TOTAL RECALL

# TOTAL RECALL FOR THE MULTILEVEL CAPTURE SYSTEM

# INSTALLATION GUIDE

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# Installing the Solid State Organ Total Recall System


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# INTRODUCTION

In the package you will also find an operating guide for the organist. Please leave this in the console when you have completed the installation. We are always happy to supply extra copies, should you require them. This document is concerned only with the installation of the system. Copies may also be downloaded from our website at www.ssosystems.com.

# A Two Minute Guide

Total Recall is an upgrade to the MultiLevel Capture System. It communicates with the MultiLevel Capture processor using a special port, which is only available on Format D processors that have been specially upgraded. It is not possible to have both the CapKard system and the Total Recall system on the same console.

The standard Total Recall System consists of a processor unit, a control panel, a disk drive and a set of interconnecting cables.

Some cable lengths are critical in this system; do not extend them as it may prevent the system from working. The mounting of the processor box is critical, as it must be close to the MultiLevel Capture Processor and the disk drive. If this is not possible, for instance when the MultiLevel Capture System is not in the console you will need to install the Total Recall Master-Slave system which can have the disk and control panel separated from the MultiLevel Capture System by up to 300 Metres (1,000 ft).

The small control panel is used for switching the unit on, and setting the mode of operation. It is not needed during playing and so can be placed anywhere on the console, but should be easily accessible to the organist for changing the settings between performances.

The disk drive unit is also not generally required during a performance, it must be mounted with the front face either vertically in either position. Do not mount the disk with the face horizontal, as it will allow dirt to enter the unit and cause premature failure.

# System Components

## Important precautions to ensure long term reliability

Like all modern electronic systems our products use components that can be damaged with static electricity. If you wish this system to remain in good working order for a long life you MUST follow the following instructions. Failure to work to these standards will damage the system's vital components and cause premature failure.

## When ever you work on the system

- Keep away from any man made fibres except those known to be antistatic material. Normal untreated plastic; Styrofoam, expanded polystyrene etc must be eliminated from the environment.
- It is also not recommended to work on a metal work-surface. Wood is the best alternative to an antistatic workbench or mat.
- Always use the grounding wrist strap supplied, free replacements are available from SSOS on request.
- The most important precaution is to ensure that you are at the same static charge as the processor before you touch it.
- If you can feel static it is already 100 times greater charge than that required to destroy the sensitive components in this or any other modern electronic system.

⊗ Remember! The damage may not become apparent until long after you have left the site.

# Returning parts to SSOS

**Always be sure to return any spare parts to SSOS in the packing supplied. Static sensitive parts not returned in the correct antistatic bags sealed at the end will not be accepted for credit as theyare damaged goods and cannot be reused.**

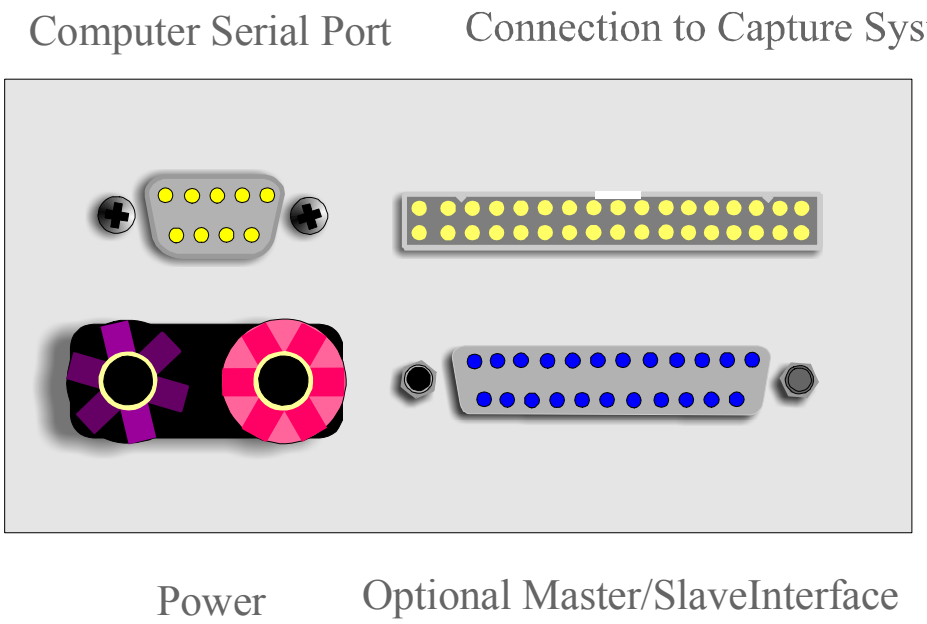
## The Processor Unit

When laying out the installation the processor unit positioning is critical. The cable that connects it to the MultiLevel Processor is only 1m metres (3ft) long and cannot be lengthened. Also connecting to the processor unit is the floppy disk which has a limited length cable of 1.8m (6ft). So this limits the distance of the floppy drive to the MultiLevel Capture Processor to 4.8m (9ft), or less if the box is not placed efficiently.

