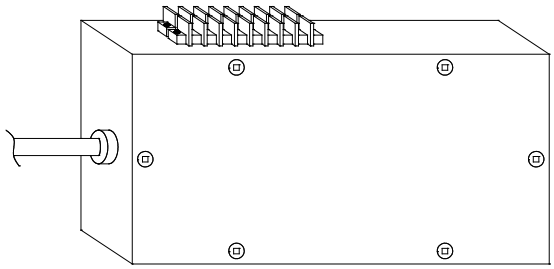
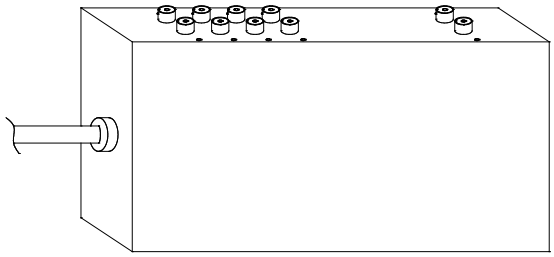
Guardian Telecom Inc.

7000 Fisher Road S.E., Calgary, Alberta, Canada T2H 0W3
Voice 403-258-3100 Fax 403-253-4967

SERVICE MANUAL
AS-DA16
AUDIO DISTRIBUTION AMPLIFIER





GENERAL DESCRIPTION:

An AS-DA16 Audio Distribution Amplifier is a two input, eight output line level amplifier designed to interface between a telephone system and up to eight power amplifiers.

The paging input is high impedance unbalanced for a maximum input level of 100 mV. This is a floating input, which will not provide a ground on either lead and is suitable for telephone exchanges that require a floating signal.

The auxiliary input is a high impedance unbalanced input for a maximum input signal level of 300 mV. This input is suitable for tuners, tape players or CD players.

There are eight control inputs which will independently switch from the auxiliary input to the paging input when and as long as the control + and - terminals are shorted. This may be by contact closure or by an open collector circuit with a handling voltage of 12 VDC.

There are internal volume adjustments for each input and for each output. There also is an internal switch, which may be used to disable the auxiliary audio input to any of the eight outputs so that background music may be excluded from that output.

FEATURES:

1. Permits distribution of up to eight line level high impedance input feeds to power amplifiers without loading on the source.
2. Allows switching of inputs from one source to a second through contact closure independently for each output channel.
3. Permits disabling of the primary input on any single or combination of output channels.

OPERATION:

When attached to a PABX, to serve as the paging distribution center, the background music source, if installed, will provide the audio feed to the amplifiers. Upon dialing the paging access numbers through the PABX the contact closure will disable the background music to that channel and in its place connect the audio path from the PABX. This change of state will remain active as long as the contact closure is maintained by the PABX.

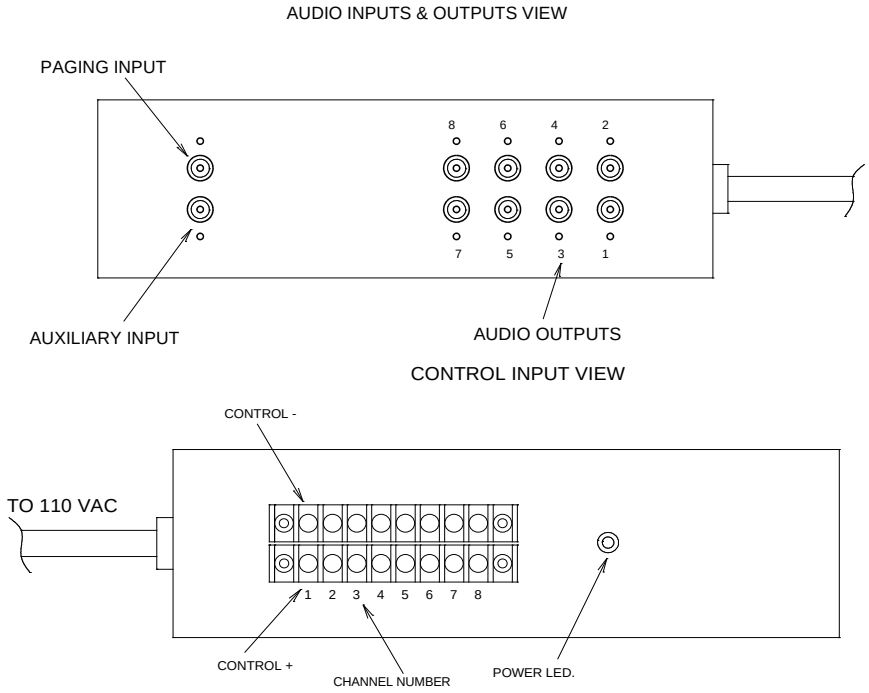
CONNECTIONS:

A telephone paging output is attached to the paging RCA input connector. The dry normally open contacts on the telephone PABX paging output are connected to the control + and control - inputs.

