will show 192 (16*12) "detection grids". You can use the directional keys and the LIVE key to select and then enable/disable the grids. (Small circle: disabled; larger circle: enabled)

The default "cursor size" is 4 grids (2*2), which means that you can toggle the setting 4 grids at a time. You can use the SEQ key to change the cursor size from 1*1 grid to 2*2, 3*3, or 4*4 grids. This makes the set up process easier. You may also use TAPE key to turn all the grids on or off. Once set up is finished, press the FUNC or MENU button to return to the "Motion" set up page.

5.7 Engineer's Menu

Press 'FUNC' and 'LIVE' simultaneously, for the following screen:

```
          Engineer Menu
Input Password              9999
Load Factory Password
Filename            D6A11201
Date                2001/05/23
Channel Number            16
System Type             NTSC
VCR Encode Type           04
HW Version            081AC6
```

5.7.1 Input Password

If you want to enter the engineer set up menu, you have to key in the password. Using the up/down keys to move the cursors to the "Input Password" and the left/right keys to select the correct password.

Press the MENU key and you will enter the engineer's set up menu. If your password is wrong, you are not allowed to enter any further into the MENU screens.

Once you have entered the engineer set up menu, the VCR adjust menu will appear.

5.7.2 Load Factory Password

This item allows you to reload the factory password in case you forget your own password (9999).

5.8 VCR Adjust

Items 1 – 4 are used to adjust the picture quality of playback, use the left/right keys to adjust their values.

```
            VCR Adjust
VCR_Brightness              47
VCR_Contrast                34
VCR_Saturation              45
VCR_Hue                     51
RS-485 ID Setup            224
Baud Rate                 9600
Clear Alarm List
Screen Center Adjust
Show Color Bar
Load Factory Setting
```

5.8.1 RS485 ID Setup

Not currently applicable.

5.8.2 Baud Rate

Not currently applicable.

5.8.3 Clear Alarm List

Move the cursor to the "Clear Alarm List" item and press LIVE. The alarm event log will be cleared.

5.8.4 Screen Center Adjust

This item is used to adjust the monitor's center point. Move the cursor to Screen Center Adjust, press LIVE then the menu will disappear. You may use the directional keys to adjust the monitor's center point. Press FUNC or MENU to escape.

5.8.5 Show Color Bar

This item allows you to fine tune the monitor's performance using a color bar pattern generated by the multiplexer.

Move the cursor to "Show Color Bar" and press the LIVE key. The color bar will appear. Press FUNC or MENU to return.

5.8.6 Load Factory Setting

This item allows you to recall the "Factory Default" settings from the read only memory. Move the cursor to "Load Factory Setting" and press LIVE. The multiplexer will reset to the original factory settings.

5.9 VCR Menu

Press 'MENU' to go to the next page.

```
                VCR Menu
Change Password              9999
VCR Source                    BNC
Rec Time                      24Hr
VCR Rec Mode                 Field
Rec Density               Standard
Sync-Trig Edge                Fall
Playback Adjust               Auto
VCR Input Check               OFF
VCR Type                      VCR
VCR Output                  Normal
```

5.9.1 Change Password

The password can be changed to any four-digit number. Use the left/right keys to change the existing password to your preferred number and press FUNC when finished. The password will be saved into the non-volatile memory. If the user forgets this new password, he can recall the factory password by using the Load Factory Password option. The default factory password is 9999.

5.9.2 VCR Source

The multiplexer will accept two kinds of VCR input, one is BNC, the other is S-VHS (4 pin mini-DIN). This must be selected according to the output and the cabling lead used from the VCR.

5.9.3 Rec Time

Options are:

Real/ SYNC/ 4Hr/ 6Hr/ 8Hr/ 12Hr/ 18Hr/ 24Hr/ 28Hr/ 30Hr/

48Hr/ 72Hr/ 168Hr/ 240Hr/ 480Hr/ 720Hr / 960Hr

Real = Real Time Mode. The recording time depends on the length of tape. If you use 120 minutes of tape, you can record up to two hours using this mode.

SYNC = Synchronise the VCR with this multiplexer. To do this, the multiplexer's VCR Trigger signal must be connected with the VCR's "SW OUT". If your VCR can provide this signal, we suggest you choose the SYNC option.

5.9.4 VCR Rec Mode

There are two options: Field and Frame.