## Connections to the processor unit

| Processor | Connection |
|---|---|
| Power | 9 to 30 V DC |
| 10 Way ribbon connector | Control panel, standard length 1.8m (6ft) may be extended. |
| 34 Way ribbon connector | Connection to Capture System. 1m (3ft) cannot be extended. This connector is on the power end of the box as at the top. |
| 34 Way ribbon connector | Connection to optional pinboard if the control panel is not used. This connector is on the floppy drive end of the box and is the top of the two. |
| 9 Way 'D" connector male | Used to connect to a computer for diagnostics. |
| 34 Way ribbon connector | Floppy drive cable. On the same end of the box as the floppy drive power connector. At the bottom. |
| 25 Way 'D" connector female | Option available on the Master – Slave version only. Connects the Master and Slave together over a long cable. |
| White 2 pin connector | Floppy drive power. |

## Power Supply End




## Power

Connect power from the console power supply, the unit draws approximately  Amp at 12V. The voltage supply may be between 9 and 30V. There is an internal fuse that will blow if the power is accidentally reversed. Cables must be stripped and inserted under the screw clamps that must securely tightened. The holes in the front of the power connector are for inserting 4mm power plugs that may also be used. Do not insert bare wires into these holes, power will not be reliably connected.

## Connection to the MultiLevel Capture System

The system is supplied with two 34 Way ribbon cables one of which is to link from here to the capture system.

**Pin 1 is marked by a red line and must be positioned to the outer edge of the processor unit.**

Run this cable to the MultiLevel Capture System rack and consult the installation manual for correct connection. If this is an upgrade to an existing system refer to the upgrade section of this manual. If you are familiar with the MultiLevel Capture System this cable goes to the processor slot bottom Q52 connector, and replaces the CapKard if present. Be sure to fit the connector the correct way around! There have been changes to the connector design over the years and it is possible to fit this backwards in some racks that may damage the equipment.

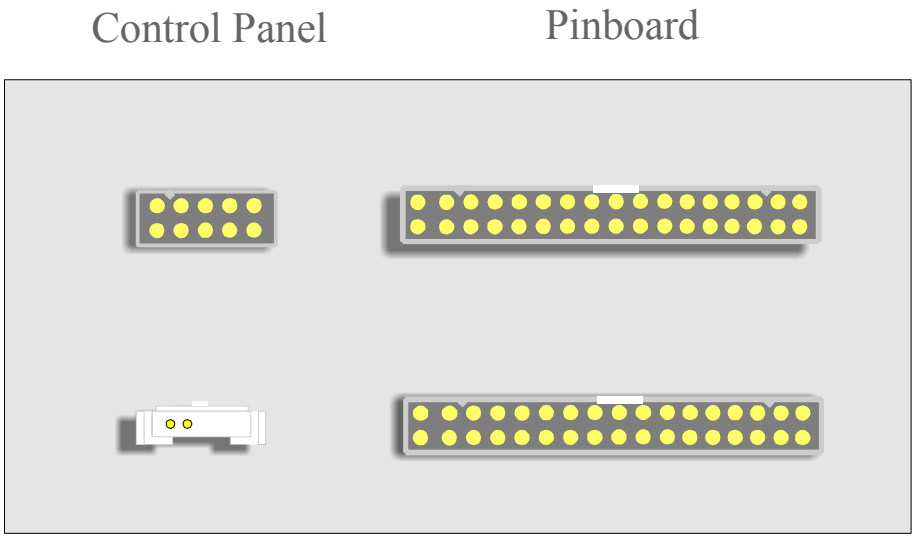
## Computer Connection

This connection is for SSOS engineers to diagnose and set-up the system and is not designed to be used by installers at this point.

## Master – Remote

Used for the optional Master – Remote system when a long cable is required from the console to the capture system. This connector links to a second TR box. Master Slave installation information is available on page **Error! Bookmark not defined.**.

## Floppy Drive Connections




## Control Panel

Connect one end of the 10 way ribbon cable (both ends are the same) to here and one to the control panel.

## Optional Pinboard Connection

If ordered as an additional item the control panel can be accessed from a pinboard so you can use your own switches and LED's. The cable plugs in here and further information is available on page 20.