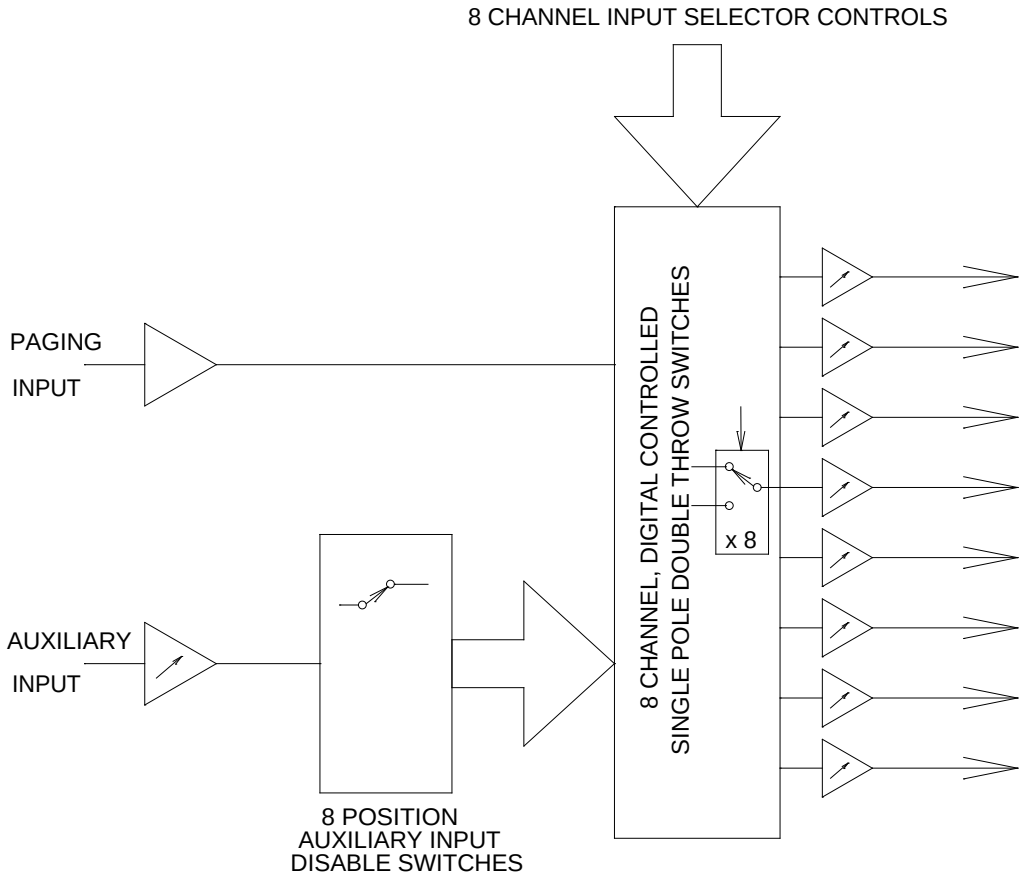
A background music source such as a tuner is connected to the auxiliary RCA input connector.

The output RCA connectors are routed to the inputs of the power amplifiers.

The Audio Distribution Amplifier is connected to a 110 VAC power source.



BLOCK DIAGRAM:



BLOCK DIAGRAM

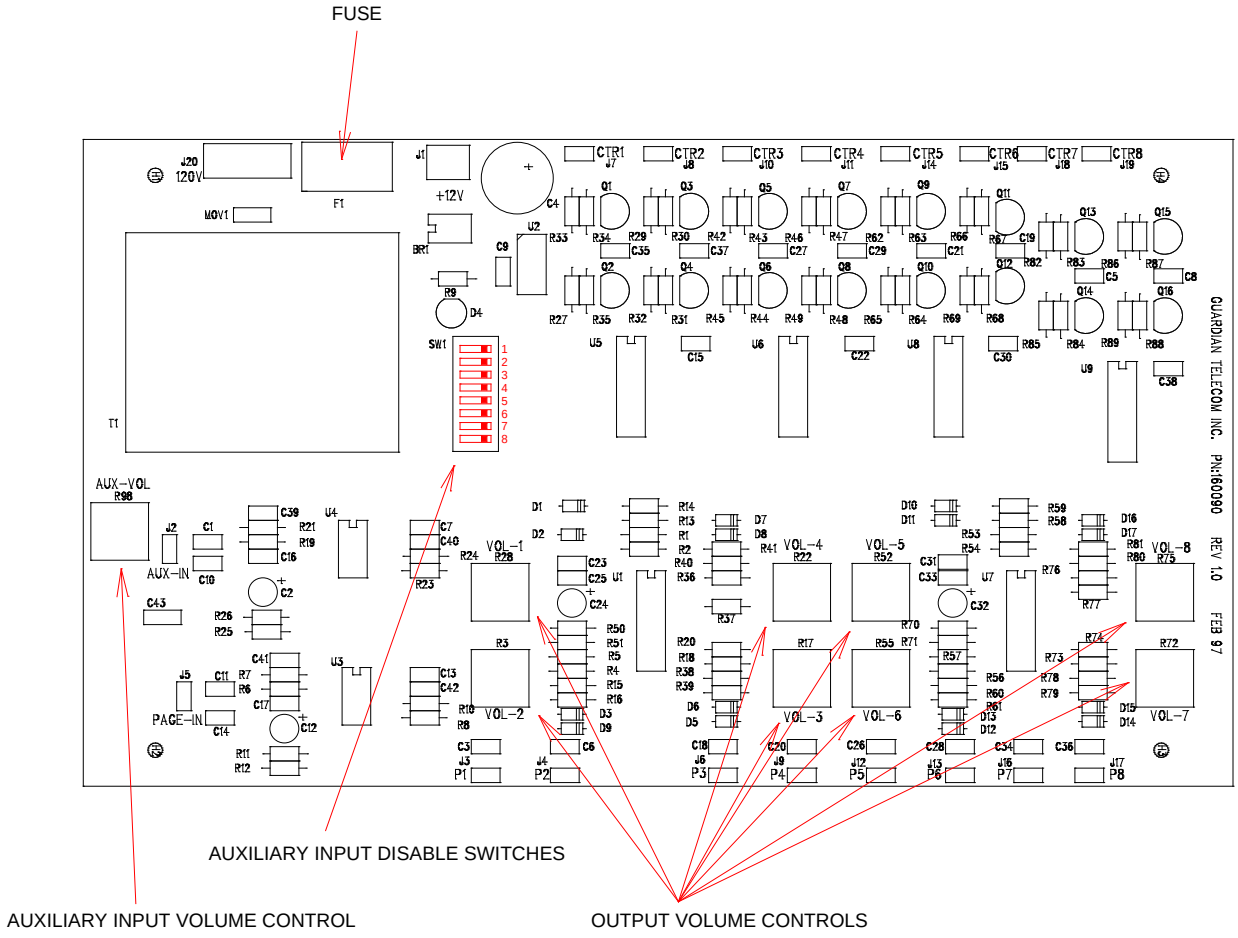
Description:

The audio from the auxiliary input in the idle mode is passed from the auxiliary input through the auxiliary disable switches. This audio may be disabled by manually changing the position of any one of these DIP switch settings if any one of the paging zones is to have no background music. The signal is then passed to the eight channel digitally controlled double throw switches. Output of these switches is routed to the eight output amplifiers.

The audio output from a PABX is fed to the paging input, which is passed to its amplifier.

Upon presenting a closed circuit to a pair of the control + and - leads, the respective digitally controlled switch will then select the output of the paging input amplifier and mute the background music to that zone. This closed circuit is normally provided by the paging function of the PABX.

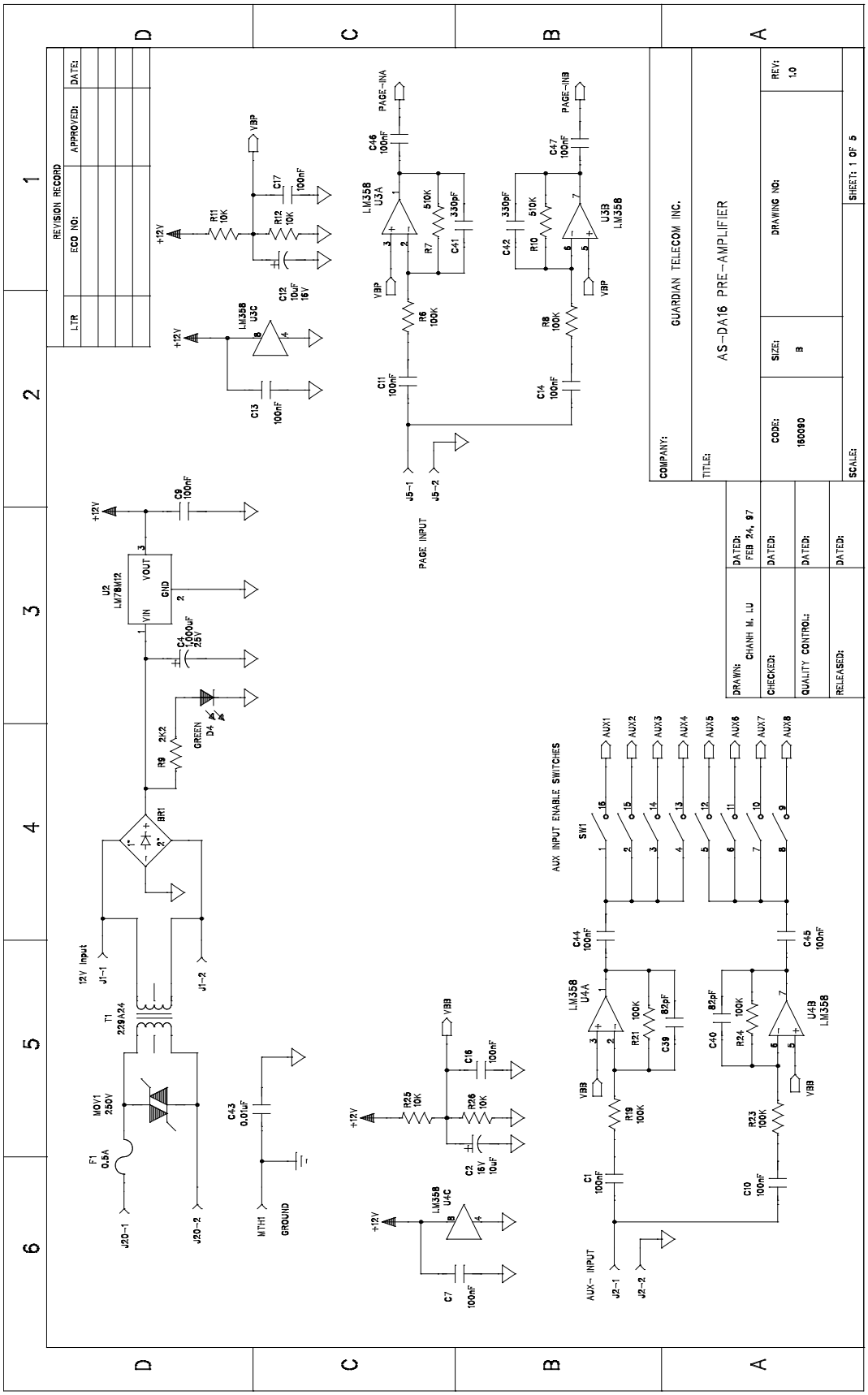
INTERNAL SWITCHES AND CONTROLS:



INTERNAL CONTROLS AND FUSE LOCATION

Description:

The internal fuse is located in the top left corner of the circuit board next to the power transformer. Directly below the transformer is R98 the auxiliary input volume control used to adjust the volume level for the background music source. To the right of the power transformer are the DIP switches used to disable the background music on each of the eight output channels. The other eight marked volume controls and are the output volume controls. The paging input has no volume control and will operate at the reference level for the Audio Distribution Amplifier.


REVISION RECORD
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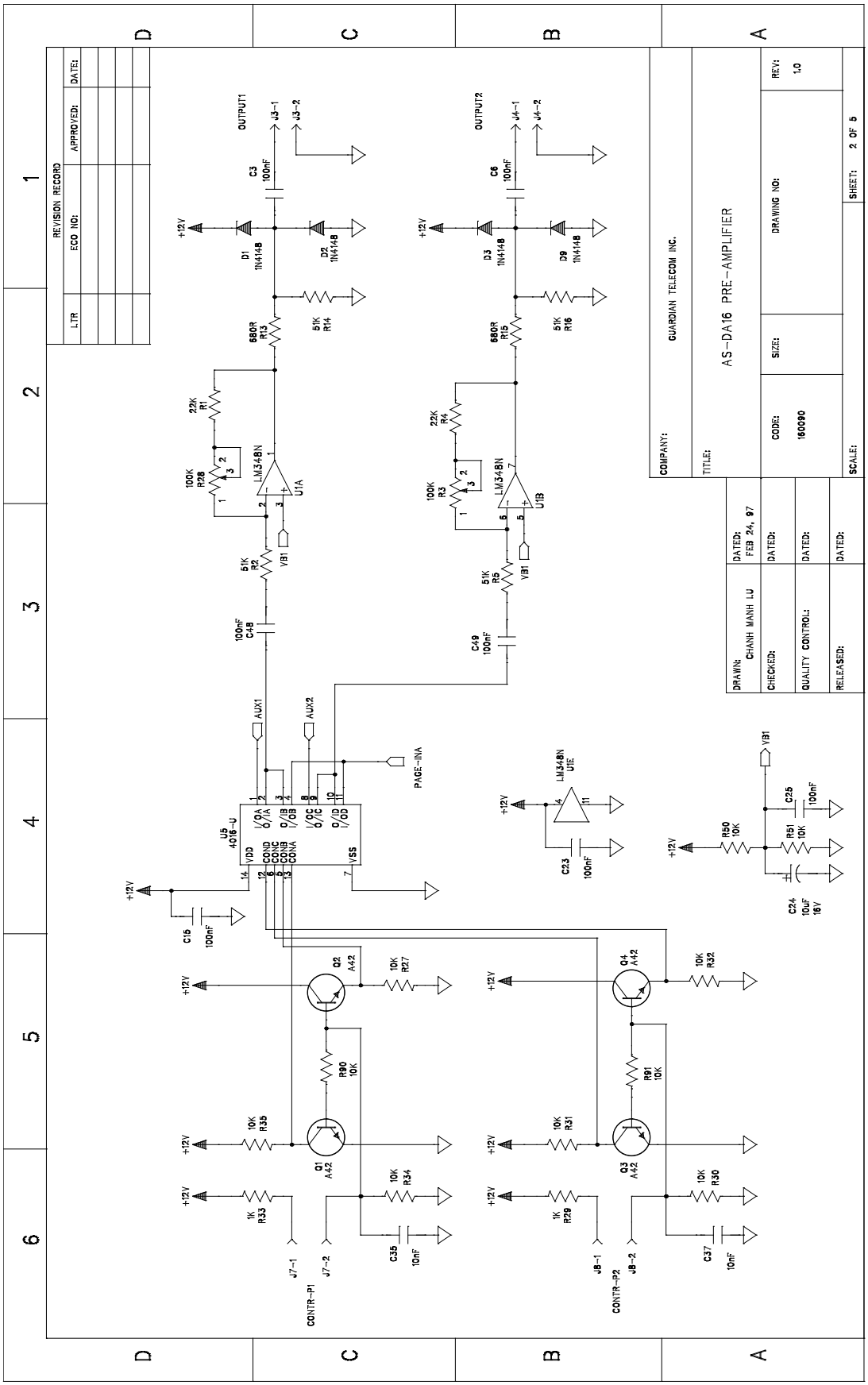
APPROVED:
DATE:
COMPANY: GUARDIAN TELECOM INC.
TITLE: AS-DA16 PRE-AMPLIFIER
CODE: 160080
SIZE: B
DRAWING NO:
REV: 1.0
SCALE:
SHEET: 1 OF 5
DRAWN: CHANH M. LU
DATED: FEB 24, 97
CHECKED:
QUALITY CONTROL:
RELEASED:
12V Input
J1-1
J1-2
T1
229A24
MOV1
250V
F1
0.5A
J20-1
J20-2
BR1
R9 2K2
GREEN
D4
U2
LM78M12
VIN
VOUT
GND
C4
1000uF
25V
C9
100nF
C43
0.01uF
MTH1
GROUND
+12V
VBB
VBP
C16
100nF
R25
10K
R26
10K
C2
16V
10uF
LM358
U4C
C7
100nF
AUX INPUT ENABLE SWITCHES
SW1
AUX1
AUX2
AUX3
AUX4
AUX5
AUX6
AUX7
AUX8
C44
100nF
C45
100nF
LM358
U4A
U4B
R21
100K
82pF
C39
C40
R24
R19
100K
R23
C1
100nF
C10
AUX- INPUT
J2-1
J2-2
LM358
U3A
U3B
U3C
C46
100nF
C47
100nF
PAGE+INA
PAGE+INB
R7
510K
330pF
C41
C42
R10
R6
100K
R8
C11
C14
J5-1
J5-2
PAGE INPUT
R11
10K
R12
10K
C17
100nF
C12
10uF
16V
C13
100nF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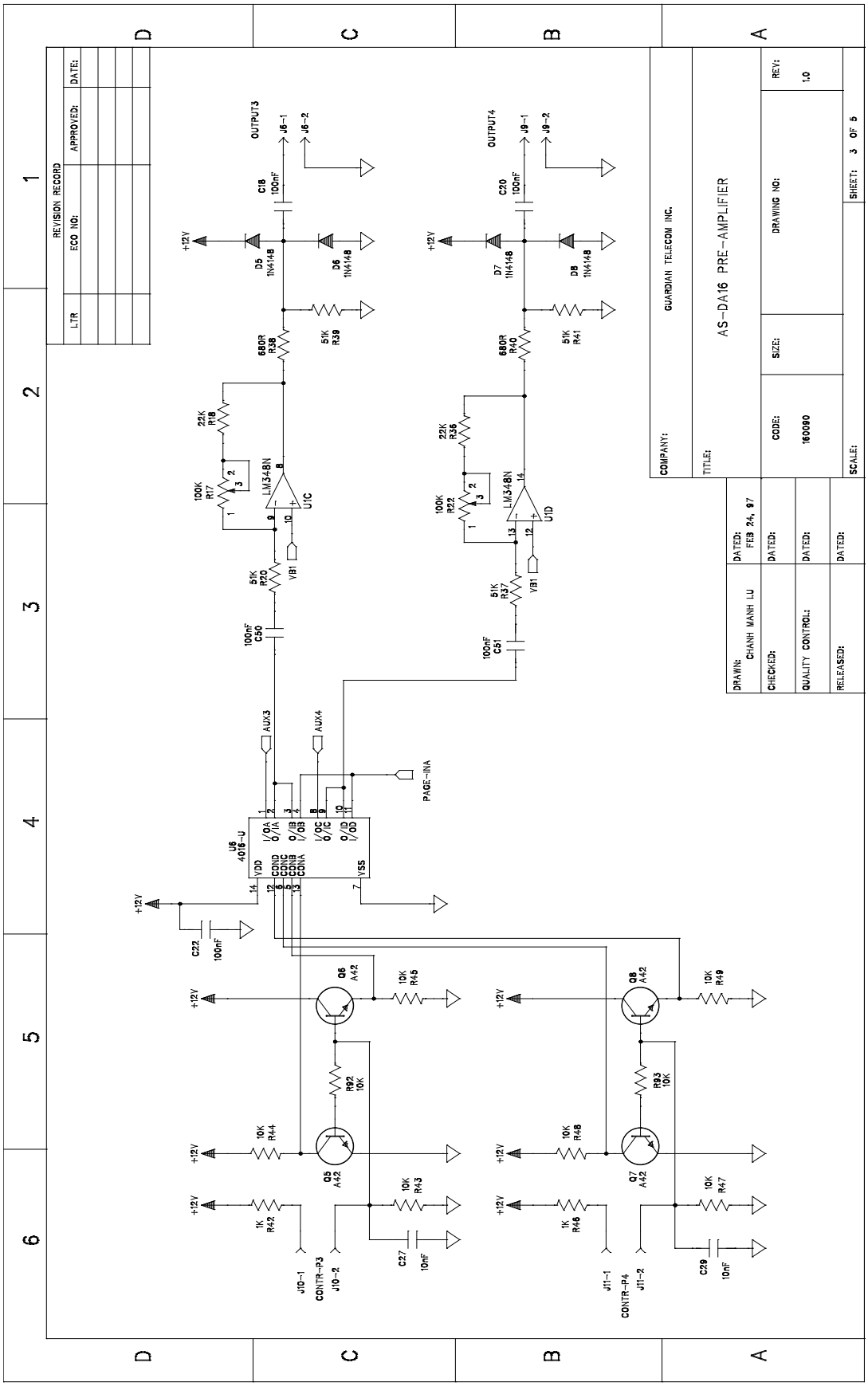
GUARDIAN TELECOM INC.
TITLE:
AS-DA16 PRE-AMPLIFIER
CODE:
160090
SIZE:
DRAWING NO:
REV:
1.0
SHEET: 2 OF 5
DRAWN:
CHANH MANH LU
DATED:
FEB 24, 97
CHECKED:
QUALITY CONTROL:
RELEASED:
SCALE:
OUTPUT1
OUTPUT2
J3-1
J3-2
J4-1
J4-2
C3
100nF
C6
100nF
+12V
D1
1N4148
D2
1N4148
D3
1N4148
D9
1N4148
680R
R13
680R
R15
51K
R14
51K
R16
22K
R1
22K
R4
100K
R28
100K
R3
LM348N
U1A
LM348N
U1B
51K
R2
51K
R5
-V31
100nF
C48
100nF
C49
AUX1
AUX2
PAGE-INA
U5
4016-U
VDD
VSS
COND
COND
COND
COND
C15
100nF
LM348N
U1E
C23
100nF
-V31
R50
10K
R51
