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**ELAN** Audio

**PIE-02**

**Program Input Equipment  
Promotional Information**

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Practical and Complete Program Input Equipment System for  
Composite FM Stereo Broadcast Transmission Site  
Occupies 3RU of Rack Space 320mm Deep  
Automatic Fail Sensing and Changeover between 2 Composite Inputs  
Automatic Start of Emergency Program  
Fully Compatible with the Elan Audio RCU-01 Remote Control System  
Decoding of Composite Signal for Monitoring  
Comprehensive Monitoring Facilities with Built In 10 + 10 Watt Amplifiers  
VU Meters Phase Fault and Overload Indicators  
Monitor Stereo, Mono, Left Channel and Right Channel  
Single Monitor Volume Control and Headphone Socket

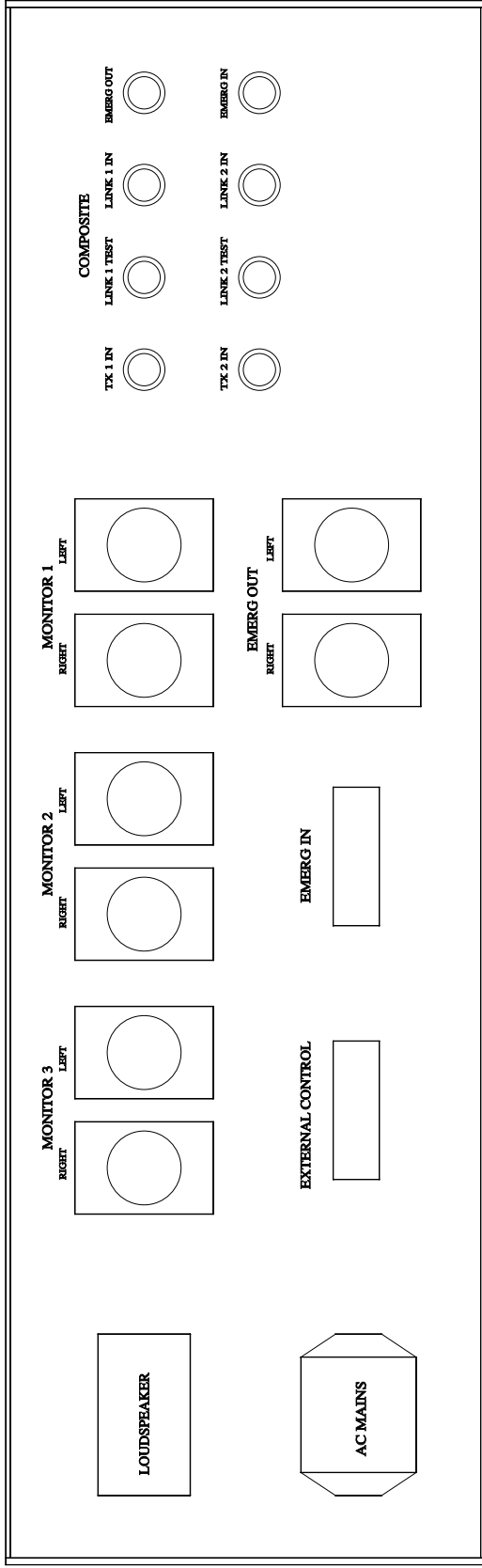
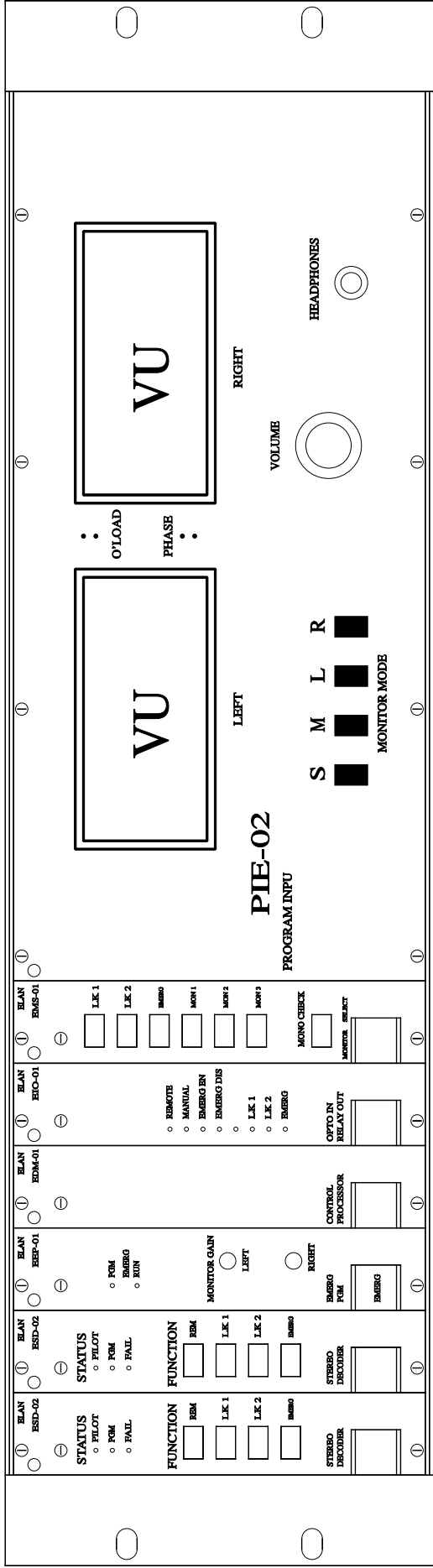
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FRONT AND BACK PANEL  
LAYOUT