## Floppy Power

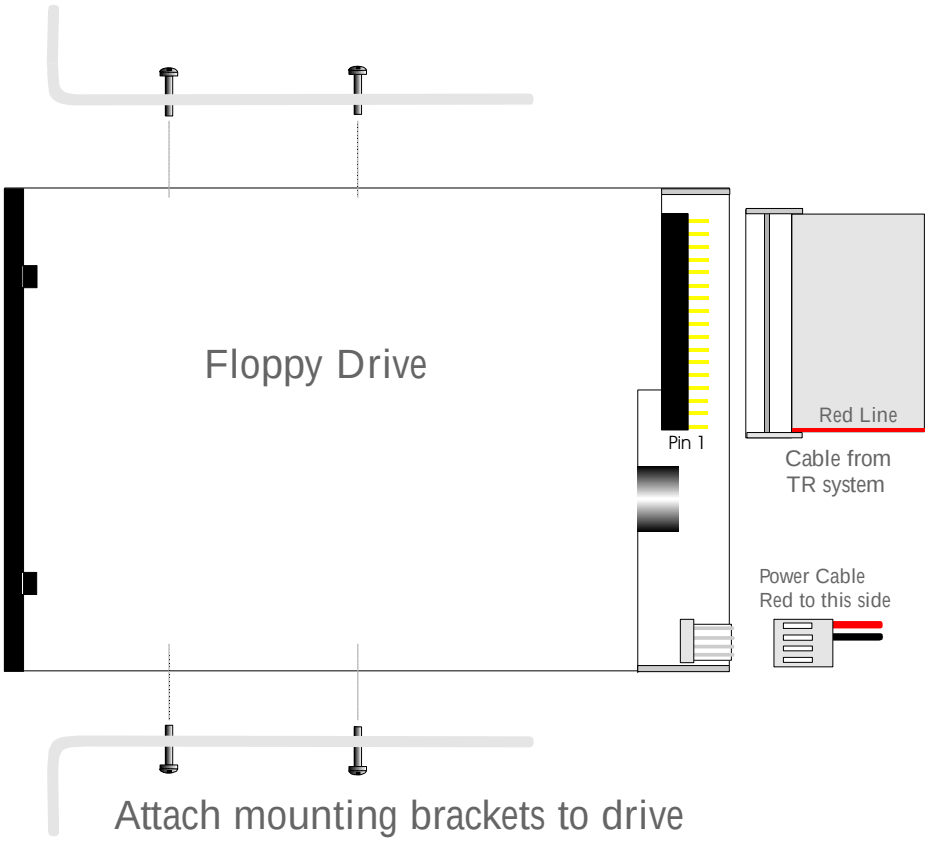
Feeds 5V to the floppy drive through a special cable.

## Floppy Drive

The disk drive unit is also not generally required during a performance; it must be mounted with the front face vertically in either position. Do not mount the disk with the face horizontal, as it will allow dirt to enter the unit and cause premature failure.

Use one of the 34 way cables to link from here to the floppy drive. This can be tricky as the floppy drives are not well labelled and it is very easy to put the cable in backwards. On the TR box the cable will only fit with the pin 1 red line marker to the outside edge of the box. However, on the floppy it will fit either way around. The correct way is with the red line to the centre of the floppy. Disk Drives are fragile units. Do not force or twist them as the will become unreliable.

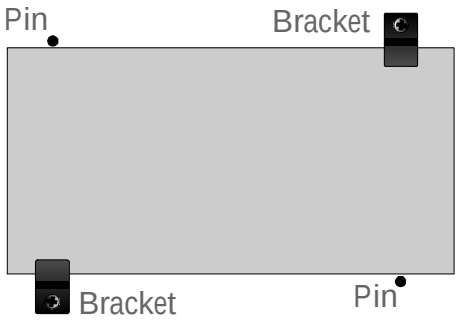
Fit the brackets to each side of the drive as shown below at this time. A cutout drawing is available at the end of this manual.




The brackets secure the drive to the inside of the console allowing the unit to protrude. It will be necessary to manufacture a suitable bezel to match the console face.

## Securing the processor box

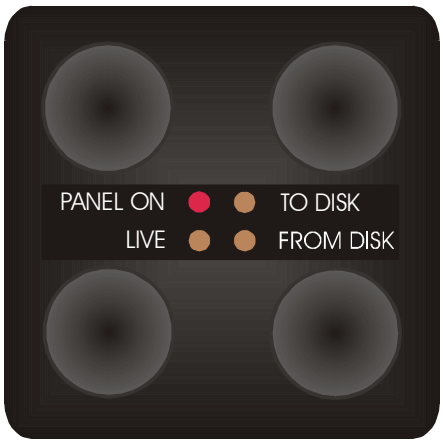
Once the position has been decided the box should be secured using the two Z shaped brackets in the kit. Fit one on each diagonal corner and use pins to prevent the box from rotating as shown in the diagram below.




