MARTIN AUDIO LTD.

MX-2 SYSTEM CONTROLLER – USER'S GUIDE

1. INTRODUCTION

The MX-2 is an advanced 2 channel system controller which is used for controlling the coaxial 12" range of MARTIN Loudspeakers either in full-range mode or in bi-amp mode with additional subbass.

The unit provides crossover frequencies, equalisation, level adjustment and either internal or external ("speaker sense") limiter protection.

2. MECHANICAL

The MX-2 is housed in a 1-unit 19" rack mounting case. In permanent installations, the MX-2 should be rack-mounted using the four holes in the front panel, no additional support being required. As with all such units, side runners are recommended when racking for heavy-duty road use.

3. POWER

To change the mains voltage, remove the rectangular fuse cap and replace it so that the correct voltage is indicated by the arrow on the body of the rectangle. The earth terminal on the IEC input connector is permanently connected to the metal case. The electronic reference ground is taken to the case via the rear panel "signal ground" switch, which inserts a 47 ohm ground lift resistor when it is set to "off".

This provides some flexibility in the unlikely event of ground loop hum occurring in the system.

4. INPUTS

The MX-2 inputs are electronically balanced via XLR connectors. Pin 1 is always screen (ground) connection, and the signal is applied between pin 2 (cold) and pin 3 (hot).

Always use 2-core + screen (i.e. "balanced" type) signal leads, even for unbalanced circuits. The screen should be regarded as separate from the signal return, even if they are connected together at the end of the line.

For either balanced or unbalanced operation, always connect the signal between pins 2 and 3, and connect the cable screen to pin 1. The screen should be lifted at the source, provided that normal safety requirements are met (i.e. the mains earth are correctly connected). Figs 1 and 2 refer.

FIG. 1

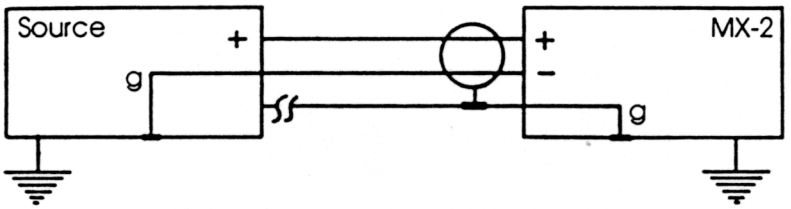
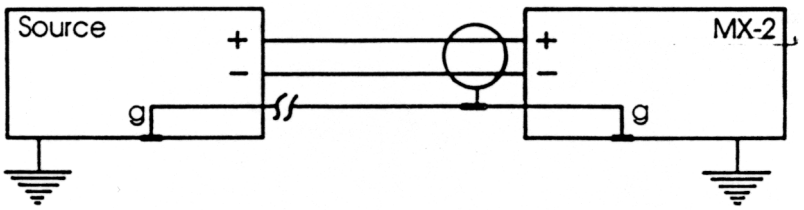


FIG. 2



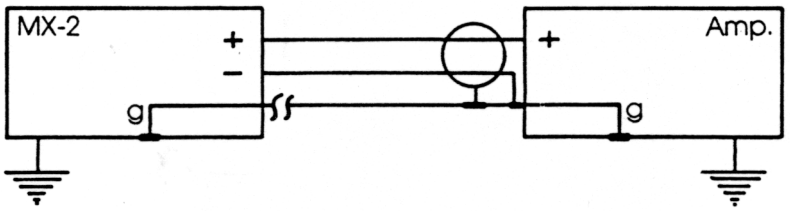
5. OUTPUTS

The MX-2 outputs are electronically balanced via XLR connectors. Pin 1 is always the screen (ground) connection, and the signal appears between pins 2 and 3.

Always use 2-core + screen (i.e. "balanced" type) signal leads, even for unbalanced circuits. The screen should be regarded as separate from the signal return, even if they are connected at one end of the line.

