MIDI for MultiSystem

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Installation Guide

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Introduction

This installation guide is for the MFM-D system, a fully flexible MIDI system for the Pipe Organ, controlled by a liquid crystal display panel.

In the package you will 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.

Main parts of the System
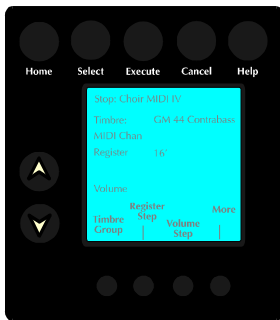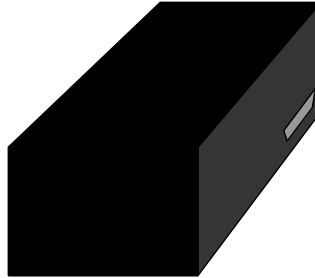
The Display Panel   The Graphics Interface   The MFM Processor

The three main parts of the system are shown above. There are additional interconnecting cables for the display. There is also a connector panel, which is shown later in this guide.

A Two Minute Guide

MFM-D is a supplementary product to the MultiSystem. You will either be installing this system to an existing MultiSystem, or performing a complete installation including the MultiSystem.
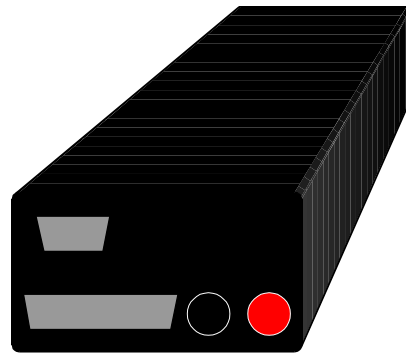
In addition to the MultiSystem, the MFM-D adds:

- An extra processor box containing the MFM processor unit.
- The liquid crystal display panel - mounted in the console to operate the System.
- An interface controller for the panel.
- A MIDI connector panel - allowing the connection of external MIDI devices.

Assembly differences
The MFM-D processor box must be added to the MultiSystem Network. It can be added anywhere in the network that is suitable, using link protection boards and a coloured ribbon cable. The system is usually placed next to the console processor. An NP linker may be used to simplify this connection. An explanation of the NP Linker and the MultiSystem Network is available later in the guide.

The console will require two cut-outs, one for the liquid crystal control panel within easy reach of the Organist and one for the MIDI connector panel.

Full Installation Guide

The following instructions are intended to be read in conjunction with the MultiSystem Installation Guide which was delivered with the MultiSystem. If you are upgrading a system and the information has been lost, please contact us and we will gladly supply a fresh copy from our archives.
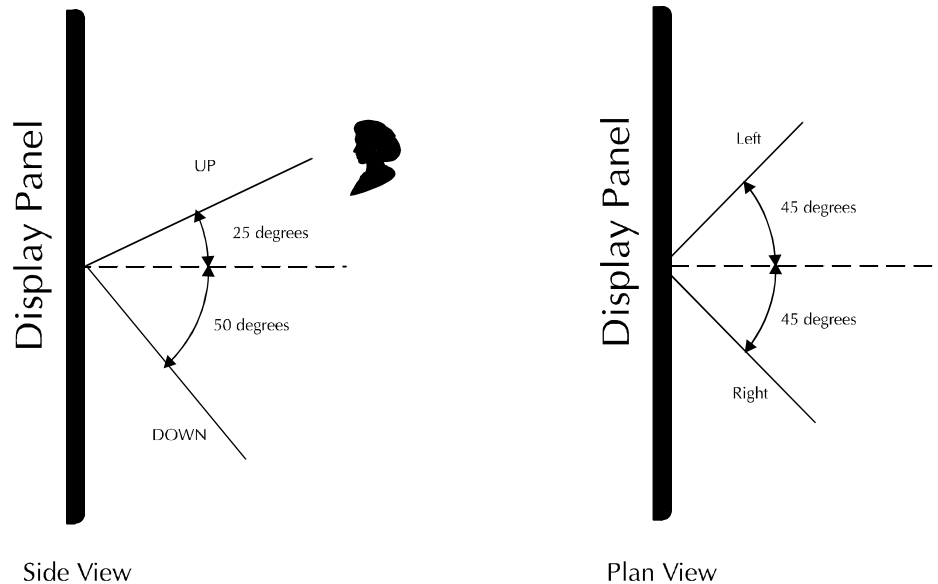
The Display Panel

The display panel must be fitted within easy reach of the Organist. We have taken great care to minimise the visual impact of such sophisticated technology by softening the corners and disguising the switches. However, the panel is thin enough to be fitted in a stop jam, or it is possible to mount the panel in a drawer if required.