## Control Panel

The small control panel is used for switching the unit on, and setting the mode of operation. It is not needed during playing and so can be placed anywhere on the console, but should be easily accessible to the organist for changing the settings between performances.

The control panel is attached to the console, a square cutout of 50mm (2inches) should be allowed.




This panel is identical to those used for the optional black metalwork for the capture system and can be used in conjunction with the new SSOS piston sequencer controls to complete a square.

Mechanical drawings of the panel are supplied at the end of this manual. The panel is held in place by screwing through a bar that bridges the back of the hole and into the spacers with the screws supplied. This may sound obvious but check that the writing on the panel is the correct way when fitting the panel as it is square and will fit in any orientation. Attach the 10-way ribbon cable by aligning it with the keyway in the connector. After installation check that the buttons move freely as they can rub on the edges of the cut-out if the panel is not aligned correctly.

# Upgrade Instructions

If you already have a MultiLevel Capture System installation and you are adding the Total Recall System to it there is an additional step required.

The MultiLevel Capture Processor will need to be replaced or upgraded. Solid State Organ Systems will have discussed the options with someone in your company regarding this installation and you will have decided on one of two options.

Be sure to read the instructions on antistatic protection at the beginning of this manual, see page **Error! Bookmark not defined.**. Returning processors in the wrong packaging will not be valid for credit or exchange and the warranty will be invalidated.

## Upgrade existing processor

It is not possible to upgrade a processor on site. However this can be completed by SSL in their workshop and returned to you. It is possible to have a temporary loan processor to keep the organ playable during this time. Although every effort will be taken to retain existing memories we cannot guarantee this and some or all may be lost in the process.

When the old processor is returned it will need to be replaced as new using the instructions below.

## Replace processor

A new processor for the MultiLevel Capture System has been supplied with this upgrade.

Small program headers are fitted into the processor board to enable the correct functions for your organ. They are fitted in a row along the centre of the processor board and have wire jumpers soldered in them.

The headers in the sockets along the centre of the board labelled P110 to P116 need to be moved to the new processor by lifting them out carefully by sliding a small screwdriver under each one in turn and gently twisting it, then moving the screwdriver further in and twisting again until the header comes free without bending the pins. Do not mix them up or put them in the wrong way around. The corner with a small chamfer marks pin 1 and this goes nearest the writing for the header i.e. P110.

Insert the processor in the same slot as the old one was removed from. Push the processor firmly into the slot so the edge is level with the other cards.

If SSL has instructed you to remove any memory cards remove them now. There should be none in the new system.

## Larger Consoles with more than One Rack

Large consoles require there to be more than one MultiLevel Capture System rack. Each rack has its own processor and memory and so they must be linked to the Total Recall system.

First you will need to locate the Master Rack. The master rack is usually labelled Master and the other racks are labelled slave 1 slave 2. The installation manual will also describe the master rack.

Install the Total Recall processor as described above to the master rack.

Each subsequent rack must now be linked to the master with a ribbon cable. If this system is replacing a CapKard memory system these links will be in place.

The processor in the master rack will be fitted with a connector on the front edge above the LED's called Q54. Attach the ribbon cable supplied to Q54 on the master processor and then attach the other end to the Q52 (bottom) connector on the rear of the nearest slave rack in the slot corresponding to the processor.

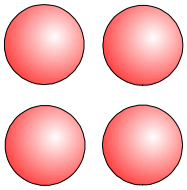
Repeat this process for a second slave rack if required by connecting from Q54 on the first slave processor to Q52 on the second slave rack.

## Testing the System

Finally check the cabling paying special attention to the power wiring and the orientation of the ribbon cables.

Position yourself so you can see the control panel when you switch on. If the system is operating all four LEDs will flash on the control panel for a second when the power is applied. If not please refer to system not responding in the trouble shooting section on page 15.

One flash = System OK



1. First establish that the MultiLevel Capture System is functioning normally. Check that all the functions are correct, and you can set pistons and crescendo settings. For more information on this please refer to the MultiLevel Capture System operating guide that came with the system, download a new one from the SSL website at www.ssosystems.com or call us for a free replacement.

2. Only when the MultiLevel Capture System is known to be OK check the Total Recall.

3. Insert one of the Total Recall disks that came with the system into the drive. Or you may use any blank IBM formatted 3.5" HD floppy disk.