5.9.5 Rec Density

This item allows you to select the recording density of the VCR. You may select

Standard/Double/Triple according to the Time-lapse VCR setting. The double /triple density is sometimes called "virtual real time" VCR. You can achieve a higher recording bandwidth if you use this kind of time-lapse VCR.

5.9.6 Sync-Trig Edge

This item allows you to select the rising or falling edge of the sync (trigger) signal from the VCR.

5.9.7 Playback Adjust

This item allows you to select the sampling video for playback. There are six choices (Auto, 1,2,3,4,5).

5.9.8 VCR Input Check

This function is used by the engineer to check the VCR input is set up correctly. This can be switched ON/OFF using the left/right keys. This is a troubleshooting option, which can help the engineer if there is a problem during playback.

5.9.9 Recorder Type

Not currently applicable.

5.9.10 VCR Output

This item allows you to select the signal for the VCR Output, either VCR (Normal) or Gateway.

Appendix A. External I/O Port (37pin DSUB)
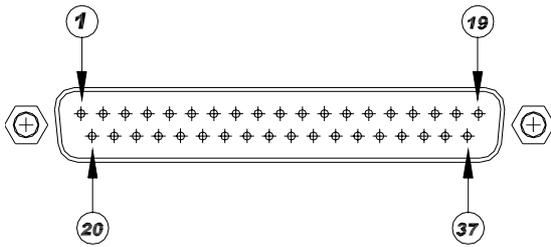
Pin No.	Definition	Direction	Pin No.	Definition	Direction
1	GND	Power	20	Reserved	Input
2	GND	Power	21	Reset Alarm	Input
3	GND	Power	22	Day / Night output	Output
4	GND	Power	23	Day / Night switch	Input
5	RX-232 (reserved)	Output	24	Set Alarm	Input
6	TX-232 (reserved)	Input	25	VCR trigger	Input
7	Alarm NO	Output	26	Alarm In 13	Input
8	Alarm COM	Output	27	Alarm In 12	Input
9	Alarm NC	Output	28	Alarm In 11	Input
10	GND	Power	29	Alarm In 10	Input
11	GND	Power	30	Alarm In 9	Input
12	GND	Power	31	Alarm In 8	Input
13	GND	Power	32	Alarm In 7	Input
14	GND	Power	33	Alarm In 6	Input
15	GND	Power	34	Alarm In 5	Input
16	Alarm In 16	Input	35	Alarm In 4	Input
17	Alarm In 15	Input	36	Alarm In 3	Input
18	Alarm In 14	Input	37	Alarm In 2	Input
19	Alarm In 1	Input			

Appendix B. Technical Specifications

The following specifications apply to this multiplexer. All specifications are subject to change without notice.

	Item	Description
Video Level	Camera Inputs	1.0Vpp, 75Ω terminated
	Camera Outputs	Loop through of camera inputs
	Main Monitor Output	Composite: 1.0Vpp, 75Ω loaded S-VHS- Y: 1.0Vpp, 75Ω loaded - C: 0.286Vpp, 75Ω loaded
	Call Monitor Output	1.0Vpp, 75Ω loaded
	VCR Inputs	Composite: 1.0Vpp, 75Ω terminated S-VHS- Y: 1.0Vpp, 75Ω terminated - C: 0.286Vpp, 75Ω terminated
	VCR Outputs	Composite: 1.0Vpp, 75Ω loaded S-VHS: - Y: 1.0Vpp, 75Ω loaded - C: 0.286Vpp, 75Ω loaded
Display	Gray Level	256 (8bits)
	Color Palette	16M colors (24bits)
	Resolution	720x480(NTSC/EIA), 720x576(PAL/CCIR)
Connectors	Power	DC Jack
	Camera In	BNC Female Connector
	Camera Out	BNC Female Connector
	Main Monitor	BNC Female Connector & S-VHS
	Call Monitor	BNC Female Connector
	VCR In	BNC Female Connector & S-VHS
	VCR Out	BNC Female Connector & S-VHS
	Alarm input	DSUB 37 pin male (TTL level)
	Alarm output	2(NO, NC) 2.0A/24V
Power Supply	Input Voltage:	12V + - 10% DC
	Power Consumption	14W (MAX)
	Safety Approval	CE, FCC
Dimension	Width	R: 432mm S: 320mm
	Height	R: 44mm S: 44mm
	Depth	R: 270mm S: 165mm
Environmental	Operation Temperature	0℃ ~ 40℃
	Humidity	0%~90% RH, Non-condensation
	Storage Temperature	-20℃~70℃