The panel is clamped from the rear using the brackets provided.

To help your design of the console layout there is a full size picture of the panel and a template for the cut-out at the rear of this book.

The display panel contains a large amount of information and must not be mounted too far from the Organist or at an angle that makes the figures difficult to read.

The recommendations for viewing the display are as follows:

Display Panel

UP

25 degrees

50 degrees

DOWN

Side View

Display Panel

Left

45 degrees

45 degrees

Right

Plan View

The drawing above shows the display panel in black, and lines indicating the maximum angle from the Organist's eyes to the centre of the display. It may help to look at an example:

- Panel mounted on a vertical surface.

Horizontal distance from the display panel to the Organist = 30 inches.

Vertical distance from the display panel to the Organist = 11 inches.
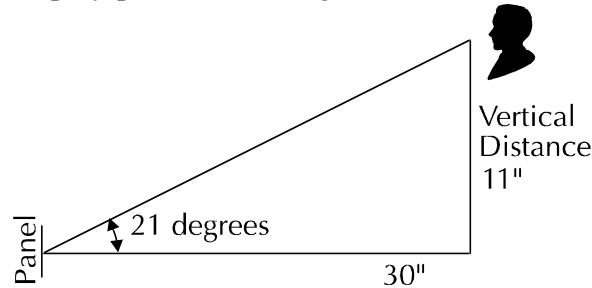
The angle may be calculated or simply drawn to scale and measured with a protractor (at last the thing has a use!). If the angle is less than stated above the Organists view will always be clear.

We must calculate the angle both vertically and horizontally.

The following table will help, by saving you performing the calculations.

If you already have the console built then use a tape to measure the actual distance from the eyes of the Organist (use the blunt end here) to the rough position on the console you plan to fit the display panel. Look up in the table the remaining co-ordinates to check that the maximum clarity will be available.

Distance from panel to eyes measured direct.	Maximum distance above panel.	Maximum distance below panel.	Maximum distance each side of the panel.
15	6	11	11
20	8	15	14
25	11	19	18
30	13	23	21
40	17	31	28
50	21	38	35
60	25	46	42
70	30	54	49
80	34	61	57
90	38	69	64

If you are working from drawings then you will probably want to refer to the next table, which gives the same information but allows you to use measurements more easily available from a drawing.

Firstly, select a possible location for the display panel. On a side view of the console draw a horizontal line from the centre of the display panel and perpendicular to it (90°). Measure the distance along this line from the panel to the point directly below (or above) the Organists eyes when they are expected to be operating the panel. Use this measurement in column one of the table below. Look up the other measurements and check that they are larger than those you measure off the drawing. If the measurements are smaller we recommend a new location for the panel to ensure good viewing.

Distance from panel to Organist measured perpendicular to the panel face	Maximum distance above panel.	Maximum distance below panel.	Maximum distance each side of the panel.
15	7	18	15
20	9	24	20
25	12	30	25
30	14	36	30
40	19	48	40
50	23	60	50
60	28	72	60
70	33	83	70
80	37	95	80
90	42	107	90

If you plan to mount the panel in a drawer then the same principles in the table above follow, left and right remain the same, below becomes in front and above becomes behind. Call us for advice if this is confusing.

Fitting the Processor

The display panel is connected to the Graphics interfacevia a ribbon cable and the graphics interface connects to the MFM-D processor using a round 25W D cable . The display panel must be fitted within 24 inches (600mm) of the graphics interface. There is also a drawing at the end of this manual showing the mechanical dimensions of the major parts.

All the connectors are different and so it is not possible to plug the wrong cables in to each box.
The display panel is already fitted with the cable assembly and the rear cover.

Two other sets of connections are required.

Power

The MFM-D system requires power from a local DC rectifier (T/R). The processor box is fitted with a pair of terminals to connect to the supply. This supply must be reasonably stable and free from electrical noise; most commercially available units are suitable. Unlike other SSOS products which are limited to a maximum of 24 volts the MultiSystem products will operate over a range between 12 and 32 volts.