4. Push the "PANEL ON" button on the control panel. With a newly formatted disk the panel on LED will flash for about a minute while the system files are copied to the disk. During this time the green light on the disk will be lit. If this does not happen refer to the troubleshooting guide on page 15. *A more detailed procedure for the following may be found in the operating guide but for completeness of this manual the following instructions will check that the system is functioning correctly.*

5. The system has two different operating modes. Live and backup. First we will test the live mode.

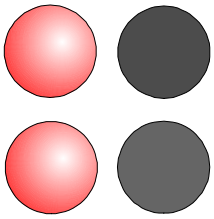
6. Set the Total Recall System with the Panel ON LED lit and the other three off.

7. Select Memory Level One on the MultiLevel Capture System.

8. If there are combinations set on this level remember what they look like. If the level is either blank or contains meaningless combinations set some that you can remember on general and divisional pistons.

9. Now press LIVE on the Total Recall control panel, and wait for the LIVE LED to come on and stay lit. If it doesn't then refer to the troubleshooting section on page 15.

## LIVE MODE



10. Now push the same pistons, they should be blank if a new disk is being used.

11. Set a new and different set of combinations and check that they are in memory.

12. Now press LIVE once again to revert to standard mode with the LIVE LED off.

13. The old combinations should be back in memory.

14. Now we need to test the backup and restore function. Using either the same disk or a fresh one if you want to, push SET and TO DISK in the same way as you would set a piston. The LIVE data and the backup data both fit on the same disk. The LED will flash while the all of the memories are being saved to disk and the green LED on the disk drive will be lit. DO NOT USE THE COMBINATION ACTION UNTIL THE PROCESS IS COMPLETE

15. After just less than one minute the TO DISK LED will remain on for a short while and then go off. This indicates the memories are saved to disk.

16. Make some changes to combinations on different levels and remember where they are.

17. Now restore the backup using SET and FROM DISK. The LED will flash for about a minute while the data is recovered; you may also see various changes of lamps on the console during this time. DO NOT USE THE COMBINATION ACTION UNTIL THE PROCESS IS COMPLETE.

18. Now check the test memories you set in 16 above. They should now be back to how they were before they were changed.

19. If so everything is OK and the installation is complete.

# Troubleshooting

## System not responding

When power is applied the 4 red LEDs on the front panel should flash for a moment, beware that it is quickly after the power is applied. If they don't, then the system is not functioning. The most likely cause is lack of power. Check that there is between 9 and 30 Volts DC at the red and black terminals on the box. Also check that the red terminal is positive and the black negative.

If the power has been accidentally applied, even for a very brief moment the wrong way then an internal fuse will blow. It is possible to change the fuse but first you will need to obtain one. The correct fuse is 20mm long and rated at 500mA.

To change the fuse the cover must be carefully removed by removing all 8 screws and observing the antistatic precautions described on page **Error! Reference source not found.Error! Bookmark not defined.** carefully lift the black cover from the processor unit. There are wires linking the cover to the main unit and so careful removal is important.

The small circuit board on the underside of the cover is the power supply for the system and is fitted with a fuse. When the supply is functioning correctly the red LED on the board will be lit.

Other than the fuse check that no plugs are loose in the unit. There are no other user serviceable parts in the unit and it will need to be returned to Solid State Logic.

## Panel On does not work.

First check the 4 red LEDs flash when power is applied. If not refer to "System not responding" above.

## Panel ON LED flashes twice when button pushed

If the LED flashes twice then stops for a short period then repeats this there is a disk error.

Is there a disk in the drive?

Is the drive connected correctly?

Check to see if the drive clicks when the system is powered on. If not, the power cable may not be connected to the disk. The drive does not always click and so this test is only a guide.

Does the green LED on the disk drive flash when the PANEL ON button is pushed? If not check to see if the ribbon cable at the floppy is plugged in correctly, it is possible to insert it the wrong way round.

## Panel on LED flashes four times when button pushed

If the LED flashes four times then stops for a short period then repeats this there is a communication error with the MultiLevel Capture System.

Has the MultiLevel Capture Processor been upgraded? See page **Error! Bookmark not defined.** for details.

Has the ribbon cable from the MultiLevel Capture System been inserted correctly, see page **Error! Bookmark not defined.** for details.

Is the red LED on the MultiLevel Capture processor lit? If not, check power to the rack.

## Panel on LED lights but LIVE control gives 2 flashes when pushed

Is the disk formatted IBM HD? If you are not sure, this will be printed on the pack the disk came in, or you can format it in a Windows PC but choosing 3½ Floppy A: in My Computer and right clicking with the mouse on the disk icon to reveal the menu and choosing Format. It is not sufficient to just delete the existing files on a disk; it must be formatted again to work in the Total Recall drive.

# Master – Remote System

Where the capture system rack is remote from the console it is necessary to use a Master-Remote set-up. This uses two Total Recall units, one at the rack and one at the console. The Total Recall unit at the capture system Rack is called a "Master-Remote" unit (part no. 723072A2). The Total Recall unit at the Console is called a "Remote" unit (part no. 723072A3).

