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# Technical Description.

# Universal Module UML-01

## Microphone to Line Amplifier with VCA and Mute Control

The UML-01 is a practical module designed to fit into the RUC-01 Universal Casing

Features

Transformerless Balanced Microphone Level Input to suit standard 200 Ohm Balanced Microphone
Links to permit normal Broadcast Line Level Input
+15V DC Phantom Microphone Power available by inserting Link
Coarse Gain adjustable by Links in 3 steps for –70, -60, and –50 dBV nominal input level
Moveable Link to provide Low Frequency Cut, -3 dB at 220 Hz
Fine Gain adjustment Trim Potentiometer with 20 dB range
Overall gain controlled by Voltage Controlled Amplifier normally holding 15 dB
Link selectable internal Trim-pot, or external 10K Potentiometer control of overall gain
External “Mute” control by bringing Mute Line to ground
Transformerless Balanced Line Level Output
Provision for “Mixing” audio signal from several UML-01 Modules to create a Microphone Sub-Mixer
Provision to provide several Balanced Line Outputs from a Sub-Mixer system

Technical Description

DC Power, +15V and –15V DC is provided via a 10 Pin Box Header on the PCB

Pins, 1 and 2 +15V DC, 3 and 4 –15V DC, 5 and 6 N/c, 7, 8, 9 and 10 Ground

Audio Input, Audio Output, External Gain Control, Mute Control and Common Ground connections are provided via a 9 Pin Female “D” Connector located at one end of the UML-01 Module

Pins, 1 and 6 Input, 2, 8 and 9 Ground, 3 and 7 Output, 4 Mute, 5 External Gain Control

The Microphone Pre-Amplifier is based on the SSM-2017 (IC-1) low noise differential balanced IC

The Balanced Input is connected to the SSM-2017 via 2 x 100K Resistors (shorted by Links for Microphone Level operation), 2 x 100 MFD 25V Electrolytic Capacitors and 2 x 22 Ohm Resistors.

The 100K Resistors form part of an Attenuator Network when the UML-01 is used with Line Level Inputs, more information about this below.

Phantom DC Power for an Electret Microphone is provided from the +15V DC supply rail via 2 x 1K Resistors, R-1 and R-2 and the Phantom Power Link

The Phantom Power Link is not normally fitted on the board and in order to obtain the lowest possible input noise figures, the Link should not be fitted unless required to power an Electret Microphone

Transverse and Longitudinal protection is provided for the SSM-2017 by the 4 x 1N914 Diodes in conjunction with the 2 x 22 Ohm series resistors R7 and R8

Some RF Protection is provided by C4 in conjunction with R7 and R8 and is normally sufficient under normal conditions assuming good quality Microphone Cable is used between the Microphone and the UML-01 Module

Resistors R5 and R6 provides the Ground Path for the SSM-2017 inputs, and in conjunction with R3 and R4 determines the Input Impedance of the UML-01 which is in the order of 1K Ohm and suitable for normal Balanced 200 Ohm Microphones

Gain of the SSM-2017 is determined by the value of a resistor connected between Pins 1 and 8

The UML-01 is provided with Links setting the Gain in 3 steps.

High Gain, to suit Low Output Microphones such as Ribbon Types or to cope with low sound levels

Medium Gain, to suit Normal Dynamic Microphones used to pick up normal speech

Low Gain, to suit the average Electret Microphone normally producing a fairly high output level

Output from the SSM-2017 is fed to the following stage (IC-2:A), via either a 10 MFD Bipolar Electrolytic Capacitor for a flat LF response, or via a simple LF Roll-off Network giving a 3 dB loss at 220 Hz

Selection between flat response of LF Roll-off is by a moveable Link

Gain of IC-2:A is controlled by a 10K Multi-turn Trim-pot providing a gain control range of about 20 dB

Output of IC-2:A is fed to the SSM-2018T (IC-3) Voltage Controlled Amplifier, and to IC-2:B connected as a unity gain inverting stage also feeding signal to the SSM-2018T

Control of the SSM-2018T is described later in this

Output from the SSM-2018T is fed to IC-4 connected as an inverting Summing Amplifier and on to the SSM-2142 (IC-5) Balanced Line Amplifier and on to the output of the UML-01 Module

Several UML-01 Modules may be connected together in order to provide a simple Microphone Mixer

To do this, it is necessary to declare one of the UML-01 Modules as the Master Module.