Adding MFM-D to an Existing MultiSystem

It is only necessary to read this section if you are upgrading an existing MultiSystem for MFM-D.

If the MultiSystem is already installed and working, the addition of MFM-D may require some changes. The amount of change depends on how much preparation for MIDI was possible on the MultiSystem when it was installed.

Some or all of the following changes may be required, please refer to the specific instructions at the beginning of this installation guide.

- Replace the console processor

- Add input cards for the MIDI stops to the console plane

- Wire new MIDI stops

The MFM-D system will have been programmed by our Test Engineers to include the stop information as detailed in the upgrade instructions.

MIDI Cables

The MFM-D system must also connect to the MIDI network. The connection system for each MIDI device has been standardised to a specification published by the MIDI Manufacturers Association of which Solid State Organ Systems is a founding member. This ensures that equipment from different manufacturers may be simply connected using cables available at your local music store.

We have included some general information on MIDI cables at the end of this guide.
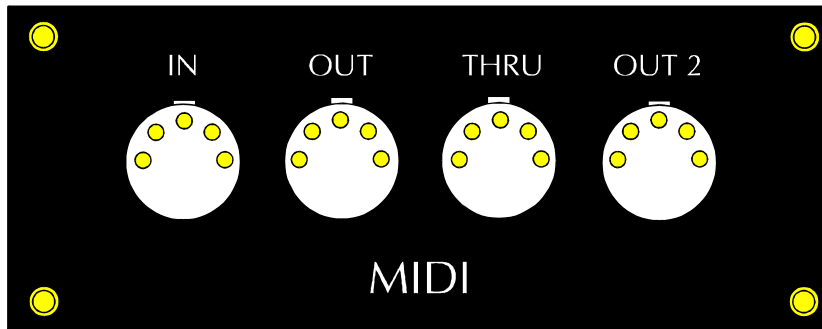
The connector panel is normally installed in the console where it can be accessed by the Organist when setting up the MIDI installation. As most MIDI equipment is portable, the connector panel is frequently in use, and should be provided with an easy access.

The connector panel mechanical details are included at the end of this guide.

The connector panel is supplied fitted with a cable to connect it to the processor as detailed earlier in this guide. The cable is supplied at a standard length of 1.5 metres (59"), if you require a longer cable, we supply extension cables that simply plug in place.

The cable may be passed through the cut-out before the connector panel is screwed in place using four, number 4, screws (not supplied).

There are four connections on the Solid State Organ Systems MFM-D system. Those of you familiar with MIDI will recognise three of these connections, but for completeness the functions of all four will be described.

IN
This connection is used to receive MIDI information. The MIDI cable to be connected here will need the other end connected to another MIDI device OUT. This single connection will communicate up to 16 channels of MIDI data.

OUT
This connection is used to send MIDI information. The MIDI cable to be connected here will need the other end connected to another MIDI device IN.

THRU

MIDI THRU provides an exact copy of the data arriving at the IN connector. It is used to pass data on to another device that requires the same information. It is not merged with the output of the MFM-D system.

OUT 2

Out 2 is used to transmit information that is required by a MIDI sequencer to accurately reproduce the organ in a subsequent playback. More information on this function is available in the user manual.
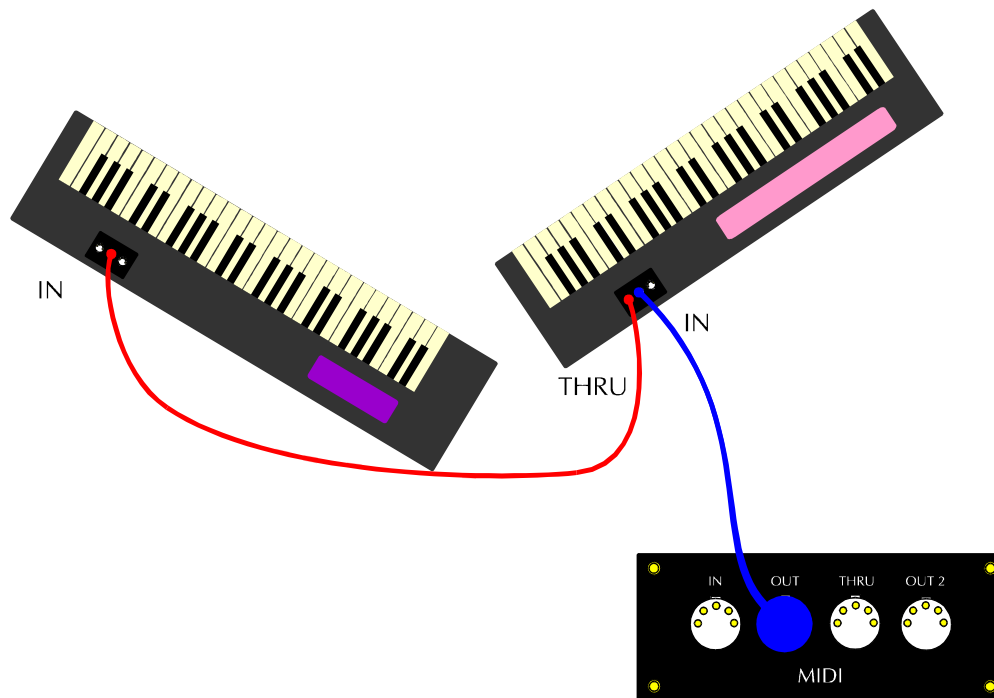
Connecting to the MultiSystem Network