10K
C25
100nF
C24
10uF
16V
Q2
A42
Q4
A42
Q1
A42
Q3
A42
10K
R27
10K
R32
10K
R90
10K
R91
10K
10K
R35
10K
R31
10K
R34
10K
R30
1K
R33
1K
R29
J7-1
J7-2
CONTR-P1
J8-1
J8-2
CONTR-P2
C35
10nF
C37
10nF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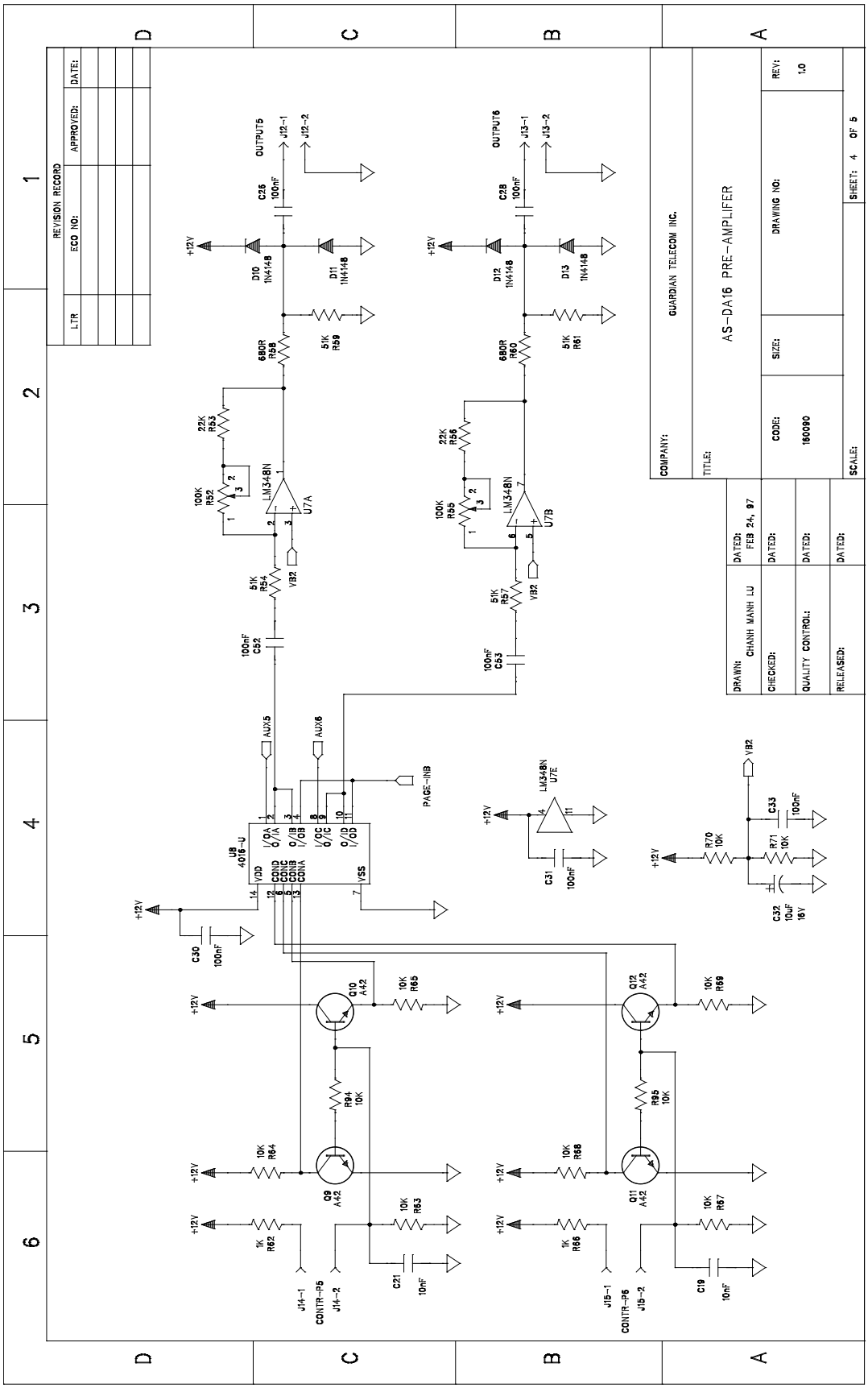
DATED: FEB 24, 97
CHECKED:
QUALITY CONTROL:
RELEASED:
CODE: 160090
SIZE:
DRAWING NO:
REV: 1.0
SCALE:
SHEET: 3 OF 5
OUTPUT3
OUTPUT4
+12V
LM348N
U1C
U1D
U6 4016-U
AUX3
AUX4
PAGE-INA
CONTR-P3
CONTR-P4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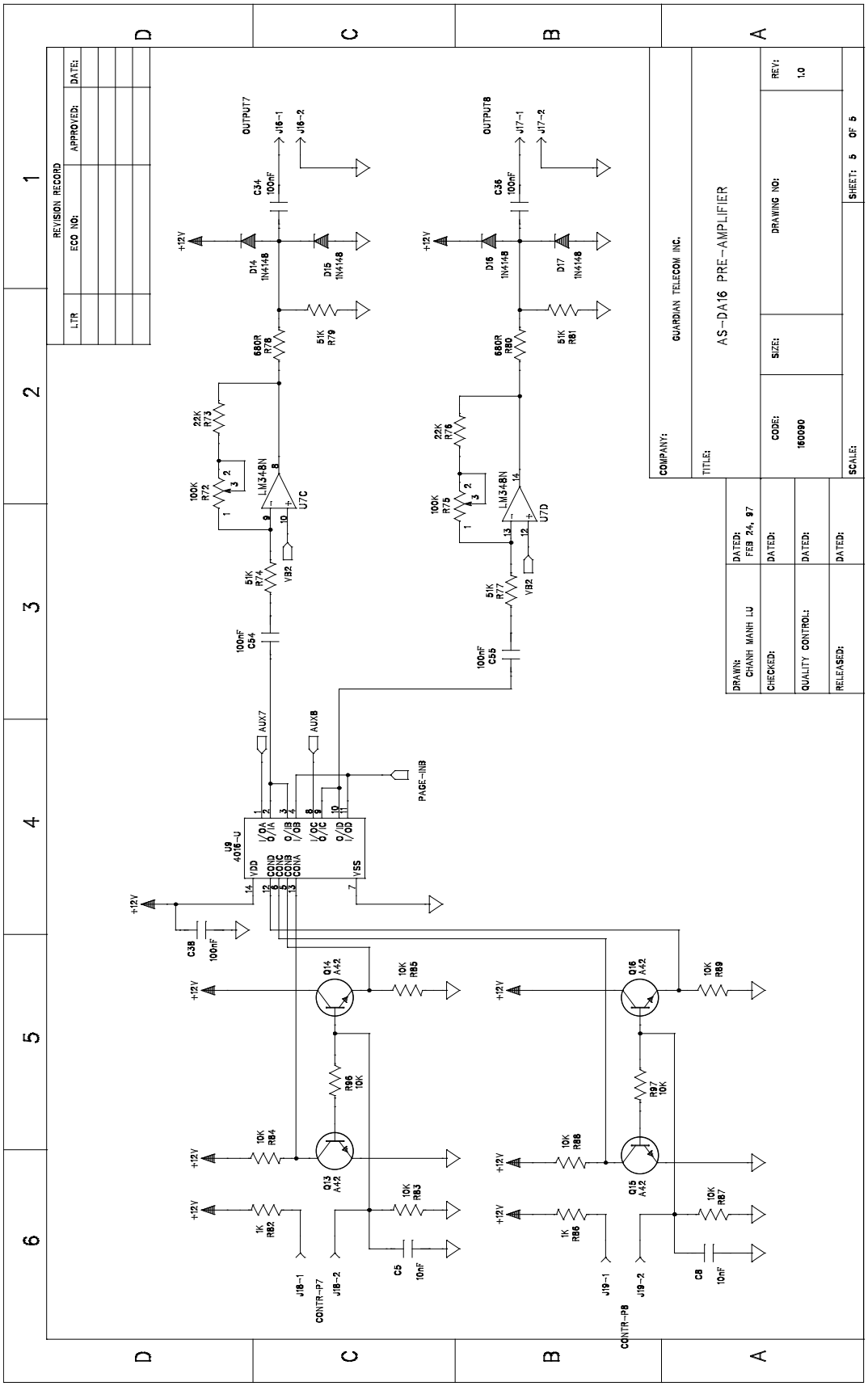
DRAWING NO:
REV: 1.0
SIZE:
CODE: 160090
SCALE:
SHEET: 4 OF 5
DRAWN: CHANH MANH LU
DATED: FEB 24, 97
CHECKED:
QUALITY CONTROL:
RELEASED:
OUTPUT5
OUTPUT6
LM348N
U7A
U7B
U7E
U8
4016-U
Q9
Q10
Q11
Q12
A42
CONTR-P5
PAGE-INB
AUX5
AUX6
+12V
VB2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160090
SIZE:
DRAWING NO:
REV:
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SCALE:
SHEET: 5 OF 5
DRAWN:
CHANH MANH LU
DATED:
FEB 24, 97
CHECKED:
QUALITY CONTROL:
RELEASED:
OUTPUT7
OUTPUT8
J16-1
J16-2
J17-1
J17-2
+12V
C34
100nF
C36
100nF
D14
1N4148
D15
1N4148
D16
1N4148
D17
1N4148
680R
R78
680R
R80
5K
R79
5K
R81
22K
R73
22K
R76
100K
R72
100K
R75
LM348N
U7C
LM348N
U7D
5K
R74
5K
R77
VR2
VR2
100nF
C54
100nF
C55
AUX7
AUX8
PAGE-NB
U9
4016-U
VDD
VSS
C38
100nF
Q14
A42
Q16
A42
Q13
A42
Q15
A42
10K
R85
10K
R89
10K
R84
10K
R88
10K
R96
10K
R97
10K
R83
10K
R87
1K
R82
1K
R86
J18-1
CONTR-P7
J18-2
J19-1
CONTR-P8
J19-2
C5
10nF
C8
10nF