Connect the Vero Pin labelled Sum to the identical pin on the other UML-01 Modules to create the Mixer, and remove IC-4 from all modules except the Master Module as it is not possible to have more than one Inverting Summing Amplifier in a Mixing Circuit

The Master Module will provide the Balanced Line Output of the “Mixer”

If more than one Line Output is required, simply connect the Vero Pins marked B together, the Summing Amplifier is perfectly capable of driving more than one Line Amplifier

Control of the SSM-2018T VCA

The SSM-2018T provides Maximum Gain with Zero Voltage applied to control port, Pin 11 with gain reducing progressively as a Positive Voltage is applied to the control port

Muting of the ULM-01 is accomplished by Grounding Pin 4 on the “D” Connector, which will cause the PNP Transistor Q-1 to apply a Positive Voltage to the control port, high enough to turn the SSM-2018T VCA off

Variable Gain Control is via IC-6 and either the built-in Trim-Pot RV2 or an external 10K Linear Potentiometer selectable as Internal or External by the Gain Control Link adjacent to RV2

The circuit is arranged to Turn Off if the Link is removed, or the external Potentiometer goes open circuit or becomes disconnected

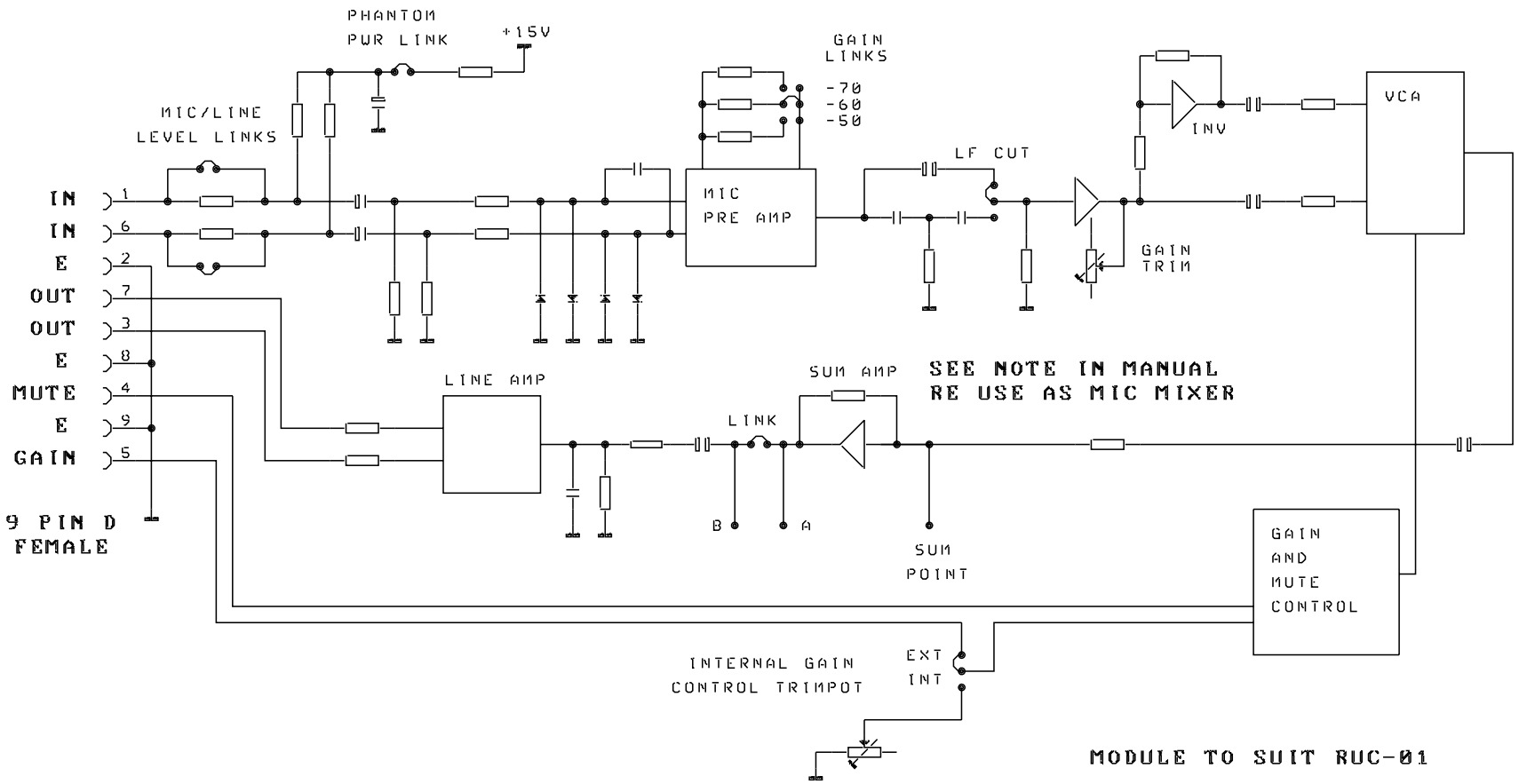
To use the UML-01 Module as a Line Level Gain Controlled Amplifier, simply remove Links LK-1 and LK-2 and adjust the gain of the Module to suit