 It is necessary to connect the MFM-D system to the MultiSystem Network.

There are two ways to do this.

1. Normally the MFM-D system can be fitted less than 0.5 metres (18 inches) from another MultiSystem processor. In this case the two coloured ribbon cables can be connected directly using an NP linker. It is not necessary to use the NP linker for short links. Method 2. will always work, it is offered as a time and space saver.

2. When greater distances are required, the cable entry to the system must be taken through a link protection board at each end. This is identical to a MultiSystem installation.   Unless this has been specified at the time of ordering you will require two more Link Protection boards, which are available ex-stock from your local SSOS office.

Direct Connection

The system will be supplied with a multicoloured ribbon cable for each black box. The cable plugs into the 25 way "D type" connector in the box at one end, and has 3 small 10 way connectors at the other. These connectors are labelled NEXT, PREVIOUS and SPARE.

For more details on how these connectors relate to the MultiSystem, please refer to the MultiSystem Installation Guide.

The MFM-D system is supplied with a small circuit board with 2 connectors, known as an NP Linker. If you wish to connect the MFM-D system directly, plug the NEXT connection of one ribbon cable and the PREVIOUS connection of the other ribbon cable into the board. Which NEXT and PREVIOUS you chose will be determined by the existing wiring on the MultiSystem. It does not matter to the MFM-D system, either will operate perfectly.
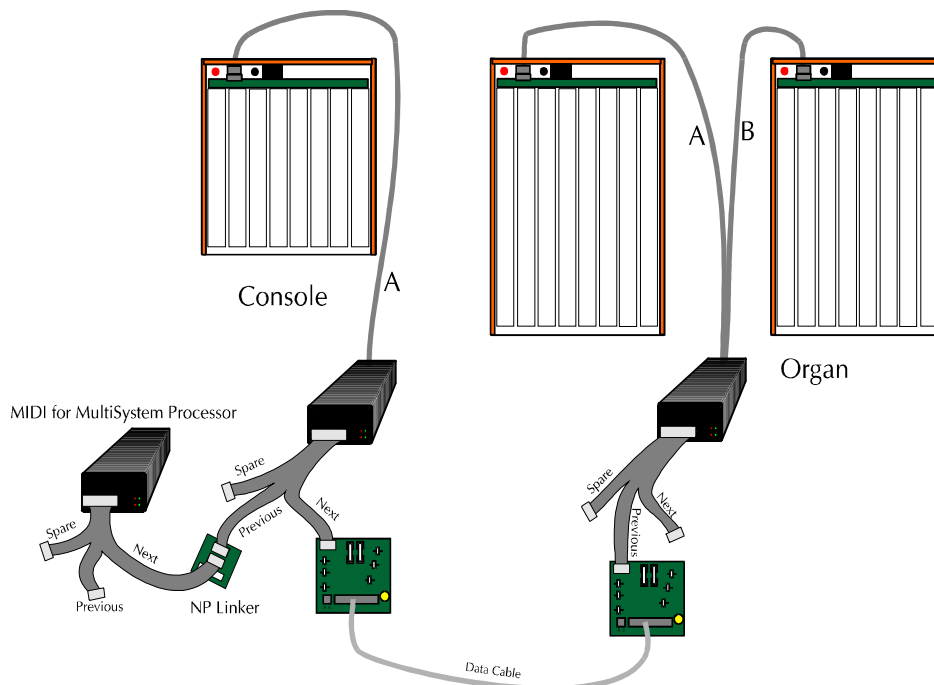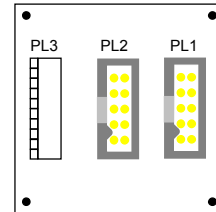
Normal Connection