PARTS LIST for AS-DA16

Item	Qty	Reference	Part Name	Description
1	4	U5-5-6 U8-9	4016U	QUAD BI-LATERAL SWITCH
2	1	BR1	DF04	RECTIFIER BRIDGE
3	4	C2 C12 C24 C32	CAP E\R, 10uF	ELECTRO RAD CAP, 0.100" PIN SPACE, 0.200" DIAMETER
4	1	C4	CAP E\R, 1000uF, 35V	ELECTRO RAD CAP, 0.200" PIN SPACE, 0.500" DIAMETER
5	37	C1 C3 C6-7 C9-11 C13-18 C20 C22-23 C25-26 C28 C30-31 C33-34 C36 C38 C44-55	CAP M\R, 100nF	MONO CAP RADIAL, .200 X .100 CENTERS: .100
6	8	C5 C8 C19 C21 C27 C29 C35 C37	CAP M\R, 10nF	MONO CAP RADIAL, .200 X .100 CENTERS: .100
7	2	C39-40	CAP M\R, 82pF	MONO CAP RADIAL, .200 X .100 CENTERS: .100
8	2	C41-42	CAP M\R, 330pF	MONO CAP RADIAL, .200 X .100 CENTERS: .100
9	1	C43	CAP M\R, 0.01uF	MONO CAP RADIAL, .260 X .100 CENTERS: .100
10	1	J1	CON\SIP\2\156P	GENERIC 2 PIN SIP HEADER .156 CENTERS M/F VRT.
11	1	J20	CON\SIP\4\156P	GENERIC 4 PIN SIP HEADER .156 CENTERS M/F VRT.
12	1	MTH1	CON\SIP\1P	GENERIC 1 PIN CONNECTOR
13	18	J2-19	CON\SIP\2P	GENERIC 2 PIN HEADER .100 CENTERS
14	16	D1-3 D5-17	1N4148	DIODE
15	1	F1	FUSE	2AG 1/2A FUSE
15A	1	2	FUSE CLIP	FUSE CLIPS
16	1	D4	LED	LIGHT EMITTING DIODE
17	2	U3-4	LM385	DUAL OP AMP 8 PIN
18	2	U1 U7	BA10324A	QUAD OP AMP
19	1	U2	LM78M12	VOLTAGE REG
20	1	MOV1	MOV	AC PEAK VOLTSGE CLAMP
21	9	R3 R17 R22 R28 R52 R55 R75 R98	POT,100K	RES POT
22	6	R6 R8 R19 R21 R23-24	R1/4W,100K	RES BODY:100 CENTERS:500
23	40	R11-12 R25-27 R30-32 R34-35 R43-45 R47-51 R63-65 R67-71 R83-85 R87-97	R1/4W,10K	RES BODY:100 CENTERS:500
24	8	R29 R33 R42 R46 R62 R66 R82 R86	R1/4W,1K	RES BODY:100 CENTERS:500
25	8	R1 R4 R18 R36 R53 R56 R73 R76	R1/4W,22K	RES BODY:100 CENTERS:500
26	1	R9	R1/4W,2K2	RES BODY:100 CENTERS:500
27	2	R7 R10	R1/4W,510K	RES BODY:100 CENTERS:500
28	16	R2 R5 R14 R16 R20 R37 R39 R41 R54 R57 R59 R61 R74 R77 R79 R81	R1/4W,51K	RES BODY:100 CENTERS:500
29	8	R13 R15 R38 R40 R58 R60 R78 R80	R1/4W,680R	RES BODY:100 CENTERS:500
30	1	SW1	SW-DIP8	DIP SWITCH
31	16	Q1-16	A42	NPN SMALL SIGNAL TRANSISTOR
32	1	T1	229A24	POWER TRANSFORMER

ENGINEERING SPECIFICATIONS:

ELECTRICAL REQUIREMENTS

Input Supply Voltage	110 VAC
Maximum Current Consumption	50 mA
Fuse	1/2A; 2AG

AUDIO PERFORMANCE

AUDIO INPUTS

AUXILIARY INPUT

Maximum voltage	300mV
Input Impedance	100K Ohms

PAGING INPUT

Maximum voltage	100mV
Input Impedance	100K Ohms

AUDIO OUTPUTS (per channel)

Maximum voltage	1,200mV
Output Impedance	600 Ohms unbalanced

LOGIC PERFORMANCE

LOGIC INPUTS

Control Input Enable	Control + & Control - Input is connected together
Recommended Activating Devices	Using dry contact relays, open collector output devices, or open drain output devices which can stand a current of minimum 100 micro Amperes and a working voltage of 12 VDC.

MECHANICAL SPECIFICATIONS

Body Construction	16 Ga. Mild Steel
Body Dimensions	6 x 12 x 3.5 inches 152.4 x 304.8 x 88.9 mm
Net Weight	6 lbs (2.7 kg)
Connection Audio	RCA Phono Jack
Connection Logic	Curtis GFTX-W8
Connection Power	110VAC U Ground Power Cord
Paint	Epoxy Powder Coat

GUARDIAN TELECOM INC. LIMITED WARRANTY

Guardian Telecom Inc gives the limited warranty set forth below. This limited warranty is only effective upon presentation of bill of sale or other proof of purchase along with the product to an authorized Guardian Factory Service Center. The product, when delivered to you in the original container, is warranted against defective materials or workmanship as follows;

PARTS: Defective parts will be exchanged for new parts or, at Guardian's option, Comparable rebuilt parts for a period of one year from the date of original purchase. The warranty period for replacement parts shall begin upon the date of purchase.

LABOUR: For a period of one year from the date of original purchase, labour will be provided free of charge by our Factory Service Centers.

The limited warranty covers all defects in the product except where:

(a) The loss or damage to the product results from:
  - i) Accident, natural disasters, mishandling, abuse, neglect, electrical current fluctuations, unauthorized product modification or failure to follow instructions contained in the instruction manual;
  - ii) The use of accessories, attachments, products, supplies, devices or parts (other than those sold by Guardian Telecom Inc.) which damage the product or causes abnormal operation;
  - iii) Repairs or service performed by any party other than an authorized Guardian Service Center;
  - iv) Shipping (claim must be presented to the shipper).

(b) Any serial number on the product has been altered or removed.

(c) A Return Authorization Number (RMA#) must be obtained prior to warranty claims or repairs.

The manufacturer will not be responsible for any costs incurred involving on-site service calls or installation. Any requested or required service calls will be handled and billed at the normal charge.

GUARDIAN FACTORY SERVICE CENTER LOCATIONS

In Canada:
Guardian Telecom Inc.
7000 Fisher Road S.E.
Calgary, Alberta, CANADA, T2H 0W3
Telephone: (403)258-3100
Facsimile: (403)253-4967