Factory Configuration

| | | |
|---|---|---|
| Links | LK1 and LK2 | Fitted |
| | Phantom Power | Not Fitted |
| | Gain Link | Medium |
| | Cut/Flat Link | Flat |
| | Output Link | Fitted |
| | Int/Ext Link | Internal |
| Gain Setting | -60 dBV in +4 dBmW Out with 15 dB held in VCA | |

Technical Specifications

| | | |
|---|---|---|
| Input | Type | Differential Balanced |
| | Impedance Mic | 1K Ohms to suit 200 Ohm Balanced Microphone |
| | Impedance Line | 200K Ohms |
| | Max Level | -15 dBV at Low Gain Setting |
| | Phantom Power | +15V DC via 2 x 1K Resistors |
| Output | Type | Differential Balanced |
| | Impedance | About 50 Ohms |
| | Max Level | + 25 dBmW into 600 Ohms |
| Performance | Frequency Resp | +- 0.5 dB 20 Hz to 20 KHz |
| | LF Cut | -3 dB 220 Hz -6 dB 120 Hz |
| | THD | 0.03% at +12 dBmW Out |
| | THD | 0.03% at +25 dBmW Out |
| | EIN Hi Gain | -128 dBV 20 Hz to 20 KHz |
| | EIN Mid Gain | -126 dBV 20 Hz to 20 KHz |
| | EIN Low Gain | -124 dBV 20 Hz to 20 KHz |
| | Off Isolation | 80 dB 20 Hz to 20 KHz |
| | SN Ratio as Line Amp | 88 dB WRT +12 dBu |
| Power | Requirements | + and – 15V DC +- 20% |
| | Current | 40 mA each side |
| Physical | Size | W 70 mm x L 120 mm x H 25 mm |




MODULE TO SUIT RUC-01

DRAWING NUMBER UML01BK

ELAN AUDIO
AUSTRALIA

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|---|---|---|
| Title: BLOCK DIAGRAM<br>MICROPHONE TO LINE AMPLIFIER MODULE | | |
| Size: A4 | Number: UML-01 | Revision: |
| Date: 1-MAY 2001 | | Sheet of |
| File: UML01BK/1 | | Drawn By: |