Please refer to the MultiSystem installation guide for more details.
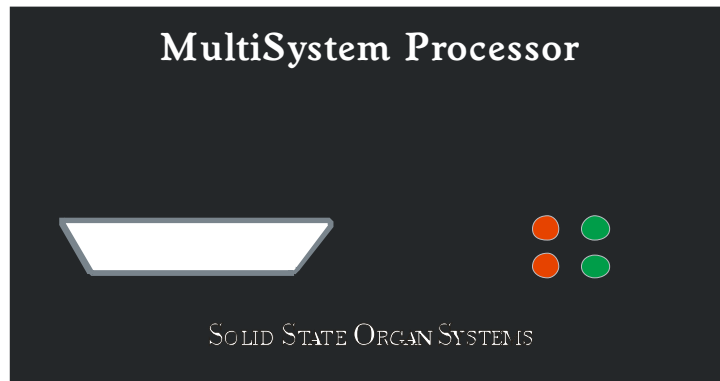
At one end of the processor box is a D connector and a group of indicators. This D connector is used to connect to the link protection boards.

It is then necessary to connect the systems together. This is normally done with a cable fixed out of sight.

The cable is wired directly to the terminals on the link protection board.

The link protection board is so called because it is used to link one part of the system to another and because it protects the system components from damage either by miss-wiring or from lightning strikes. It is very important to connect the earth terminal on each board to a suitable earthing point. If this is not done, the protection will not operate and a lightning strike may cause damage to the system.

Your system will come complete with the necessary link protection boards and cables. The assembly will look similar to the system shown in the following diagram.
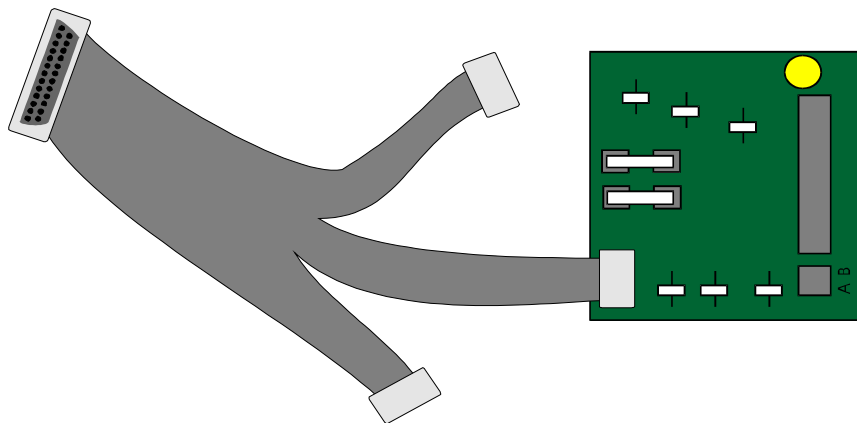
The cable used to wire the systems together is critical to its operation. Although the cable appears to be a telephone type cable, it is actually a very high performance computer data cable and no guarantees of system performance can be made if this specific type of cable is not used. We use a Belden cable, type number 1456A Level 5 UTP with overall shield. Suitable cables are available from our offices or from reputable computer cable dealers such as RS Components in Europe under part number 369-854 for 100m for flexible installations (moving consoles) or 369-832 for fixed wiring.