PROGRAMME INPUT CONTROL

EQUIPMENT

PIE-02

PIE-02  
Front Panel



PIE-02  
Back Panel



# Programme Input Equipment System

## Type PIE-02

### General Description

The PIE-02 is a comprehensive Program Input Equipment System for use on FM Broadcast Transmitter Sites using Composite Stereo

It is designed to replace the earlier Elan Audio model PIE-01 and is functionally identical

The PIE-02, is housed in a 3 RU Eurorack and is constructed partially using specially designed Plug-In Euromodules and partially using 'Fixed' PC Boards

Operating levels are factory calibrated to the following levels and impedances

Composite Stereo Inputs and Outputs; BNC Type, Unbalanced, High Impedance, 3.5V PP or +4 dBu corresponding to 100% Modulation at 400 Hz

Balanced Outputs: Cannon XLR Type, Low Impedance, Alignment Level +4 dBu

Balanced Inputs: Cannon XLR Type, High Impedance, Alignment Level +4 dBu

Unbalanced Emergency Inputs; Female DB 25 Connector, High Impedance, Stereo, 300 mV

Emergency Control connections also appear on the same Female DB 25 Connector

Connections to the Optional Remote Control System appear on a Male DB 25 Connector

### Systems Functions

The PIE-02 offers a practical solution to the requirements existing on normal Commercial Radio Station Composite Stereo FM Transmitter Sites having Duplicated Program Links and Transmitters

The following functions are provided

- Two Composite Stereo Program Link Inputs
- Two Composite Stereo Transmitter Feed Outputs
- One Composite Stereo, or Pre-Emphasized Mono Emergency Program Input
- Pre-Emphasized Mono Output from Emergency Program Module
- Balanced Emergency Stereo Output to feed external Stere Generator
- Emergency Source Start Relay (Low Voltage Type Only)
- Automatic Program Source to Transmitter Changeover
- Automatic Emergency Program Start and Changeover
- Adjustable Program Fail Level and Fail Delay Time
- Fail Mode, Link Selectable from Audio Signal or Pilot Tone Fail
- Manual Control of Program Source to Transmitters
- Remote Control of Program Source to Transmitters
- Comprehensive Monitor System with selection from 3 Internal and 3 External sources
- Monitor Mode Selection, Stereo, Mono, Left and Right Channels
- Visual indication by VU Meters, Overload and Phase Fault Indicators
- 10 Watt per Channel Stereo Monitor Amplifier
- ¼" Headphone Monitor Socket Outlet