## Master-Remote Connections

The Master-Remote unit at the capture system Rack will use the following connections:

| | |
|---|---|
| Power | Connects to the same power supply as the MUCAP Rack |
| Connection to Capture System | Connects to the MUCAP Rack |
| Computer Serial Port | not required |
| Master – Remote | Use the coloured ribbon cable to connect "Next" to the link protection board |
| Control Panel | not used |
| Pinboard | not used |
| Floppy Drive Power | not used |
| Floppy Drive Interface | not used |

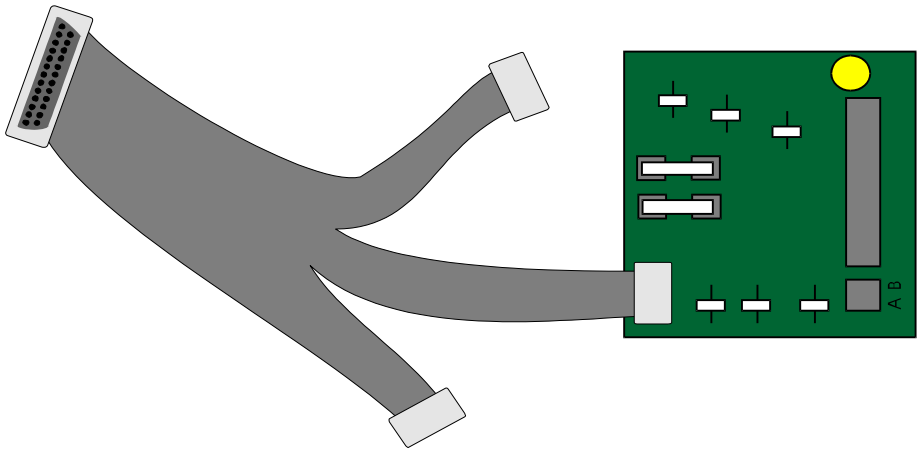
## Remote Connections

The Remote unit at the console will use the following connections:

| | |
|---|---|
| Power | Connects to the console power supply |
| Connection to Capture System | not used |
| Computer Serial Port | not required |
| Master – Remote | Use the coloured ribbon cable to connect "Previous" to the link protection board |
| Control Panel | 4 Button Control Panel |
| Pinboard | Optional Pinboard |
| Floppy Drive Power | Floppy Drive |
| Floppy Drive Interface | Floppy Drive |

## Connecting the Master-Remote unit to the Remote Unit

Your system will come complete with the necessary link protection boards and cables. The assembly will look similar to the system shown below.




**The coloured ribbon cable**

## Data Cable

The cable used to wire the units together is critical to its operation.

Although the cable appears to be a telephone type cable, it is actually a very high performance computer data cable and no guarantees of system performance can be made if this specific type of cable is not used.

We recommend the use of a Belden cable, type number 1624R or 1633A LAN Data Cable Category Level 5 FTP with overall shield. However a number of alternatives are available and these are detailed in the table below, the cable must have a shield, as this is an integral part of the circuit. Suitable cables are available from our offices or from reputable computer cable dealers. For suppliers see the listing in the back of this book.

| MultiSystem Data Cable - Alternative Types | | | | | |
|---|---|---|---|---|---|
| | Belden | Alpha | Farnell/ Newark | RS Components | SSOS Partcode |
| Level 5 (Preferred) | 1624R or 1633A | 9504FS | 473-261 | 369-832 | 31L08368 |
| Level 5 (Flexible for mobile consoles) | | | 296-788 | 369-854 | 31L08468 |

## Connecting the Units to the Link Protection Boards

At this point in the assembly you will have the following parts available.

1. The Total Recall Box

2. The Link Protection Board

3. The Coloured Ribbon Cable (Part Number 66D10260)

First plug the D connector of the ribbon cable into the Total Recall unit then mount the Link Protection boards to the organ/console structure at a point where the ribbon cable will easily reach.

## Connecting the Systems Together

Earlier in the instructions we mentioned the use of the cable that links the systems together. This cable should be placed in position and the ends connected to the link protection boards.

If all is well, by now you will have assembled the systems. It is now necessary to link them together.

## Some Rules

1. Each data cable can only be used to connect from one point to another.

Cables must not be chained or "Tee" jointed. If this is done, reflections of the data will echo around the system and may cause interference problems. In much the same way as the wind in a pipe oscillates, electricity in a wire will do the same, except at a much higher frequency.