Connecting the Processor Box to the Link Protection Boards

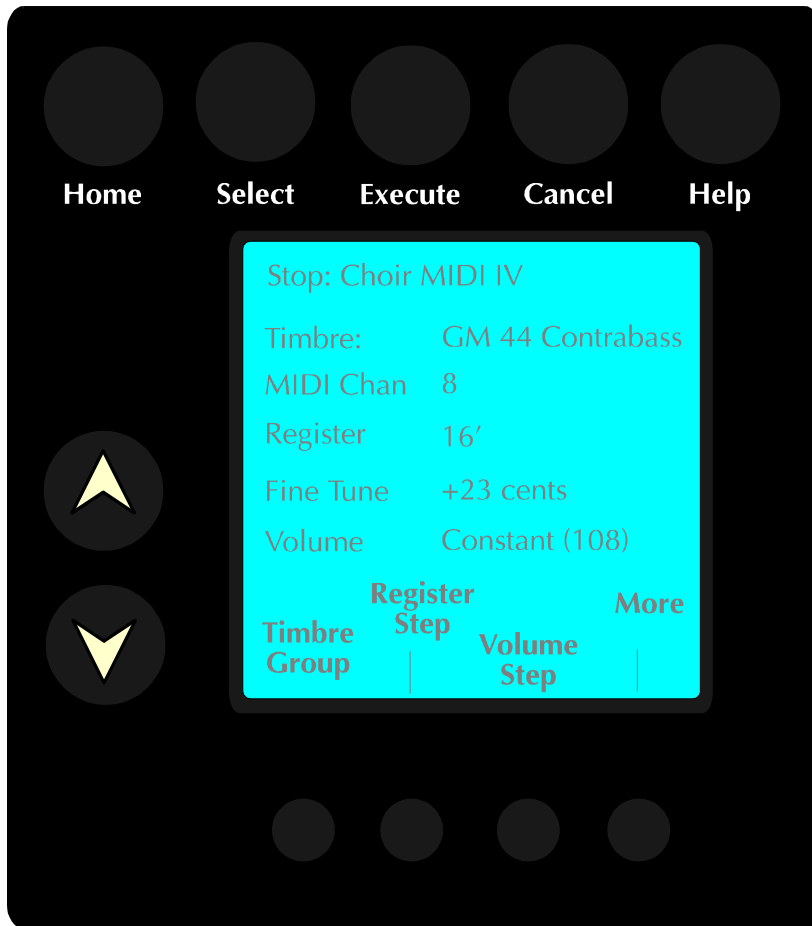At this point in the assembly you will have the following parts available.

- The MFM Processor Box

- The MultiSystem Processor Box

- The Link Protection Board

- The Coloured Ribbon Cable (SSOS Part Number 66D10260)

The MultiSystem processor box should by now be connected to the plane or planes, for the system. At the opposite end of the processor box is another connector used to connect the processor to the link protection board via the ribbon cable.
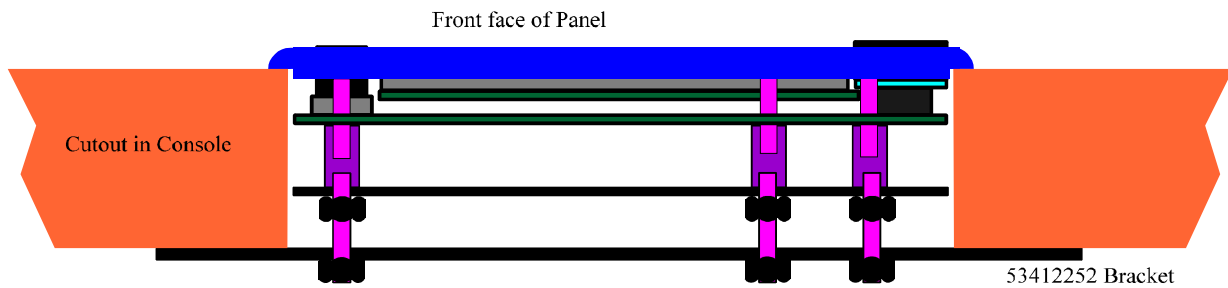
The MFM-D processor box should also have been connected to the display panel and the graphics interface. At the opposite end of the MFM-D processor is a connector that matches the MultiSystem connector. First plug the D connector of the coloured ribbon cable into each processor box, then attach the Link Protection boards to the organ or MultiSystem Plane at a point where the ribbon cable will easily reach.

The system is now complete.