## **Individual Systems Modules or Blocks**

### **Composite Program Changeover Board PIE-01**

This Board is provided with 8 BNC Connectors and 4 High Quality Relays

The BNC Connectors are as follows

- Emergency Program Out, Pre Emphasized Mono from Emergency Program Module
- Emergency Program In, Composite or Mono Feed to Emergency Changeover Relays
- Input from Link-1, Feed to Changeover Relays and Buffer Amplifiers
- Input from Link-2, Feed to Changeover Relays and Buffer Amplifiers
- Link-1 Test, Link-1 Program after Buffer Amplifier
- Link-2 Test, Link-2 Program after Buffer Amplifier
- TX-1 In, Feed to Transmitter 1
- TX-2 In, Feed to Transmitter 2

The Program Changeover Relays are controlled by the Microprocessor on the EDM-01 Module and have the following functions

- Link-1 or 2 Select to TX-1 via the Emergency to TX-1 Relay
- Link-1 or 2 Select to TX-2 via the Emergency to TX-2 Relay
- Emergency Program to TX-1
- Emergency Program to TX-2

The Relays are arranged in a 'Fail Safe Mode' where on Power Failure, the relays will drop out and feed Link-1 to Tx-1 and TX-2

Control of the Relays are from the EDM-01 Processor Module, via the manual override switches on the EDS-02 Stereo Decoder Modules

### **Stereo Decoder Module ESD-02**

Two Stereo Decoder Modules are fitted in the PIE-02 unit where Module 1 service Link-1 and Module 2 service Link-2 and have the following functions

- Decode Composite Stereo Signal from Link Input for Monitoring and Program Sensing
- Rectify Audio Signal for Program Fail Detector
- Sense presence of Pilot Tone
- Selectable Program Fail Level at 0, -10, -20, -30 and – 40 dBu
- Selectable Program Fail Delay in 1 Second steps to 256 Seconds
- Switches to manually control program feed to Transmitters
- Status indicator LED's

### **Emergency Program Input Module EEP-01**

The EEP-01 provides the following functions

- Balanced/Unbalanced Stereo Inputs
- Unbalanced Stereo Outputs to the EMS-01 Monitor Selector Module
- Balanced Stereo Outputs to feed optional external Stereo Generator
- Unbalanced Mono Pre-Emphasized Output to feed directly into Emergency Input
- Emergency Start Relay closing to Run Emergency source (Low Voltage and Current only)
- Emergency Program Presence LED and Open Collector Output
- Emergency Relay Operate Input

## **Control Processor Module EDM-01**

This Module is the main controller of the PIE-02 System and based on a PIC 16C57HS Microprocessor programmed to control the functions of the PIE-02

It is provided with 16 TTL Level Inputs, and 16 Open Collector Outputs

## **Input Output Module EIO-01**

The EIO-01 Module provides the Control Interface between the outside world and the PIE-02 System

It is provided with 8 Opto Isolated Inputs, 8 Relay Isolated Outputs and 8 Front Panel Mounted Indicator LED's

The LED's indicate the systems status as follows

- Remote, System is under Automatic or Remote Control
- Manual, System is under Manual Control
- Emerg Enable, Emergency program source is enabled to operate Automatically
- Emerg Disable, Emergency program source is disabled and will not start Automatically
- Spare, No Function
- LK-1, System is in Automatic Mode, both Transmitters feed from Link-1
- LK-2, System is in Automatic Mode, both Transmitters feed from Link-1
- Emerg, System is in Automatic Mode, both Transmitters feed from Emergency source