2. The cable may be joined if cut too short, but be careful to connect the screen/shield as well.

3. Each system has "Inputs" and "Outputs".

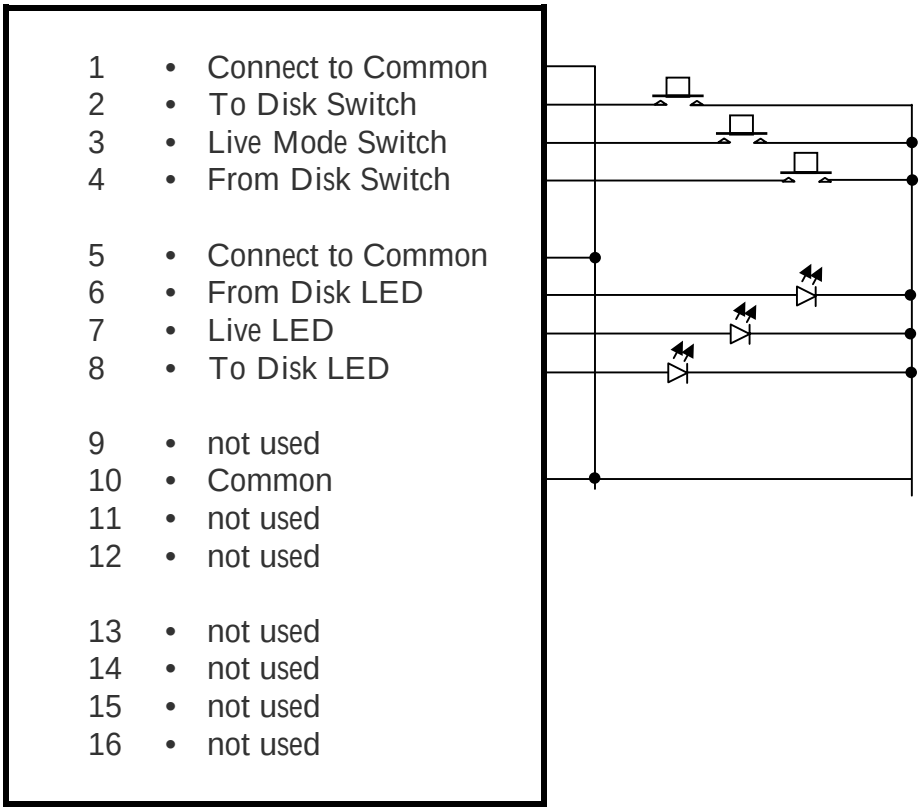
The small plugs on the end of the coloured ribbon cable are labelled NEXT, PREVIOUS & SPARE. The correct connector must be used as follows:

| Total Recall Unit | Connector to use |
|---|---|
| Master-Remote (Rack) | NEXT |
| Remote (Console) | PREVIOUS |

## Pinboard Connections

Where custom switches are required instead of the standard 4 button control panel a pinboard will be supplied. The connections to the pinboard are as detailed below:

Control Pinboard




Master remote systems are required when the distance between the console control panel, disk drive and the capture system rack exceeds ten feet (9m). In this case a Master system is supplied to communicate with the capture system and another remote system is supplies to communicate with the controls and disk. These two units are connected using a CAT 5 data cable and can be situated up to 1,000ft (300m) apart.

## FAULT FINDING WITH A COMPUTER

This section is only for engineers familiar with debugging systems using a computer and a certain amount of prior knowledge is assumed when writing this section.

The system is assessable with a standard RS232 serial port at 9600 BAUD 8,1,N. using a terminal emulator such as HyperTerminal.

Connection is through a standard 9 Way D Type female using a standard straight cable.

When the system is operating, press ENTER on the keyboard and the system will respond with the prompt:

TR+

***To get a menu at any time press:***

TR+ ? {ENTER}

```
Cnnnn - Call Routine at memory location nnnn
Bssss eeee ff - Block fill ssss to eeee with ff
Inn   - Input from Port nn
Onn,xx- Output xx to Port nn
R     - Total Recall Submenu
M     - Examine MUCAP Memory Space
F     - Examine Total Recall Memory Space
?     - Show this screen
```

***To reach the Total recall menu:***

TR+ R {ENTER}

```
e sector/s     14 = Write Disk Image to Disk
  07 = Read Boot Sector   15 = WRITEFILE
  08 = fb00h LOOP         17 = Read Root Directory
  0a = BACKUP             0b = RESTORE
  11 = Read FAT Table     0e = LOCKMUCAP
  12 = Set up SSLDATA.BIN 0f = UNLOCKMUCAP
  10 = TOTALLOCK          0d = RESETMUCAP
  30 = Panel On Button    31 = Backup Button
  32 = Live Button        33 = Restore Button
  40 = ENABLECARD         41 = DISABLECARD
Q - Return to monitor
O - Enable debug dialog
F - Disable debug dialog
Disk+30
Disk+e30
Selected Logical Address - D000
Selected track -  6B
Selected sector -  01
Number of Sectors to transfer -  0B
Disk+0b
Disk+o
Debug enabled
Disk+
Boot Sector Read OK
Root Directory ReaDisk+
```

The System responds with a DISK+ prompt for the TR menu.