Appendix One: Mechanical Details

Stop: Choir MIDI IV

Timbre: GM 44 Contrabass

MIDI Chan   8

Register   16'

Fine Tune   +23 cents

Volume   Constant (108)

**Register
Step**

More

**Timbre
Group**

**Volume
Step**

Home   Select   Execute   Cancel   Help

Fitting the Control Panel in the Console

Front face of Panel

Cutout in Console

53412252 Bracket

Minimum depth below console front face = 26mm (1 inch)

Maximum thickness of console woodwork with studs supplied = 34mm
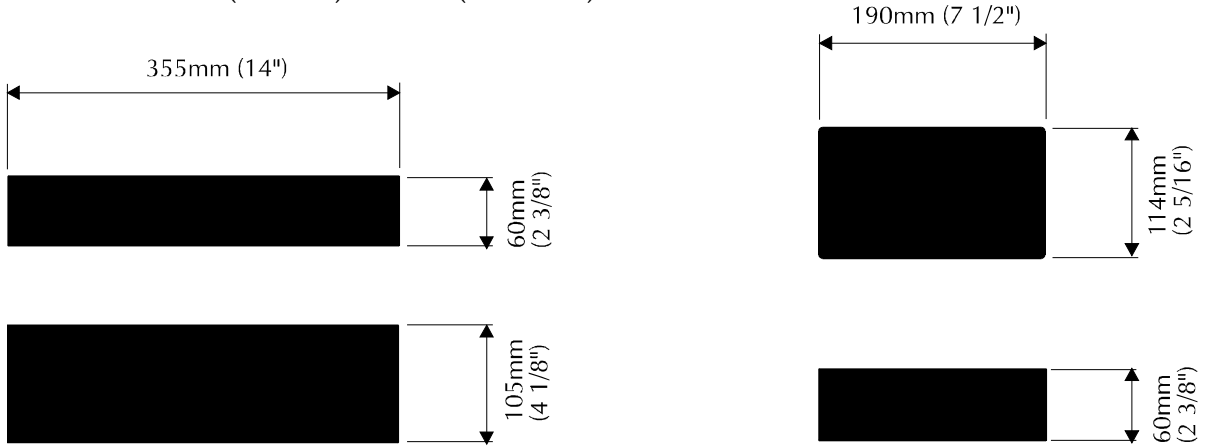
Longer studs are available, or use M3 studding.

Corner Radius of Panel = 3/16" (4mm)
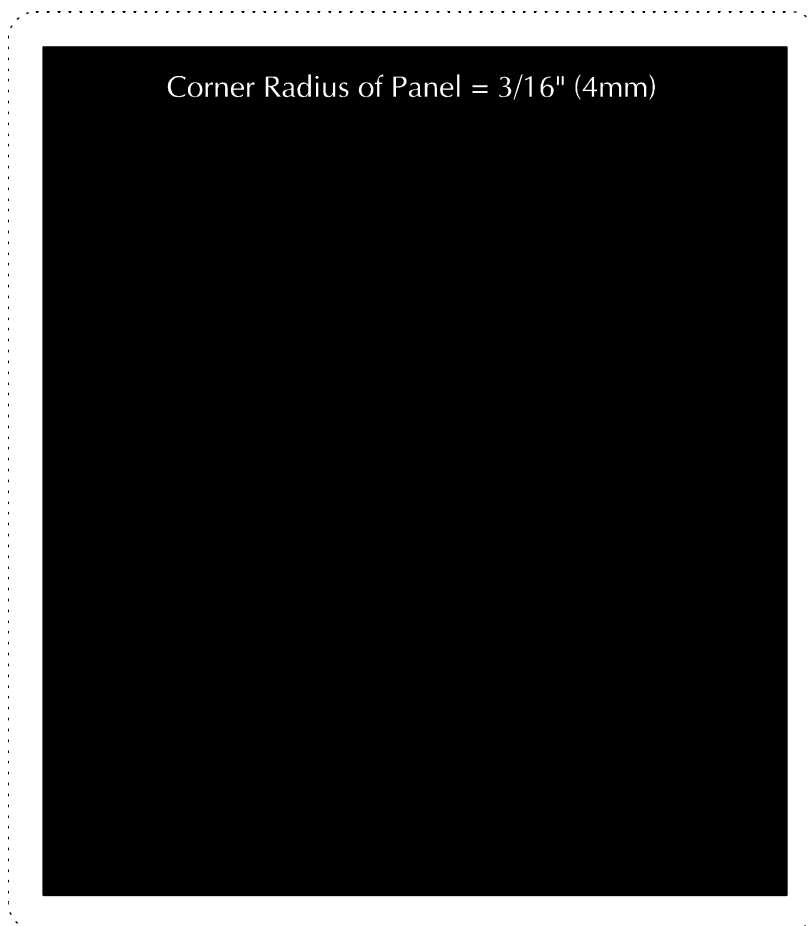
Cut-out for MIDI Display Panel