## **Monitor Select Module EMS-01**

The EMS-01 Module selects from 6 Stereo Monitor sources as follows

- Link-1, Buffered on ESD-02 Module as unbalanced Stereo
- Link-2, Buffered on ESD-02 Module as unbalanced Stereo
- Emerg, Buffered on ESD-02 Module as unbalanced Stereo
- Monit-1, Balanced Stereo from XLR Connectors on Back Panel
- Monit-2, Balanced Stereo from XLR Connectors on Back Panel
- Monit-3, Balanced Stereo from XLR Connectors on Back Panel

Output from the EMS-01 Module is Balanced Stereo and feeds to the RMS-01 Audio Board

## **Audio Board, Type RMS-01**

The RMS-01 Audio Board is the standard Audio Monitor and Power Supply Board used in the Elan Audio RMS-01 Monitor System, and RMD-02 Delegation Switcher

It features the following

- Balanced Stereo Inputs
- 4 way interlocking Monitor Mode Switch selecting, Stereo, Mono, Left and Right
- 2 x VU Meters calibrated to read 0 VU on +4 dBu input level to Monitor Inputs 1, 2 and 3
- Overload LED Indicator, set to flash at +14 dBu
- Phase Fault LED Indicator, set to flash on program phase inversion
- Single Rotary Volume Control
- 2 x 10 Watt Monitor Amplifiers
- Headphone Socket, arranged to cut our Monitor Loudspeakers
- Power Supply for Monitor Amplifier and Euromodules

## General Notes

As mentioned above, The ELAN Audio, Programme Input Equipment System, type PIE-02, is specially designed to provide automatic and manual management and changeover of composite programme feeds from the Studio to Transmitter links and automatic control of local emergency programme equipment.

It provides the complete solution to Composite FM Transmitter site programme control and monitoring.

## OPERATION.

Operation of the PIE-01 system is quite simple, and is described in brief in the following.

With the PIE-02 system switched off, all relays are released, and both transmitters feeding from Link-1, giving a "Fail Safe" condition.

Assuming that the selector switches on the two ESD-02 modules are in the Remote condition, and that both Link-1 and Link-2 are providing normal programme, the relays will stay released, and feed both transmitters from Link-1.

Remote control outputs and indicator LEDs, will show Remote, Emergency Enabled, TX feeding from Link-1, Programme present on Link-1 and Link-2.

Failure of Link-1 will cause the transmitters to feed from Link-2 after the Pre-Set delay.

If the programme fail detect is set to respond to Audio failure, the changeover will occur after the preset timeout 1 to 256 seconds, if set to operate from pilot tone failure, the change will occur after about 1 second. System will indicate TX feeding from Link-2, programme present on Link-2.