To quickly check that the system is operating type 0 to enable the debug dialog and then operate the system.

Push to LIVE button when PANEL ON is lit and the following response will occur:

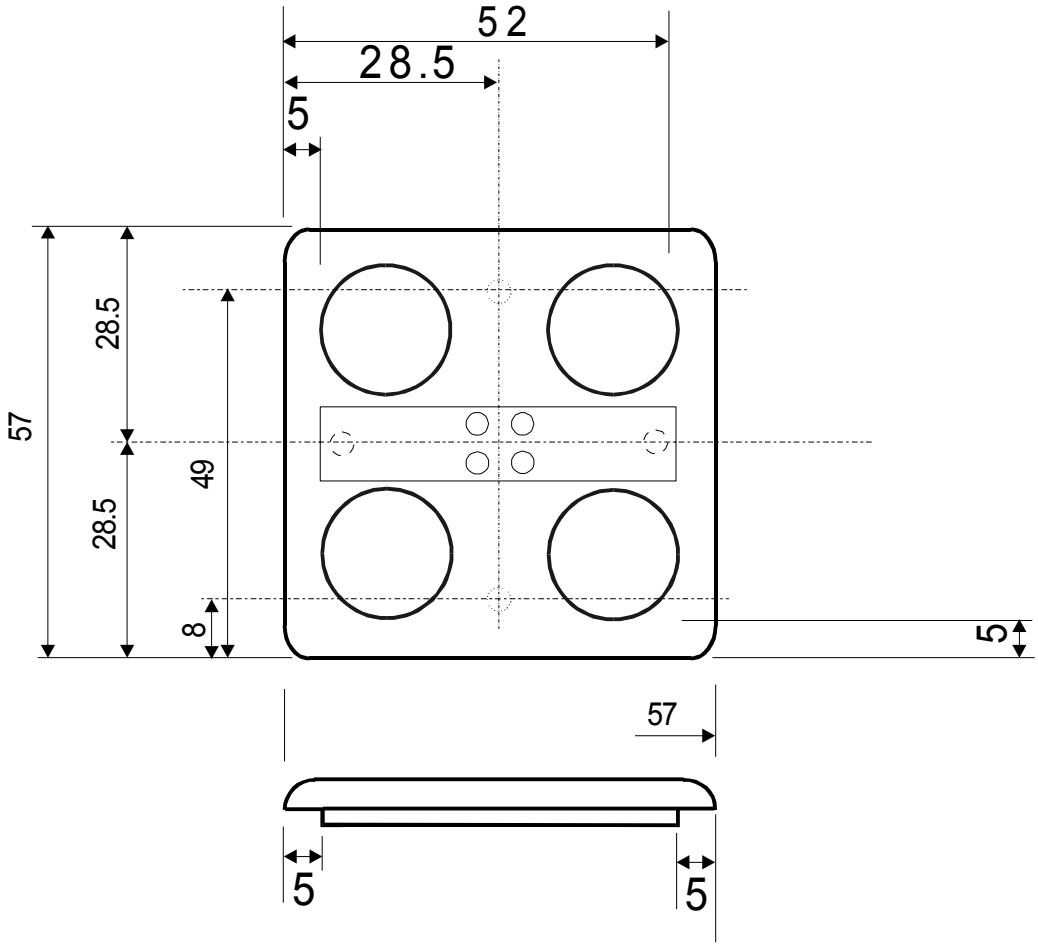
File Write OK - SSLDATA.BIN
Disk+

Push TO DISK with PANEL ON lit and the following response will occur:

File Write OK - SSL4000A.BIN
File Write OK - SSL4000B.BIN
File Write OK - SSL6000A.BIN
File Write OK - SSL6000B.BIN
File Write OK - SSLC000A.BIN
File Write OK - SSLC000B.BIN
File Write OK - SSLA000.BIN
File Write OK - SSL8000.BIN
File Write OK - SSL2000.BIN

# Templates

## Control Panel




Note: 1 inch = 25.4mm & 1mm = 0,04 inches.

Cut out for mounting control panel 50mm x 50mm.

## Disk Drive

The floppy disk drive requires a panel cut-out of 1" x 4" (25.4mm x 102mm) and requires a minimum of 6¼ " (160mm) clearance behind the front face. The corners of this cutout must be square. It is recommended to manufacture a small bezel surround the drive front for neatness.

Both the floppy drive and the control panel are black in colour.