Minimum size of cut-out = 4 1/8" (104mm) x 4 11/16" (119mm)

Panel Size = 4 1/2" (114mm) x 5 1/8" (129.5mm)
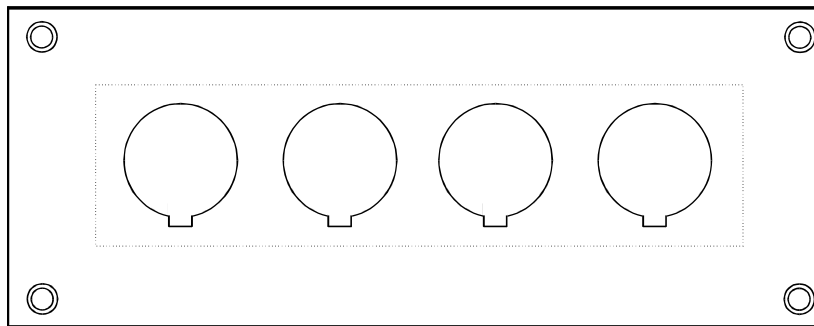
355mm (14")

60mm (2 3/8")

105mm (4 1/8")

190mm (7 1/2")

114mm (2 5/16")

60mm (2 3/8")

The MFM Processor

The Graphics Interface

MIDI Connector Panel

Panel 115mm (4 1/2") x 45mm (1 3/4")

Cut-out 92mm 3 5/8") x 23mm (15/16")

Appendix Two: MIDI Cables

Choosing MIDI cables is easy, if you keep in mind three simple rules. To minimise cable headaches:

- buy lots of them, in assorted sizes

- make sure they are all shielded and properly wired

- use the shortest possible cable for each connection

Always keeping a supply of spare cables on hand is the best way to avoid the most common problems that plague MIDI systems and to isolate those problems that occur. Cables wear out through repeated disconnection and reconnection. People trip over them, and they can get folded around a corner or back on themselves with a weight on top of them. Any of these and other common conditioned can cause cable failure. Without a ready replacement a lost cable could mean a useless module or, worse, a useless system. Although MIDI may fail in these circumstances the organ system and MultiSystem will not be affected.

Shielding protects cables from mistakenly picking up electrical signals in the surrounding environment. Even one unshielded cable can pick up noise-spurious electrical signals from the operating environment-which can cause the digital data represented by the current levels within the MIDI cable to become scrambled. The solution is simple-buy only shielded cables from the very beginning.

Just as you cannot tell shielded cable from unshielded by looking at it, you cannot tell by looking if a cable is wired up correctly. The MIDI specification uses only three of the five pins on a MIDI connector. The other two should be left unconnected, but some manufacturers use those pins for their own purposes. Using such a cable can cause problems, so use only cables that meet the MIDI specification. If a particular piece of hardware requires a non-standard cable, tag the cable with an identifying label so that you will not accidentally use it on another piece of equipment.

The best approach is to check with other MIDI users. They can usually suggest a brand of cable that has worked well for them (and probably warn you about some that have not.) If there are knowledgeable salespeople at your MIDI music store, ask them to recommend a good shielded cable that conforms to the MIDI specification. Once you find a cable manufacturer you trust, try to stick with them.

Quality cables do not come cheap though. First-time cable buyers are often surprised that MIDI cables are as much as five times the price of audio cables of the same length. The investment is worth it.

If price is no object, you might want to consider buying cables in a rainbow of colours rather than just basic black. Colour-coding cables can help you remember which cable is used where and help make sense of the inevitable tangles of MIDI cables that accompanies a complex set-up.

Whether your cables are colour-coded or not, it is a good idea to tag each cable with a legend that tells where it is coming from or going. Keep a supply of plain white peel-off mailing labels on hand, and as you plug in a cable write its source or destination on a label, peel the label off its backing, and wrap it around the cable, near the connector, sticking the two ends of the label together. The labels are easy to tear off when the set-up changes, you can tell at a glance how the system is wired, and it is easy to follow cables from connections at one end to the other.

The longer the cable, the more it acts like an antenna, picking up stray electrical signals. Use the shortest cable that will reach between the two devices you want to connect. This is true regardless of how simple or how complex a MIDI set-up you have.