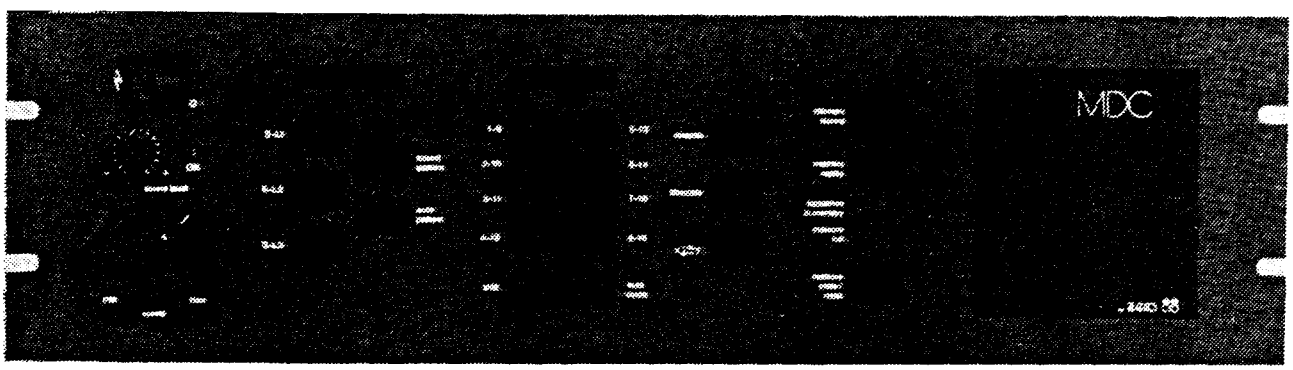
the MDC

Multi Dimensional Controller



Installation guide & Operating instructions

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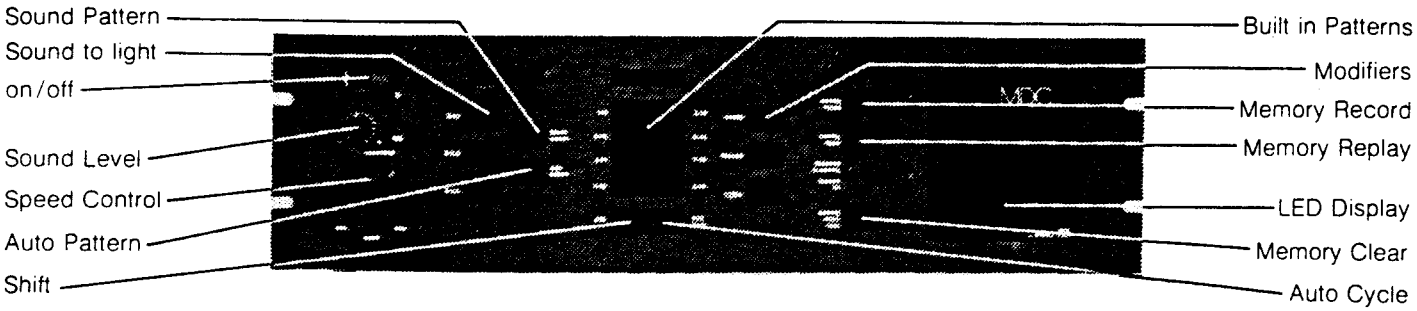
OPERATING INSTRUCTIONS



1 DESCRIPTION

The Multi Dimensional Controller (MDC) is designed for use with pattern displays of a variety of shapes and sizes. It may be used to provide straight forward patterns, user selected pattern sequences, and has three world beating sound to light effects.
The controls have been designed to be as simple as possible to enable you to select any of the hundred or so effects that this machine will produce.

A Multi Dimensional Power Booster (MDB) is available which, when connected to an MDC, will drive a further 6kW of displays. One MDC may drive up to 10 MDBs situated up to 50 metres away. For really large installations, the Multi Dimensional Phaser (MDP) enables an MDC to drive six Lightmaster 690 slave racks, giving an incredible 72kW of pattern control. The MDP allows the user to set minimum and maximum levels to suit the mood of the show.

We hope you will enjoy using your MDC.

2 INSTALLATION

This equipment must be installed by a competent electrician who should ensure that the lighting displays you are using are wired in accordance with the installation instructions that follow.

3 WARNING

A GOOD EARTH CONNECTION IS ESSENTIAL FOR THIS MACHINE.

ISOLATE MACHINE from the mains supply before removing any covers, or changing lamps in the display.

This unit will NOT operate inductive loads such as Pinspots, Neon, or Fluorescent lights.

ALL OUTPUTS FROM THIS MACHINE ARE HIGH VOLTAGE AND LIVE.

4 GENERAL

All pushbutton names are underlined throughout this text, eg SL1.

The effect selected is indicated by a light in the appropriate button[s].