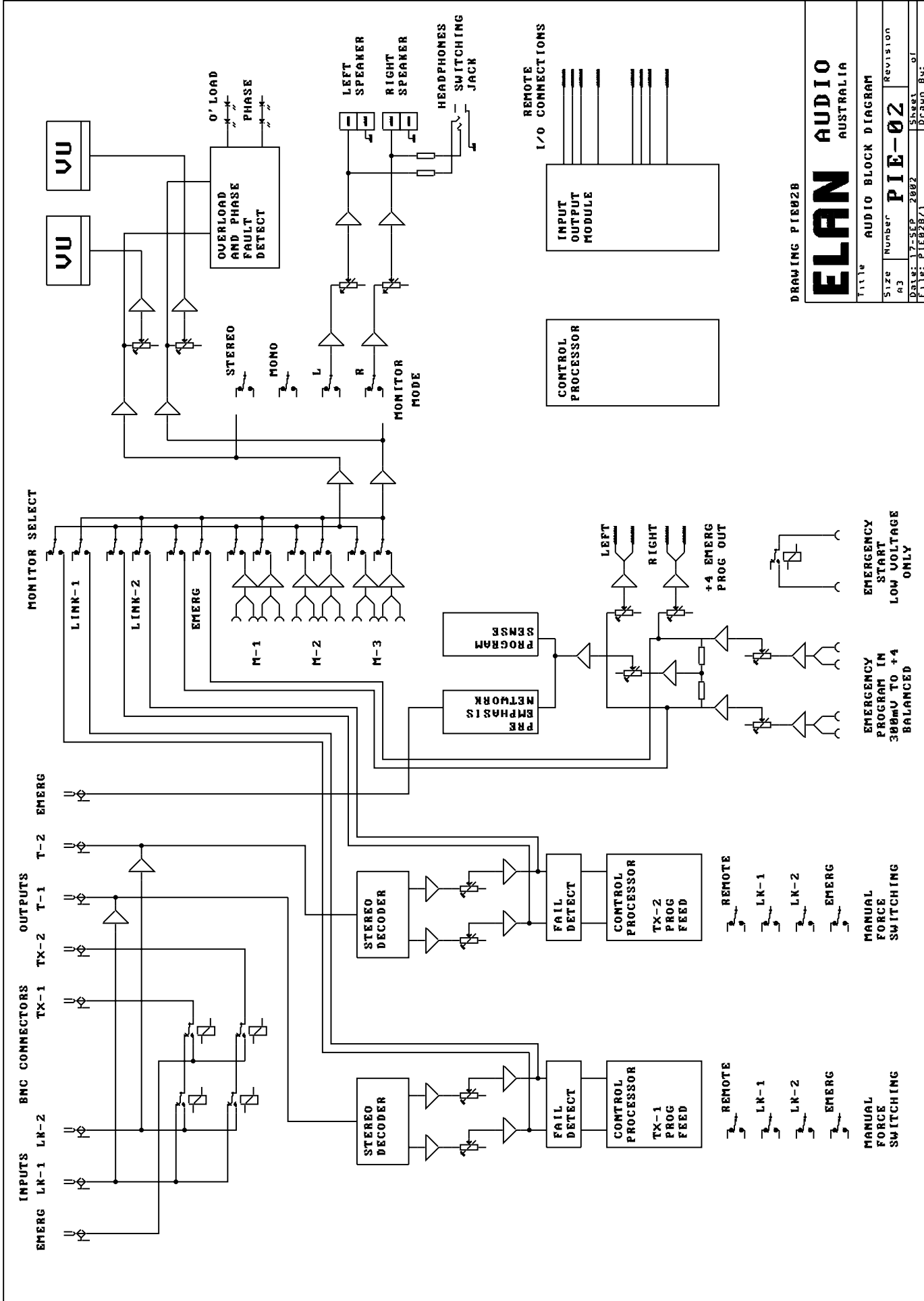
Restoring Link-1 will result in the system automatically switching back to Link-1, as Link-1 has priority over Link-2. The LED's will indicate accordingly.

Failure of both Links, will start the Emergency programme, and feed both Transmitters from this

Indication back will show Emergency program to Transmitters, and Emergency programme present

A Low Voltage Low Power emergency run relay will close whenever the emergency condition is evoked, to start the emergency programme source through a suitable Power Rated Relay

Attached Block Diagrams shows the elements of the PIE-02, and a typical systems configuration