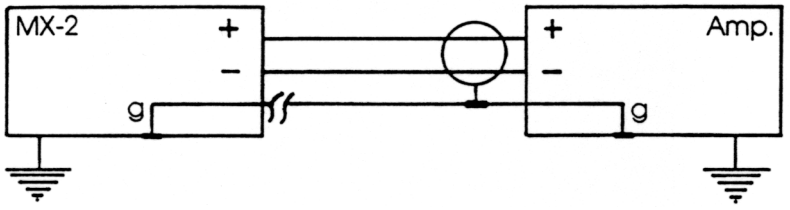
For unbalanced use, having decided which pin is "hot" (see above), connect the "cold" pin and the cable screen to the ground of the driven amplifier (at the amp input). The screen should, in case of hum occurring, be lifted at the MX-2 output. This method takes advantage of the hum rejection properties of the output stage which permit the amplifier to be locally grounded (as required for safety reasons) without causing a hum loop (Fig 3 refers). If the signal is merely taken between either pin 2 or 3, and pin 1, a level loss and response degradation will occur.

FIG.3



For balanced operation, the screen should be connected to pin 1 (ground) at the receiving end. To eliminate ground current loops, it should be lifted at the MX-2 output provided normal safety requirements have been met (i.e. the mains earths are correctly connected). Fig 4 refers.

FIG. 4



6. INITIAL SETTINGS

MX-2 units are supplied with adjustments set as follows:

Mains Voltage: 240 volts AC.

Ground switch: ON.

Internal limiter threshold: 1.5 Volts RMS.

External limiter threshold: 40 Volts RMS ("speaker sense").

Bi-amp mode (i.e. with subbass).

7. PASSBAND FREQUENCIES

Crossover frequencies in the bi-amp mode is of fourth order Linkwitz-Riley alignment. In both full-range and bi-amp mode additional equalisation is provided to suit both the low end and the high end of the loudspeakers for which they are designed.

8. LEVELS

Each output level may be adjusted from -infinity to +6dB relative to its nominal level.

9. LIMITERS

Each output is fitted with a limiter which provides momentary gain reduction when the signal level exceeds a preset threshold value. Triggering of the limiter is indicated by a red LED on the front panel. The trigger signal for the limiters can be supplied either internally or via the "speaker sense" input banana plugs at the back of the unit.

If the latter is used it should be wired as Fig 5 refers. The unit will sense it has a loudspeaker connected and automatically change the limiter trigger signal path and indicate it by turning out the green limiter LED at the front panel.

The limiter level value for this function is factory preset and should not be changed.

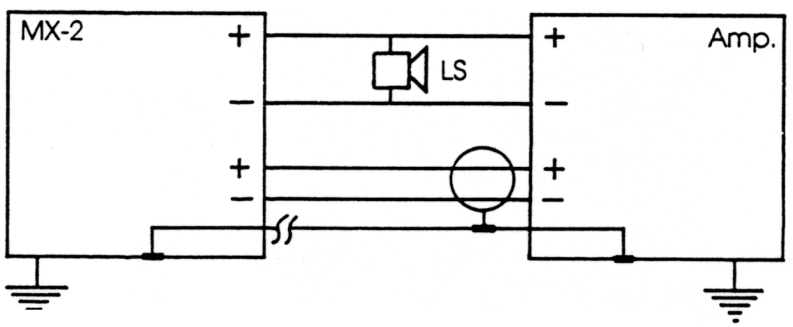


FIG. 5

However if "speaker sense" is not possible and the internal limiter function has to be used, the factory preset 1.5 Volts RMS threshold setting can be changed in the following way:

Remove the top panel of the MX-2 case (two screws each side) to gain access to the circuit board. (This provides a reasonable level of security from unauthorised adjustment.)

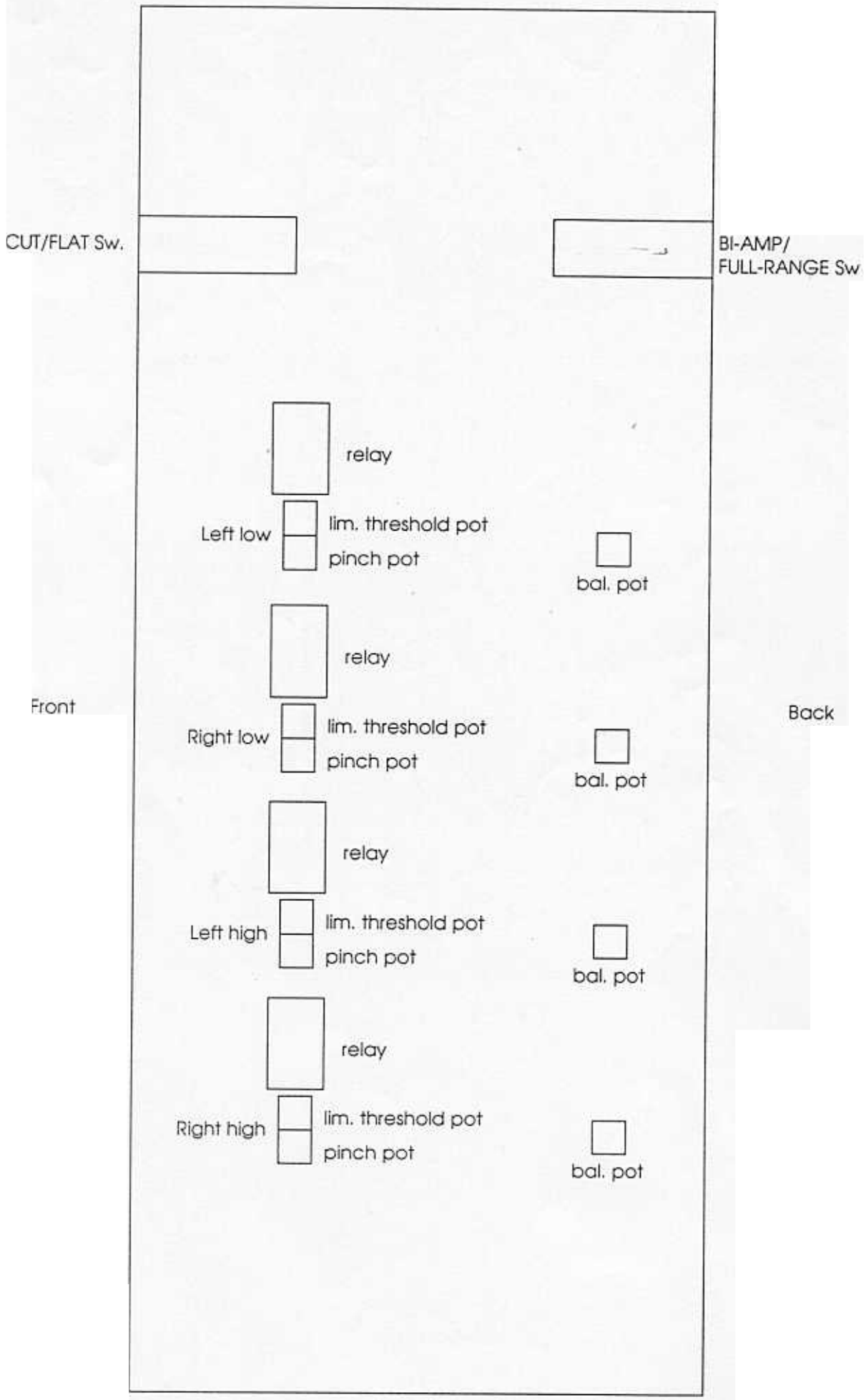
The internal limiter threshold is set by a single turn potentiometer on each output. These are located on the main board just beside the sense change-over relays. The drawing of the MX-2 circuit board refers to this.

Do not touch the potentiometer beside it, it's the voltage pinch off regulation of the FET gain cell!

Apply a 3 volts RMS/85Hz sinusodial signal to the XLR "LEFT INPUT" between Pins 2 and 3, and an accurate RMS Voltmeter at XLR "LOW LEFT" output, between Pins 2 and 3. Turn the pot fully clockwise and adjust the output level at front panel pot to the same amount as the input (3 Volts RMS). Turn the preset pot anti-clockwise to the desired output limiter level. Change the input signal to 3 Volts RMS/1kHz, make sure the equaliser switch at front panel is in position "flat", connect the voltmeter to XLR "HIGH LEFT" output and repeat the procedure. Repeat for right channel.

FIG. 6

CIRCUIT BOARD OVERLAY



Each channel limiter sets a maximum drive level from the MX-2, which in turn sets the maximum continuous voltage that the following amplifier presents to its load. If correctly set up, this will provide a high degree of protection against overdriving the loudspeakers, although not as high as the "speaker sense" mode due to its direct sense at the loudspeakers.

For further protection when using the internal limiters, particularly where technically inexperienced operators are in control of the system (e.g. discotheque installations), the limiters should be adjusted so that the maximum output voltage of each amplifier corresponds to the continuous power rating of the loudspeaker it is driving. In the MARTIN CT2 and CTX case 40 volts RMS.

The amplifier gain or sensitivity specifications may then be used to determine correct limiter settings. For greater accuracy, or in case of doubt, the limiters should be set up using a signal generator, oscilloscope and audio voltmeter, with the amplifier driving a dummy load resistance equal to the loudspeaker's nominal impedance.

Alternatively, if the speakers will handle the full amplifier rated power or if maximum system headroom is required, the limiters may be set to prevent the amplifiers driving into hard clipping. This also provides loudspeaker protection, as an amplifier driven into continuous clipping will deliver considerably more than its rated power. Although the high level of distortion will normally provide an audible warning of overloading, the operator's time of reaction may be too long to avoid damage. Correct adjustment of the limiters will avoid this problem, and requires a signal generator, oscilloscope, and a dummy load resistance equal to the loudspeaker's nominal impedance. The amplifier is driven to just below its clipping point, and the limiter set to prevent it from being driven any harder.

10. EQUALISATION

Situated on the left side of the front panel is a "MID CONTOUR" user operable switch. In position "CUT" it provides a midband shelving performance, which is desirable for some loudspeaker nearfield listening purposes.

11. FULL-RANGE/BI-AMP MODE

At the back of the MX-2 case just beside the input XLR's, the switch for this function is situated. A red LED on the right hand side of the front panel will indicate full-range mode and a green LED will indicate bi-amp mode.

Beware! In the "FULL-RANGE" mode, the "LOW" output (i.e. subbass) will still be active; make sure therefore if a loudspeaker is connected to this output, that the switch is in "BI-AMP" mode.

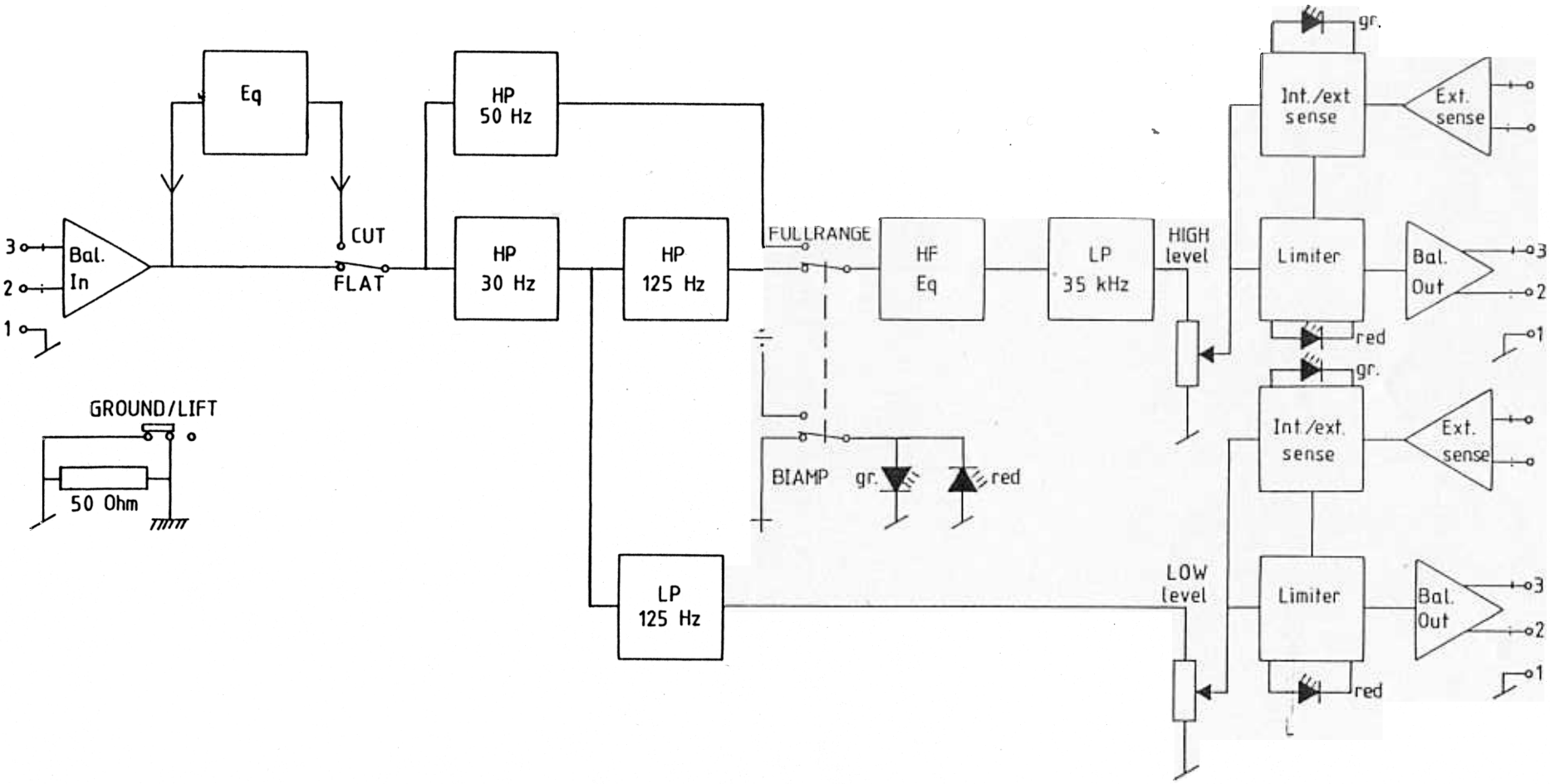
MX-2 SPECIFICATIONS:

MAINS SUPPLY:	IEC mains connector with integral fuseholder and voltage selector switch.
MAINS VOLTAGE:	Selectable 100, 120, 220, 240 VAC/50 60 Hz.
INPUTS:	XLR 3-31 or equivalent. Input impedance >10k ohm electronically balanced. CMRR >60dB @ <10kHz. Maximum level +20dB.
OUTPUTS:	XLR 3-32 or equivalent. Output impedance <50ohm electronically balanced, with auto-correction for unbalanced termination.
HUM & NOISE:	-90dBm 20-20kHz unweighted, 110dB dynamic range.
FIXED FILTERS:	Lowpass -3dB @ 25kHz. Highpass low -3dB @ 30 Hz. Highpass high -3dB @ 50 Hz.
SYSTEM PARAMETERS:	Crossover frequencies, slopes and built in equalisation defined to suit the MARTIN CT-series.
LIMITERS:	Individual band limiters with presetable threshold and program related dual attack time. Externally "SPEAKER SENSE" accessible. Automatic change over internal/external.
INDICATORS:	Full-range/Bi-amp LEDs, internal/external and attack limiter LEDs.
FRONT PANEL FACILITIES:	Mains switch, power and systems status indicator. Mechanically latching EQ "CUT/FLAT" switch. Four x level controls (-inf., +6dB).
BACK PANEL FACILITIES:	Mechanically latching "FULL-RANGE/BI-AMP" switch.
GROUNDING:	IEC connector direct to chassis. Signal ground switchable direct or via 47 ohm lift resistor.
DIMENSIONS:	44 x 480 x 190 mm (1.75" x 19" x 7.5").
SHIPPING DIMENSIONS:	112 x 530 x 335 mm (4.5" x 21" x 13").
WEIGHT:	3.5 kg (7.5 lbs).
SHIPPING WEIGHT:	4.3 kg (9.5 lbs).

PART OF

DO NOT SCALE

SHEET OF



ISSUE	DESCRIPTION	APPD	DATE
	MX-2 1ch. blockdiagram		

TITLE

MX-2

DRAWN	TRACED	CHECKED	APPROVED	DATE
PRO				

DRAWING No.

RS 561-381

297 x 420mm A3