All the lights on the MDC are designed to glow slightly when power is connected and the machine is switched on, making the controls easier to find in low light conditions.

Throughout the operation of the machine, flashing button lights are used to inform you that you should select one of the functions indicated.

Any button function may be switched off by pressing that button again.

5 POWER

5.1 Switch on power to the unit at the mains isolation switch. The indicator on the top left hand side of the front panel will come on.

5.2 Switch on (I) the control switch next to the indicator. The illuminated sign "Select Effect" will come on and a short time afterwards, lights will begin flashing in the five buttons immediately beneath the sign.

6 SPEED AND SOUND LEVEL

6.1 Pattern speed is controlled by the large knob on the left of the panel.

6.2 The sound level knob is above the speed knob. Ensuring that sound is connected, turn it fully anticlockwise (-), then slowly clockwise (+) until the "OK" light comes on.

7 SOUND TO LIGHT

Press one of the buttons SL1, SL2, or SL3.

SL1: A two dimensional effect which is called Sound Ball. One light is driven all over the display by both bass and treble parts of the music.

SL2: A block of light with constantly changing size, shape, and position.

SL3: Similar to the Sound Ball but the size of the spot changes with the bass of the music, giving a third dimension to the effect.

NOTE: If a stereo sound system is in use, ensure that both channels are connected via a stereo jack plug.

8 PATTERNS

8.1 SELECTION

Select a pattern effect:

Sound Pattern: The patterns are changed by each bass beat in the music.
Auto Pattern: The rate of pattern change is set by the speed knob.
Sound Pattern and Auto Pattern: Together these produce a bass speed up effect. The lowest speed is set by the speed knob; this is increased in proportion to the volume of the bass content of the music. The overall maximum speed is the same as when the Auto Pattern only is used. For best results, set the speed control about half way.

When the required button(s) has been pressed, "Select Pattern" will be illuminated and a further ten buttons will flash.
Select the top left hand button marked 1-9. This will produce a one line build-up chase (Pattern 1) along the bottom of the display panel. If you are using a square (Matrix) display then you will see exactly the same effect on the display; if however the display is of the star/circle variety then you will see a build up chase on either one spoke or on one circle.
One of the other seven patterns may now be selected simply by pushing the required push button in the block of eight.

To select pattern 9, press Shift whilst 1-9 is selected, similarly for the other seven patterns (10-16).

Select Auto Cycle if it is required to run through all sixteen patterns in sequence. To exit from this sequence, press any pattern other than the one that is currently being displayed.

8.2 MODIFICATION

Each pattern may be modified by selecting any combination of the three buttons Reverse, Staccato, and X-Y.

Reverse: Changes the direction of the pattern.

Staccato: Turns the display off between each pattern step, giving an effect which will vary from a slow "blink" to a "strobe" and then to a fast "chase" by varying the speed control knob.

X-Y: Changes the axes of the pattern, eg a horizontal build up becomes a vertical build up pattern.

8.3 MEMORY

The MDC has a 40 step pattern sequence memory which is accessed by three buttons: Memory Record, Memory Replay, and Memory Clear. There are also two lights: "Sequence in Memory" and "Memory Full".

Memory Record Each time this is pressed, the pattern that is in progress on the display is recorded. NOTE that Cycle is only one step and that patterns are added (including any modifiers selected) in the order that they are recorded. A notepad can be useful when composing complex sequences.
Memory Replay Replays the pattern sequence that has been recorded. Note that the button lights indicate which pattern (and modifier) is being displayed as the sequence is being replayed.
Memory Clear Pressed for a second or so, clears the memory. This short time delay prevents the user accidentally clearing a pattern sequence.
"Sequence in Memory" light shows that a prerecorded pattern sequence is available.
"Memory Full" indicates that there is no further room in memory for additional pattern steps in the sequence.

8.4 EXAMPLE SEQUENCE

Turn the MDC off and then on again. This will reset the processor, clear the memory of any stored pattern sequences and illuminate "Select Effect".
Press the buttons in the following order:

BUTTON	RESULT
Auto Pattern	"Select Pattern" illuminated
3-11	Pattern 3 displayed
Memory Record	Records Pattern 3. "Sequence in Memory" light comes on
X-Y	Changes axes for Pattern 3
Reverse	Reverses direction
Memory Record	Records Pattern 3 with modifiers
Memory Replay	Replays the two patterns in sequence - a ball of light going all round the display
1-9	Stops memory replay and displays Pattern 1.

RESET MODIFIER BUTTONS - If the light under any button is on, press that button to reset the modifier

3-11	Pattern 3
Staccato	Pattern 3 modified
Memory Record	Records Pattern 3 with modifier
X-Y	Changes axes
Reverse	Reverses direction
Memory Record	Records Pattern 3 with modifiers
Memory Replay	Replays the sequence of four patterns recorded- A ball of light going around the edge of the display, first steadily, then flashing. If the speed control is set to maximum, then the ball appears to be going round at two different speeds.

9 OTHER FEATURES

9.1 DISPLAY FREEZE

To stop an effect and freeze the display, press the effect button that is currently in use, or stop the sound input. Pressing the effect button will turn on the "Select Effect" sign. To restart, push any effect button or restart the sound. If the display is left frozen, it will turn off after about 90 seconds (See 9.3).

9.2 DISPLAY OFF

The display may be turned off when patterns are being used by pressing the pattern button that is lit once. The "Select Pattern" sign will come on. To turn the display on again, press any pattern button.

9.3 MAXIMUM STATIC ON PERIOD

This machine is designed to drive large displays of lamps. As the displays are not usually continuously rated, the machine has been programmed to switch off its outputs if left for more than about 90 seconds with no display movement. This is most likely to happen when a sound triggered effect is being used and the music stops. The display will come on again as soon as the music is restarted and needs no adjustment by the operator. This prevents the display from overheating.

9.4 RESET FACILITY

If you press buttons in the wrong sequence, the machine will usually tell you what is wrong by flashing lights at you. If it fails to do so or you get stuck in a strange effect, switch the Control Switch "off" and then "on" again quickly to reset the processor.
You will rarely, if ever, have to use this feature.

10 INSTALLATION GUIDE

10.1 MECHANICAL DETAILS

The MDC is designed for mounting in 19" racks or in consoles.

RACK MOUNTING
The MDC may be mounted in a standard 19" rack; it is 133 mm (5.25" or 3U) high and requires 270mm (10.5") clearance behind the front panel to accommodate the unit and cables.
If the rack is enclosed, plenty of room must be allowed for free air circulation. A minimum of 100 sq cm (16 sq") each for intake and exhaust is required. If mounted with other equipment which becomes hot in use, we reccomend fitting a fan to the rack.

CONSOLE MOUNTING
Figure 1 shows the cutout and fixing holes required in the console. Allow 270mm (10.5") behind the front panel for the unit plus cables. Do not restrict the cooling airflow - air enters at the sides of the case and exhausts from the top. Do not mount in a totally enclosed console - a minimum of 100 sq. cm (16 sq") each for intake and exhaust is required.
Servicing may be by rear access or by removing the MDC from the console.

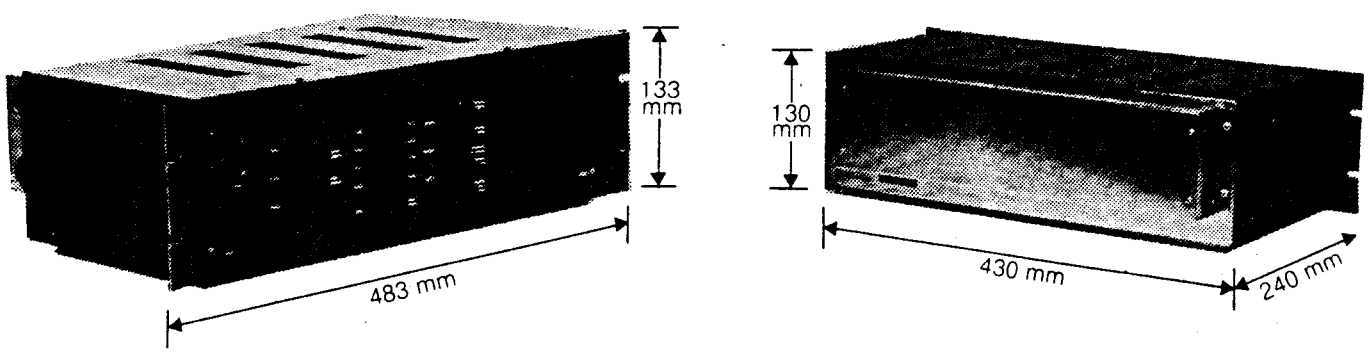


FIGURE 1: MDC DIMENSIONS

10.2 ELECTRICAL REQUIREMENTS

The MDC will operate on single phase supplies of 110-115v or 220-240v at 50 or 60Hz. The total load is 30Amps (6kW) at 240v [3kW at 110v] if used at its maximum rated capacity.

A GOOD EARTH CONNECTION IS ESSENTIAL.

All power connections are made by means of terminals at the rear of the unit; there is an integral conduit box with 20mm cable entry holes.

A 30 Amp isolation switch must be incorporated in the supply circuit, preferably close to the MDC in an easily accessable position. The control switch on the MDC only controls the electronics supply within the unit. The adjacent neon indicator will glow at all times supply is connected.

WARNING: ALL OUTPUTS FROM THE MDC ARE HIGH VOLTAGE AND LIVE

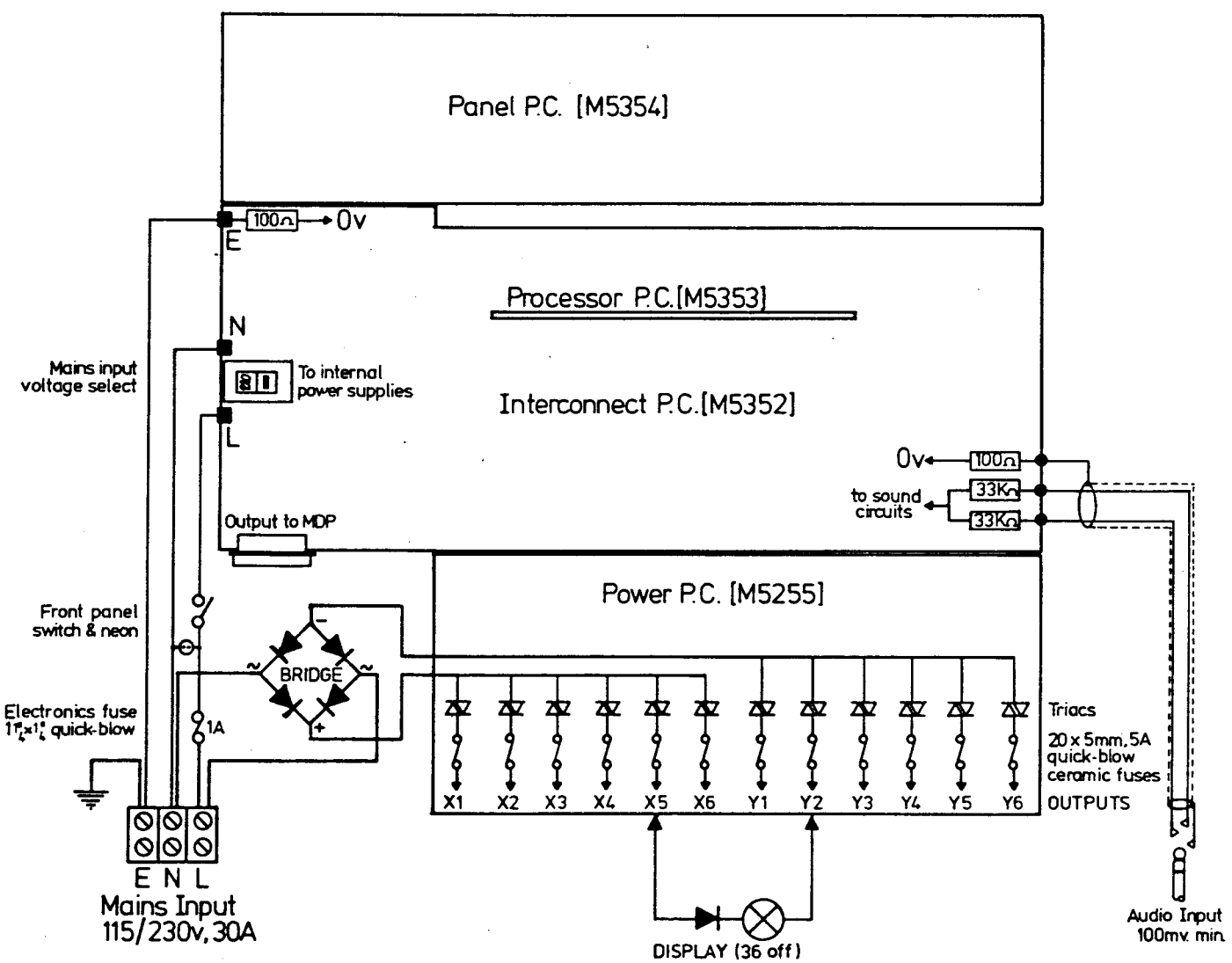


FIGURE 2: MDC INTERNAL BLOCK DIAGRAM

10.3 ELECTRICAL CONNECTIONS

The MDC must be installed and serviced by a qualified technician or engineer.
THERE ARE NO USER SERVICEABLE PARTS IN THE MACHINE.

MAINS SUPPLY

Units are usually supplied for 240V operation. Check the label on the carton. To change voltage setting, remove the cover and reset the slide switch located near the main terminal block (see Fig.2).

Remove the conduit box cover and connect to the isolator using 6 sq mm (10 AWG) three core flexible cable.

Connect the twelve outputs to the decoding unit or display (see section 10.4) using 0.75 sq mm (18 AWG) flexible cable.
NOTE: ALL OUTPUTS ARE HIGH VOLTAGE AND LIVE.

OUTPUT FUSES AND TRIACS

These are situated behind the conduit box cover. To check a fuse, remove the conduit box cover and unscrew the required fusecap; carefully withdraw the fuse.

The triacs are situated behind the cover plate which locates the fuseholders. To change a triac, remove this plate, unscrew the appropriate triac and unsolder the leads. When fitting a new triac it is most important that the screw securing the tab to the heatsink is fully tightened before soldering the leads in place.

AUDIO

Plug in a standard jack plug (mono or stereo) to the socket provided on the rear panel and connect to a suitable audio source (100mV to 50V, NOT 100V line). The input impedance is 15k, unbalanced.

CONTROL OUTPUT

If using with an MDB booster pack or an MDP phaser, suitable "Cannon D" plugs and sockets are supplied with the MDB or MDP. Cables may be made up to the required length using 15 way screened cable. Pin 1 on the plug is connected to Pin 1 on the socket and so on. The cable screen should be connected to Pin 9 (0v) at the plug end only.

10.4 DISPLAY

The output of the MDC is full wave rectified mains giving high voltage feeds to the display(s). There are twelve outputs, X1-X6 and Y1-Y6. X outputs are positive and Y outputs are negative.

Displays used with the MDC (and MDB) require either a diode decoding unit or diodes in the displays. 1N5404 type diodes must be used.

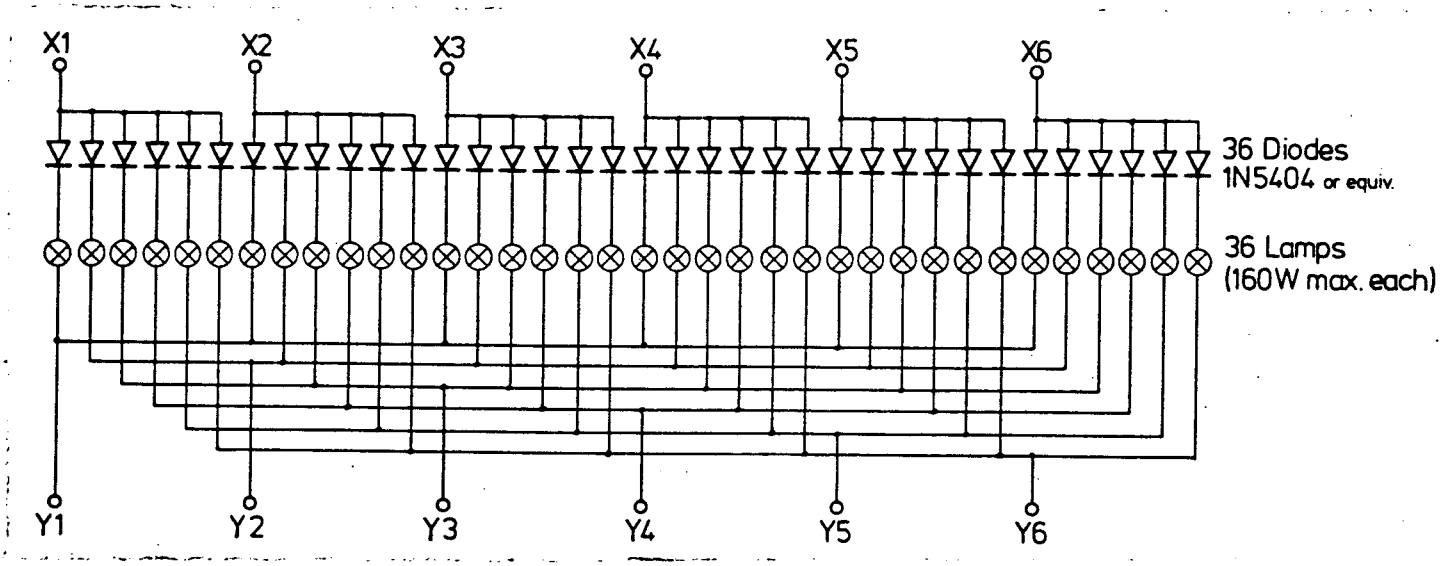


FIGURE 3: DIODE DECODING UNIT

Fig.3 shows a diode decoding unit consisting of 36 diodes, with twelve input lines (from the MDC) and seventy two output lines to thirty six lamps. These units are best used with large fixed installations where the decoder may be mounted near the display to minimise the wiring between it and the MDC.

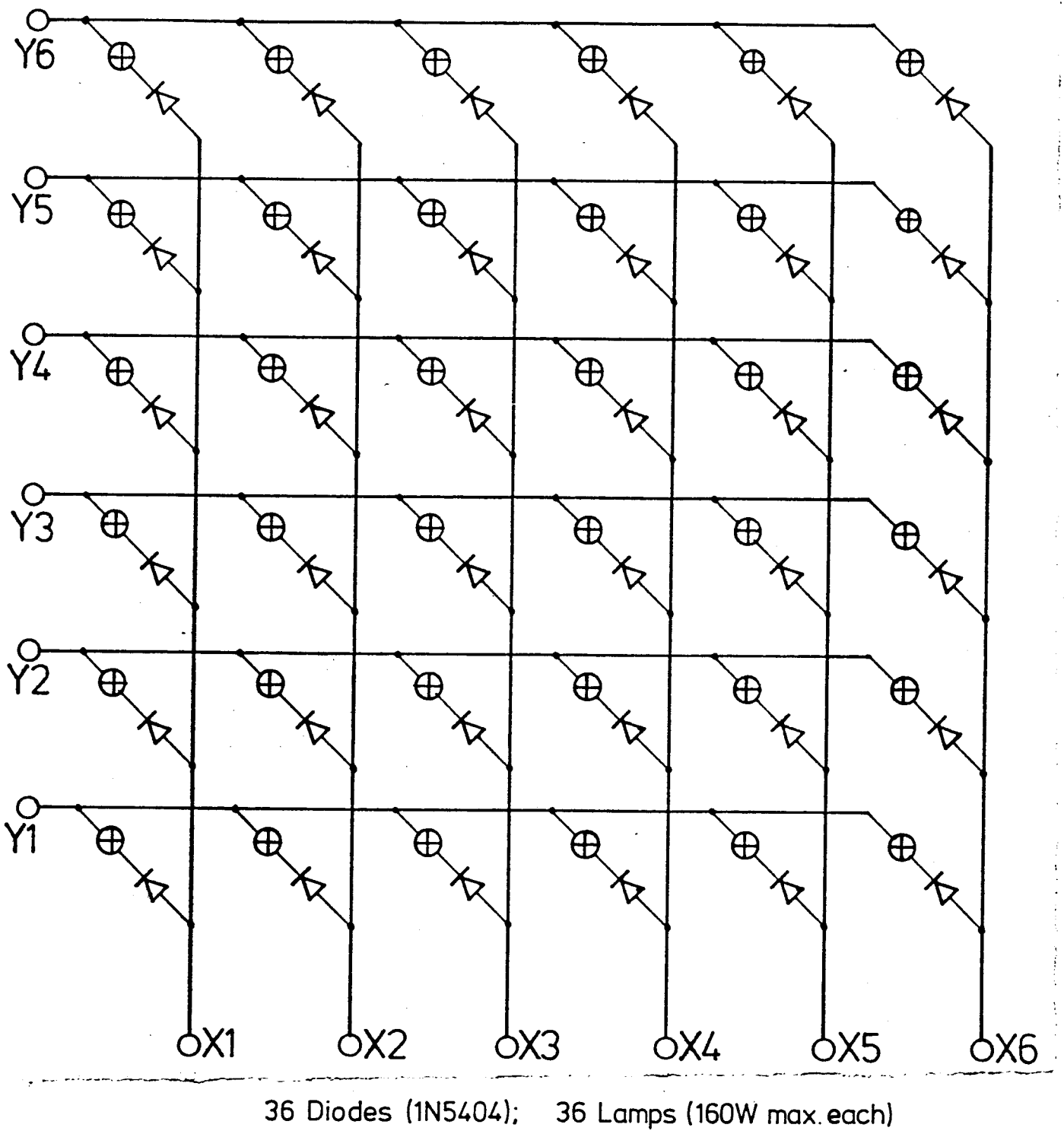


FIGURE 4: SIX BY SIX MATRIX DISPLAY WIRING

Fig.4 shows the wiring for a six by six matrix display with the diodes built in. This gives patterns in the same format as the MDC front panel mimic display.

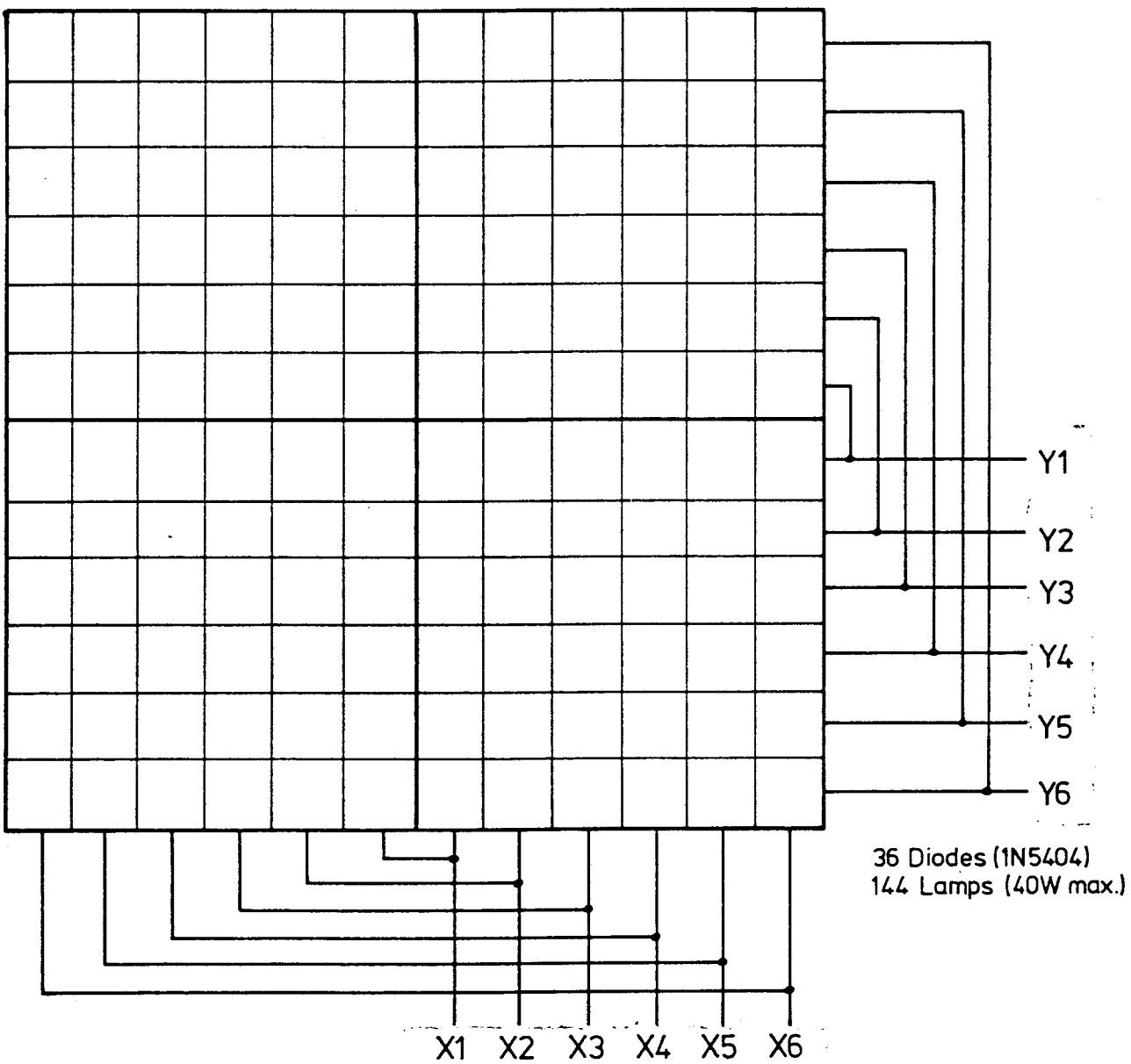


FIGURE 5: FOUR QUADRANT MDC DISPLAY

Four 6 by 6 matrix displays may be assembled together as shown in Fig.5 above to give a four quadrant display. Note that four lamps can be connected in parallel to each diode, or one diode per lamp could be used. Alternatively, several matrix displays may be arranged side by side to produce a long "strip" display. These and similar arrangements are most commonly used for dance floors.

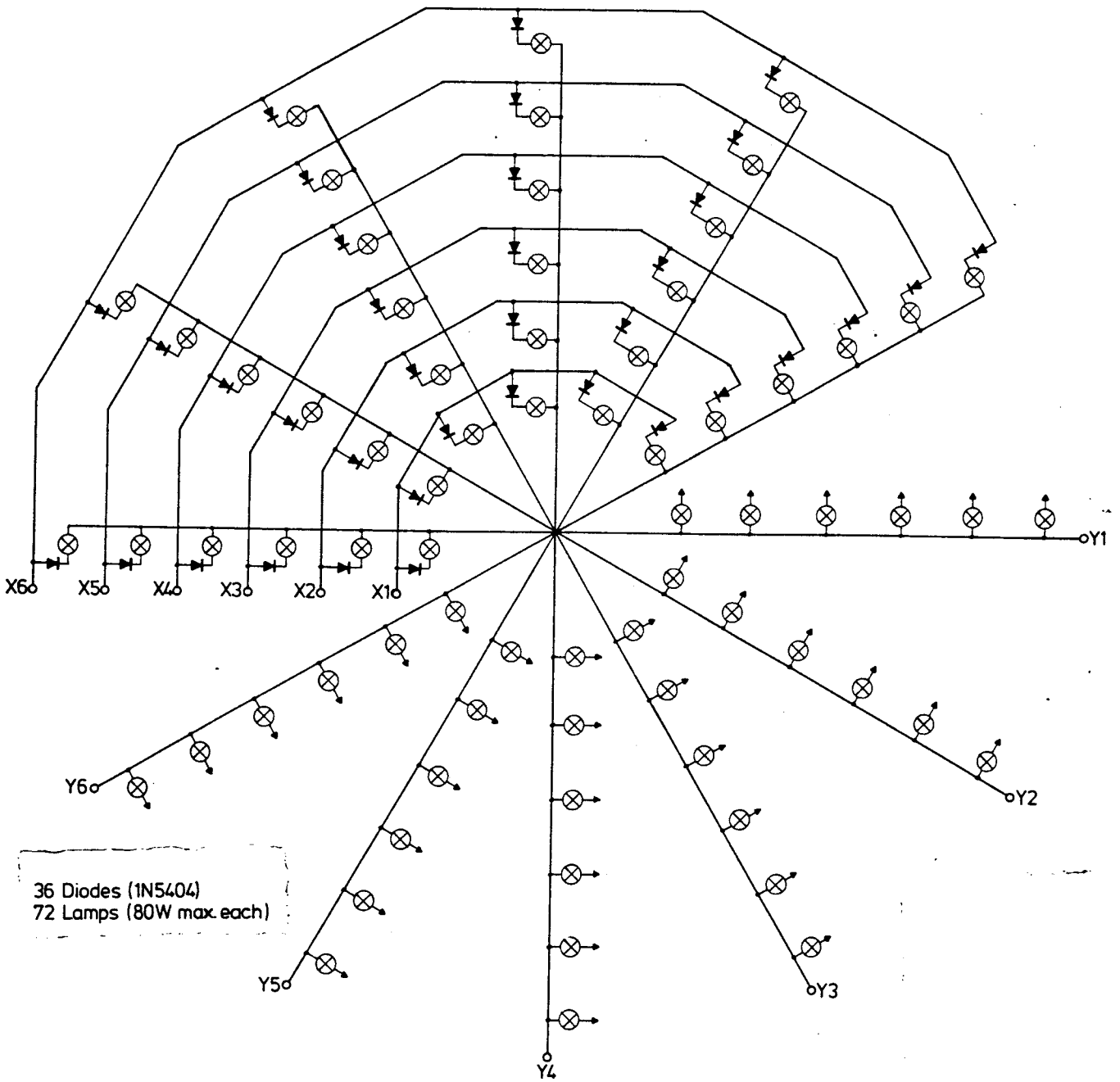


FIGURE 7: SEVENTY TWO LAMP, TWELVE ARM STAR/CIRCLE DISPLAY

Note that the lamps in the bottom half of the display are connected in parallel with those in the top half. As before, seventy two diodes could be used.

The above are suggestions for three different display styles. Many others are possible, including circle sets, spheres, cubes, and stars. There are many specialist display consultants and suppliers who would be pleased to advise on any special requirements.

11 SIMPLE FAULT FINDING

11.1 MDC "DEAD"

Is mains indicator on?
YES NO - Check mains isolator is on; if it is call an electrician to check the supply.
↓
Is control switch on?
YES NO - Switch to on (I).
↓
Is "Select Effect" on and five pattern buttons flashing?
YES NO - Switch control switch on and off quickly to reset processor. If the MDC still does not operate correctly, call a service engineer.
↓
Press one of the buttons indicated. If the effect is not as described in the operating instructions, reset the processor as described above.

11.2 SOUND; SOUND TO LIGHT; SOUND PATTERNS - DO NOT WORK

Is audio source connected and operating?
YES NO - Connect and turn on audio (stereo if possible)
↓
Turn Sound Level knob clockwise (+).
Does OK light come on?
YES NO - Check that the lead is OK and that the audio source is greater than 100mv. If it is call a service engineer.
↓
If effect still does not work, call a service engineer.

11.3 DISPLAY DOES NOT WORK

Is MDC front panel mimic display working?
YES NO - Try pressing "Auto Pattern" and one pattern button to check that the MDC has not switched itself off.
↓
Are display and mimic on and working?
YES NO - Display is frozen, press any effect button (Auto Pattern if sound is off)
↓
Does only part of the display work?
YES NO - Check display connections, if they appear OK, call a service engineer.
↓
If only some lamps are dead, then ask an electrician to check for dead lamps and then to check for dead outputs from the MDC. Section 10.3 describes how to change fuses or triacs.

CONNECTORS

Buffer output connector (15-way 'D' type socket)

PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	Y2 output	6	X3 output	11	Reserved
2	Y1 output	7	X2 output	12	Y6 output
3	X6 output	8	X1 output	13	Y5 output
4	X5 output	9	0v ref.	14	Y4 output
5	X4 output	10	Reserved	15	Y3 output

If multi-core cables to connect the MDC to displays are required, the recommended connectors are Beau series 33, 15 pin. (Available in the U.K. from Bulgin Electronic Components Ltd.)
Pin connections should be:-

PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	X1 output	6	X6 output	11	Y5 output
2	X2 output	7	Y1 output	12	Y6 output
3	X3 output	8	Y2 output	13	Reserved
4	X4 output	9	Y3 output	14	Reserved
5	X5 output	10	Y4 output	15	Earth

USE THIS SPACE TO NOTE YOUR SYSTEM WIRING - IT MAY SPEED UP SERVICING IN THE FUTURE.