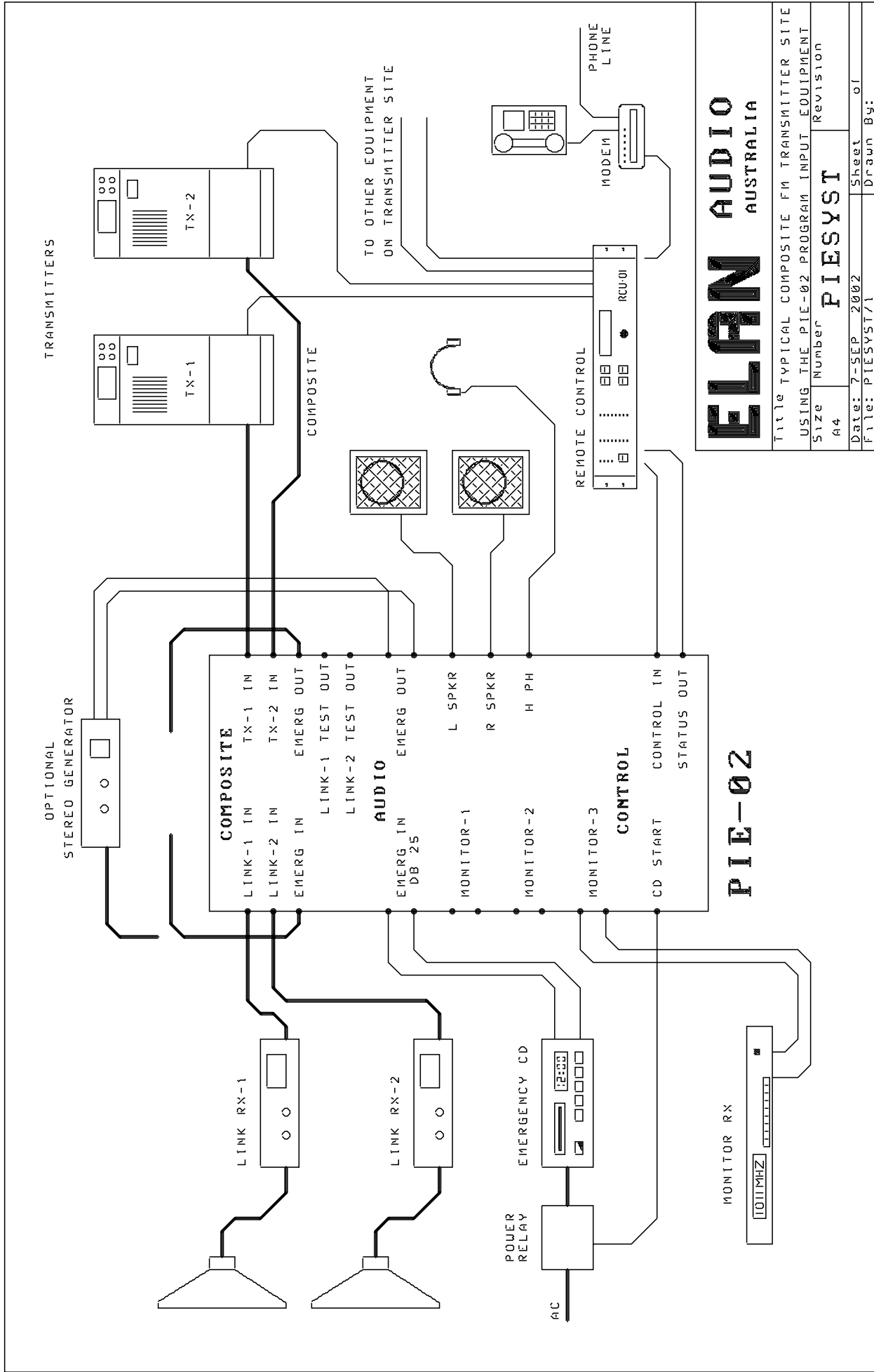


DRAWING PIE02B

# ELAN AUDIO AUSTRALIA

Title		AUDIO BLOCK DIAGRAM	
Size	Number	Revision	
A3	PIE-02		
DATE: 12-SEP-2002		SHEET	
FILE: PIE02B1		OF 01	
		DR:MM:BN:	





# ELAN AUDIO AUSTRALIA

Title		TYPICAL COMPOSITE FM TRANSMITTER SITE
Using		THE PIE-02 PROGRAM INPUT EQUIPMENT
Size	Number	Revision
A4	PIESYST	
Date:	7-SEP-2002	Sheet of
File:	PIESYST/1	Drawn By: