

OPERATIONS MANUAL

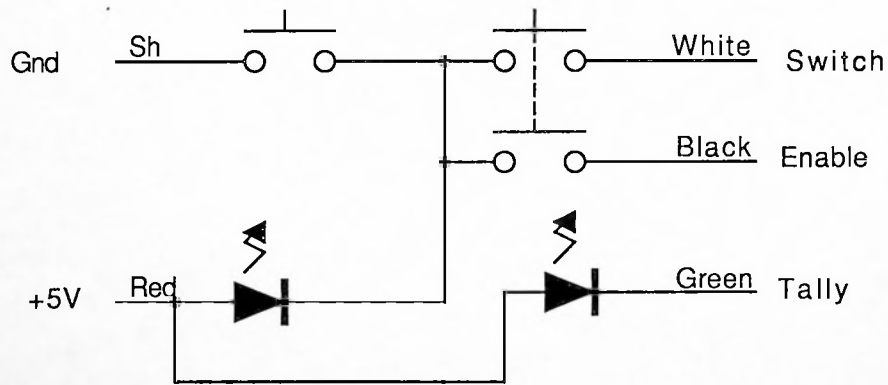
# 10A/20A Program Switchers

**GENTNER**  

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**ELECTRONICS  
CORPORATION**

# Gentner Remote Panel Wiring for Air Switcher



# PROGRAM SWITCHERS

## TABLE OF CONTENTS

- 1.0 Introduction
  - 1.1 Specifications
  - 1.2 Warranty
- 2.0 General Description
  - 2.1 Front Panel Description
  - 2.2 Rear Panel Description
  - 2.3 Functional Description - Front Panel Controls
  - 2.4 Functional Description - Rear Panel Controls
- 3.0 Installation
  - 3.1 Installation Steps
    - 3.1.1 Inspection
    - 3.1.2 Jumper Options
    - 3.1.3 Mounting
    - 3.1.4 Connecting your equipment
    - 3.1.5 Designation Strip
  - 3.2 Interface Connectors
  - 3.3 Interface Connector Pinouts
    - 3.3.1 Signal connector
    - 3.3.2 Remote connector
    - 3.3.3 Auxiliary connector
  - 3.4 Jumper Select Options
    - 3.4.1 Control Enable
    - 3.4.2 Deselect
    - 3.4.3 Deselect Bus
    - 3.4.4 Lamp Control
    - 3.4.5 +5V
    - 3.4.6 Strobe
    - 3.4.7 Report Back Enable
    - 3.4.8 Switching Output
    - 3.4.9 Permanent Control Enable
    - 3.4.10 Source Termination
    - 3.4.11 Using a 20A as a 10A
  - 3.5 Building a Matrix Switcher
  - 3.6 240 VAC operation
- 4.0 Operation

## PROGRAM SWITCHERS

### 5.0 Applications

5.1 Audio Routing

5.2 Digital Signal Routing

5.3 Control Signal Routing

5.4 Telephone Line Routing

5.5 Control through the REMOTE connector

5.5.1 Standard Remote Control

5.5.2 Thumbwheel Remote Control

5.5.3 Remote Control with a GENTNER ENGINEERING TC-100

5.6 Matrix Switcher

### 6.0 Quick Reference Guide

### 7.0 Technical Information

7.1 Technical Description

7.2 Schematics

7.3 Component Layout

## PROGRAM SWITCHERS

### 1.0 INTRODUCTION

Thank you for your purchase of a GENTNER ENGINEERING COMPANY Program Switcher! We're confident that this product will give you many years of dependable, profitable service. This manual is intended to give you all the information needed to use and operate the unit.

The PROGRAM SWITCHERS passively route or switch a variety of electrical signals to an output destination. The 10A STEREO SWITCHER selects ten stereo channel inputs to a single stereo channel output; the 20A MONO SWITCHER selects twenty mono channel inputs to a single mono channel output.

In addition to their normal use with audio signals, the units can also be used to switch digital signals, control signals and telephone lines.

The PROGRAM SWITCHERS provide PASSIVE switching through magnetically latching relays which only require power when actually switching. The passive switching means that the units can route a signal in both directions (multiple sources to a single destination, or a single source to multiple destinations) and that the unit in no way changes the quality of the signal it is switching.

The units are controlled by means of front panel switches, and are optionally controllable from a remote location via a rear panel connector. The PROGRAM SWITCHERS are also stackable, enabling them to function as a matrix switcher (for example, five Mono Switchers can be made to act as a 20 X 5 Switcher).

NOTE: This manual should be read thoroughly before installation and operation, as the placement of internal jumpers during installation will have effect on the operation of the unit.

## PROGRAM SWITCHERS

### 1.1 SPECIFICATIONS

FREQUENCY RESPONSE: DC to 30 kHz;  $\pm$  .01 dB  
30 to 100 kHz;  $\pm$  .5 dB

SIGNAL/NOISE RATIO: >90 dB

CHANNEL SEPARATION: >90 dB

RECOMMENDED LEVELS: -20 to +20 dBm

SWITCHING METHOD: Passive connection using Sealed,  
Magnetically Latching DPDT relays

OPERATION CONTROL: Front Panel - Momentary Switches  
Remote - closure to ground

REPORT BACK: Front Panel - Indicator LED in Switch  
Remote - open collector output

INTERFACING: Rear panel 50D connectors  
Audio Signal Inputs-Male  
Audio Output and Remote Control-Female

Rear panel DB-25 Auxiliary connector  
for output and control

POWER REQUIREMENTS: 120 VAC ,20 watts (240 VAC optional  
10 watts), 50-60 Hz

PHYSICAL DIMENSIONS: 19" X 1.75" X 11" (WHD)  
(483 mm X 44 mm X 279 mm)

WEIGHT: 9.5 lbs. (3.85 Kg)

SHIPPING WEIGHT: 14 lbs. (5.7 Kg)

## PROGRAM SWITCHERS

### 1.2 WARRANTY

GENTNER ENGINEERING COMPANY, INC. warrants that this product is free from defects in both materials and workmanship. Should any part of this equipment be defective, Gentner Engineering Company agrees, at its option, to:

A. Repair or replace any defective part free of charge (except transportation charges) for a period of one year from the date of the original purchase, provided the owner returns the equipment to Gentner Engineering Company at the address set forth below. No charge will be assessed for parts or labor during this period.

B. Replace or furnish replacement for any defective parts in the equipment for a period of one year from the date of original purchase. Replacement parts shall be furnished without charge except for labor and transportation.

This Warranty excludes assembled products not manufactured by Gentner Engineering Company, whether or not they are incorporated in a Gentner Engineering Company product or sold under a Gentner Engineering Company part or model number.

#### THIS WARRANTY IS VOID IF:

A. The equipment has been damaged by negligence, accident or mishandling, or has not been operated in accordance with the procedures described in the operating instructions; or,

B. The equipment has been altered or repaired by other than Gentner Engineering Company personnel or an authorized service representative of Gentner Engineering Company; or,

C. Adaptations or accessories other than those manufactured or provided by Gentner Engineering Company have been made or attached to the equipment which, in the determination of Gentner Engineering Company, shall have affected the performance, safety, or reliability of the equipment; or,

D. The equipment's original serial number has been modified or removed.

PROGRAM SWITCHERS

NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE, APPLIES TO THE EQUIPMENT, nor is any person or company authorized to assume any warranty for Gentner Engineering Company or any other liability in connection with the sale of Gentner products.

Gentner Engineering Company does not assume any responsibility for consequential damages, expenses or loss of revenue or property, inconvenience or interruption in operation experienced by the customer due to a malfunction in the purchased equipment. No warranty service performed on any product shall extend the applicable warranty period.

In case of unsatisfactory operation, the purchaser shall promptly notify Gentner Engineering Company at the address set forth below, in writing, giving full particulars as to the defects or unsatisfactory operation. Upon receipt of such notice, Gentner Engineering Company will give instructions respecting the shipment of the equipment, or such other manners as it elects to honor this warranty as above provided. This warranty does not cover damage to the equipment during shipping and Gentner Engineering Company assumes no responsibility for such damage. ALL SHIPPING COSTS SHALL BE PAID BY CUSTOMER.

THIS WARRANTY EXTENDS ONLY TO THE ORIGINAL PURCHASER AND IS NOT ASSIGNABLE OR TRANSFERABLE.

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(801) 975-7200  
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# PROGRAM SWITCHERS

## 2.0 GENERAL DESCRIPTION

The PROGRAM SWITCHERS are passive routing devices that use magnetically latching relays for ultimate reliability. The 10A selects 10 stereo inputs to a stereo output; the 20A selects 20 mono inputs to a mono output.

Since the PROGRAM SWITCHERS passively route signals, any type of signal source can be switched; audio, telephone, digital, and control signals can be easily routed.

Internally, the use of magnetically latching relays means that the relay coils are energized only during the actual switching process. This makes the PROGRAM SWITCHER insensitive to power line fluctuations.

The inputs which are not selected may either be left floating or terminated to an internal 600 ohm load.

## 2.1 FRONT PANEL DESCRIPTION

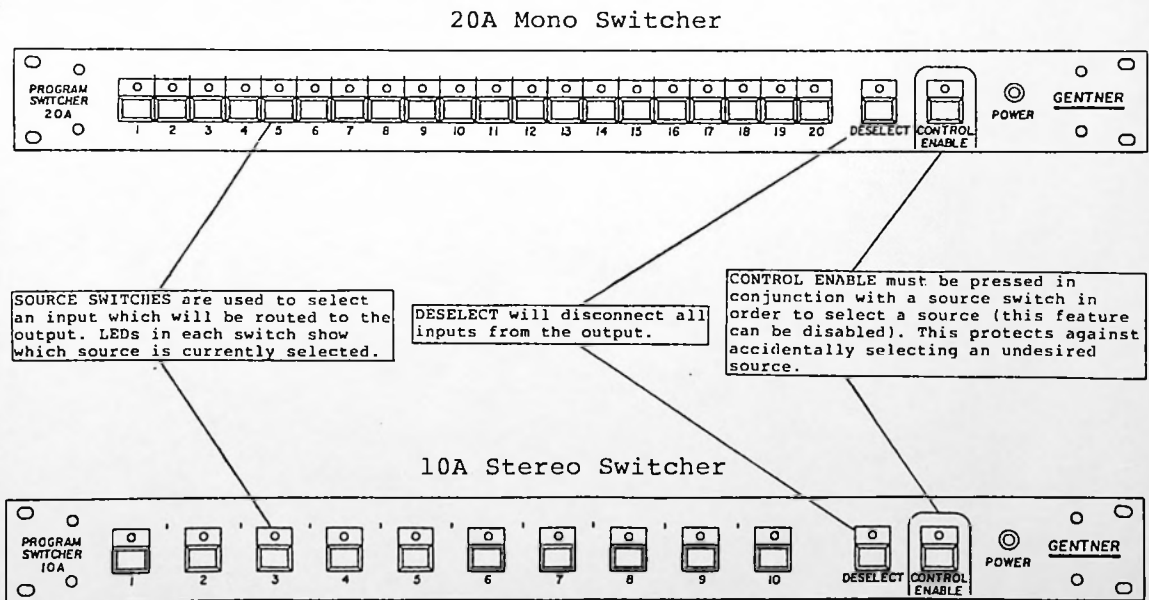


Diagram 1 - Front Panels

## PROGRAM SWITCHERS

### 2.2 REAR PANEL DESCRIPTION

The rear panel contains all the input, output and remote control interfacing connector. Signal inputs and outputs are routed through the SIGNAL connector. Remote control of the Program Switcher is accomplished through the REMOTE connector. The AUXILIARY connector provides an alternative point for signal output and some of the remote functions (this connector is usually used when several Program Switchers are used in a Matrix Switcher configuration).

Refer to section 3.3 for the pinouts of these connectors.

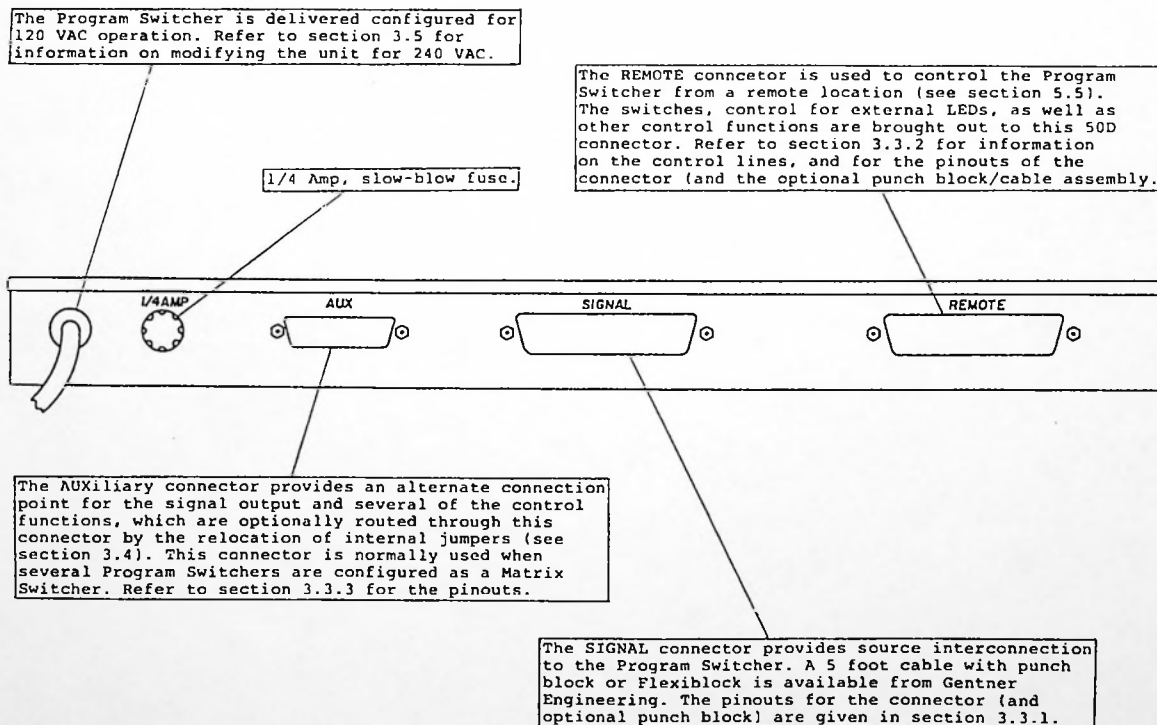


Diagram 2 - Rear Panel

## PROGRAM SWITCHERS

### 2.3 FUNCTIONAL DESCRIPTION - FRONT PANEL CONTROLS

#### SOURCE SWITCHES:

Each switch represents an input to be routed to the switcher's output. The switches are highly reliable ITT Schadow(r) switches, which will give the user years of dependable service. Each switch has an LED indicator which will illuminate when that particular source is routed to the output. When a source is selected, the previous source will be deselected.

#### CONTROL ENABLE SWITCH:

This switch must be depressed and held to enable selection of the source switches. This switch is provided to protect against accidental switching of the sources; however, it can be bypassed if desired.

#### DESELECT SWITCH:

This switch, when pressed in conjunction with the CONTROL ENABLE switch, deselects the switcher - no sources will be routed to the output.

### 2.4 FUNCTIONAL DESCRIPTION - REAR PANEL CONNECTIONS

#### POWER CORD:

Connects to 120 VAC. The unit may be modified for operation with 240 VAC if desired (see section 3.6).

#### FUSE:

A 1/4 Amp, slow-blow fuse is used in the Program Switcher.

#### SIGNAL CONNECTOR:

A female 50D connector attaches here to provide connection of signal (audio) sources. A mating connector, five foot cord and punch block (or Flexiblock) are available from Gentner Engineering. Pinouts are listed in section 3.3.1.

## PROGRAM SWITCHERS

### REMOTE CONNECTOR:

A male 50D connector attaches here to provide connection to equipment which will remotely control the switcher. A punch block (or Flexiblock) with a five foot cable and mating connector is available from Gentner Engineering. Pinouts are listed in section 3.3.2.

### AUXILIARY CONNECTOR:

The male DB-25 connector attaches to the AUXiliary connector to provide alternate connection points for the signal output and several of the control functions, which are optionally routed through this connector by the relocation of several internal jumpers. This connector is normally used when several Program Switchers are configured as a Matrix Switcher. Pinouts are listed in section 3.3.3.

## PROGRAM SWITCHERS

### 3.0 INSTALLATION

The Gentner Engineering PROGRAM SWITCHERS are very simple to install. The signal inputs, outputs and control lines are connected via a punch block (or Flexiblock) cable, available from Gentner Engineering. Several options can be selected during installation by the placement of internal jumpers.

Installation of the Program Switcher consists of five steps:

1. Inspect the unit.
2. Set the jumper options.
3. Mount the unit in the rack.
4. Connect your equipment to the PROGRAM SWITCHER.
5. Label and apply the designation strip.

#### 3.1.1 STEP 1: INSPECTION

Please examine your PROGRAM SWITCHER carefully for any damage that may have been sustained during shipping; if any is noted, please notify the shipper immediately. Retain the packaging for inspection by the shipper.

The package should contain the PROGRAM SWITCHER, this manual, a warranty card, a designation strip kit, and a set of four rack mount screws and washers. Please notify GENTNER ENGINEERING COMPANY, INC. at (801) 268-1117 if any of these items are missing.

#### 3.1.2 STEP 2: JUMPER OPTIONS

The jumper options greatly affect the operational characteristics of your PROGRAM SWITCHER. Refer to section 3.4 for complete information.

#### 3.1.3 STEP 3: MOUNTING

Mount the unit in a rack, being sure to allow adequate airflow for cooling.

#### 3.1.4 STEP 4: CONNECT YOUR EQUIPMENT

The PROGRAM SWITCHER interfaces to your equipment (sources, loads and remote control) through the rear panel connectors. Optional punch block (or Flexiblock) /cable accessories are available from Gentner Engineering. Section 3.3 lists the pinouts of these connectors and the optional punch block assemblies.

## PROGRAM SWITCHERS

### 3.1.5 STEP 5: DESIGNATION STRIP

The designation strip kit for the unit consists of two parts; a sheet of adhesive paper strips, and a sheet of clear adhesive strips.

Type or write the source descriptions on the top adhesive paper strip. Remove the strip from the sheet, peel off the backing paper, and apply the adhesive paper to the front panel of the PROGRAM SWITCHER just above the switches.

Remove a single strip from the sheet of clear tape, sticking it on top of the paper strip applied as described above. This will prevent the labels on the paper strip from becoming smudged or smeared.

Apply AC power to the unit. Your PROGRAM SWITCHER should now be fully functional.

### 3.2 INTERFACE CONNECTORS

All interfacing with the PROGRAM SWITCHER is made through the three connectors on the rear panel.

The SIGNAL connector interfaces all signals to be switched by the unit, and is a male 50D connector. A punch block (or Flexiblock) with cable and mating connector attaches to this connector. This assembly is available from Gentner Engineering. After plugging in the punch block connector, fasten it securely to the rear of the PROGRAM SWITCHER with the Velcro straps. All interconnections to your equipment are then made through the Punch block. Refer to section 3.3.1 for the pinouts of both the connector and Punch block.

The REMOTE connector permits remote control of the unit, and is a female 50D connector. An optional mating connector with a five foot cable to a punch block (or Flexiblock) is available from Gentner Engineering Company, Inc. This connector is also securely fastened with Velcro straps. All remote control functions are then provided through this Punch block; refer to section 3.3.2 for the pinouts of both the connector and Punch block.

AUXILIARY functions are available through the "AUX" DB-25 female connector. These consist of the signal output and several of the remote control functions, which are optionally routed through this connector by the relocation of several internal jumpers. Pinouts are listed in section 3.3.3.

PROGRAM SWITCHERS

BLU  
GR  
GE  
BR  
SL

TRACE  
WH  
RED  
BLA  
YEL  
VID

3.3 INTERFACE CONNECTOR PINOUTS

3.3.1 SIGNAL CONNECTOR - PUNCH BLOCK

The SIGNAL connector provides the input and output connections for the signals being switched. A cable/punch block assembly connects to this connector. The following list contains the punch block (or Flexiblock), as well as the rear panel, connections for the SIGNAL connector.

SIGNAL CONNECTOR

| AUDIO SOURCE |        | CONNECTION          |     |                            |     |    |
|--------------|--------|---------------------|-----|----------------------------|-----|----|
| STEREO       | MONO   | REAR PANEL<br>Pin # |     | PUNCH BLOCK<br>Connector # |     |    |
|              |        |                     | +   | -                          | +   | -  |
| 1L           | 1      | WH BLU              | 26, | 1 BLU WH                   | 1,  | 2  |
| 1R           | 2      | WH OR               | 27, | 2 OR WH                    | 3,  | 4  |
| 2L           | 3      | WH GR               | 28, | 3 GR WH                    | 5,  | 6  |
| 2R           | 4      | WH BR               | 29, | 4 BR WH                    | 7,  | 8  |
| 3L           | 5      | WH SL               | 30, | 5 SL WH                    | 9,  | 10 |
| 3R           | 6      | ✓ RED BLU           | 31, | 6 BLU RED                  | 11, | 12 |
| 4L           | 7      | ✓ RED GR            | 32, | 7 GR RED                   | 13, | 14 |
| 4R           | 8      | ✓ RED OR            | 33, | 8 OR RED                   | 15, | 16 |
| 5L           | 9      | ✓ RED BR            | 34, | 9 BR RED                   | 17, | 18 |
| 5R           | 10     | ✓ RED SL            | 35, | 10 SL RED                  | 19, | 20 |
| 6L           | 11     | ✓ BLA BLU           | 36, | 11 BLU BLA                 | 21, | 22 |
| 6R           | 12     | ✓ BLA OR            | 37, | 12 OR BLA                  | 23, | 24 |
| 7L           | 13     | ✓ BLA GR            | 38, | 13 GR BLA                  | 25, | 26 |
| 7R           | 14     | ✓ BLA BR            | 39, | 14 BR BLA                  | 27, | 28 |
| 8L           | 15     | ✓ BLA SL            | 40, | 15 SL BLA                  | 29, | 30 |
| 8R           | 16     | ✓ YEL BLU           | 41, | 16 BLU YEL                 | 31, | 32 |
| 9L           | 17     | ✓ YEL OR            | 42, | 17 OR YEL                  | 33, | 34 |
| 9R           | 18     | ✓ YEL GR            | 43, | 18 GR YEL                  | 35, | 36 |
| 10L          | 19     | ✓ YEL BR            | 44, | 19 BR YEL                  | 37, | 38 |
| 10R          | 20     | ✓ YEL SL            | 45, | 20 SL YEL                  | 39, | 40 |
| L OUT        | OUT    | VID BLU             | 46, | 21 BLU VID                 | 41, | 42 |
| R OUT        | OUT    | VID OR              | 47, | 22 OR VID                  | 43, | 44 |
| Ground       | Ground | VID BR              | 24, | 25 BR VID                  | 47, | 48 |
|              |        | VID SL              | 49, | 50 SL VID                  | 49, | 50 |

## PROGRAM SWITCHERS

### 3.3.2 REMOTE CONNECTOR - PUNCH BLOCK

The following list provides the punch block (or Flexiblock) and rear panel Remote connector pinouts. The front panel switches, indicator (report back) LEDs, and several internal control lines are brought out to the rear panel for remote control of the Program Switcher. A Punch Block or Flexiblock assembly is available from Gentner Engineering for this connector.

#### SWITCHES

The front panel switches are brought out through the rear panel REMOTE connector, providing a means of controlling the Program Switcher from a remote point. This feature is also used when several Program Switchers are used in a Matrix Switcher.

#### REPORT BACK

The controlling signals for the front panel indicator LEDs are brought out through the REMOTE connector as individual open collectors, and can be used for a Report Back to a remote control point of which source is selected. The Report Back output for the selected output will go low, providing a return for an LED indicator, and can be used as illustrated in section 5.5.1.

#### CONTROL ENABLE

The front panel "Control Enable" switch is brought out to the Remote connector, and its use is the same as that of the front panel switch. The "Control Enable" line must be pulled low in order to select a new source.

#### STROBE LINE

This line provides an indication that a source selection has been performed either from the front panel or via the REMOTE connector. The output is an open-collector which goes low to indicate a new source being selected. This low output can be used for external control of a timer start, tape start, etc.

#### DESELECT BUSS

The Deselect Buss is both an input and an output. When used as an input, it has the same function as the Deselect line in that, when it is pulled low, it will deselect all inputs in the Program Switcher. However, being an output as well, when any channel on the Program Switcher is pulled low, the deselect buss will go low.



## PROGRAM SWITCHERS

This feature is generally used in a matrix switcher arrangement where only one Program Switcher at a time is to be active. In the matrix switcher, the deselect buss of all the Program Switchers should be tied together; when any new source is selected anywhere in the matrix, the deselect buss of that Switcher will go low, pulling all other deselect buss lines low as well and thereby deselecting the previously active path, wherever it may have been in the matrix.

### DESELECT

The DESELECT switch on the front panel is brought out through the Remote connector; its use is the same as with the front panel switch. When the Deselect line is pulled low, all the relays in the Program Switcher will be deselected, resulting in no sources being connected to the output. The "Control Enable" button does not need to be pressed when deselecting through the rear panel.

### DISPLAY ENABLE

The indicator lamps in the front panel are normally enabled directly from within the Program Switcher. They can be externally enabled by grounding the Display Enable pin. This input line will only function if External Enable has been selected with jumper option 4 (section 3.4.4).

### REPORT BACK ENABLE

This input, which is normally only used in a matrix switcher, controls whether the report backs are being enabled or disabled.

### +5 VDC PULLUP

The Program Switcher provides +5 VDC through a 180 ohm resistor, at a maximum current drain of 28 mA, through its REMOTE connector. This 5 volt output can be used in conjunction with the Report Back to light external LEDs. This can be accomplished by tying the anodes of the LEDs to the +5VDC pullup, and tying the individual cathodes to the report back pins.

PROGRAM SWITCHERS

REMOTE CONNECTOR

| FUNCTION |          | CONNECTION          |                      |
|----------|----------|---------------------|----------------------|
| STEREO   | MONO     | REAR PANEL<br>Pin # | PUNCH BLOCK<br>Pin # |
| 1        | Switches | <i>w/d</i> 26       | 1                    |
|          |          | 1                   | 2                    |
| 2        |          | <i>w/d</i> 27       | 3                    |
|          |          | 2                   | 4                    |
| 3        |          | <i>w/s</i> 28       | 5                    |
|          |          | 3                   | 6                    |
| 4        |          | <i>w/d</i> 29       | 7                    |
|          |          | 4                   | 8                    |
| 5        |          | <i>w/s</i> 30       | 9                    |
|          |          | 5                   | 10                   |
| 6        |          | <i>R/B</i> 31       | 11                   |
|          |          | 6                   | 12                   |
| 7        |          | <i>R/</i> 32        | 13                   |
|          |          | 7                   | 14                   |
| 8        |          | 33                  | 15                   |
|          |          | 8                   | 16                   |
| 9        |          | 34                  | 17                   |
|          |          | 9                   | 18                   |
| 10       |          | 35                  | 19                   |
|          |          | 10                  | 20                   |
|          | Ground   | 36                  | 21                   |
|          | Ground   | 11                  | 22                   |

<continued>

## PROGRAM SWITCHERS

REMOTE CONNECTOR

| FUNCTION |                | CONNECTION          |                      |
|----------|----------------|---------------------|----------------------|
| STEREO   | MONO           | REAR PANEL<br>Pin # | PUNCH BLOCK<br>Pin # |
| 1        | Report Back    | 37                  | 23                   |
|          |                | 12                  | 24                   |
| 2        |                | 38                  | 25                   |
|          |                | 13                  | 26                   |
| 3        |                | 39                  | 27                   |
|          |                | 14                  | 28                   |
| 4        |                | 40                  | 29                   |
|          |                | 15                  | 30                   |
| 5        |                | 41                  | 31                   |
|          |                | 16                  | 32                   |
| 6        |                | 42                  | 33                   |
|          |                | 17                  | 34                   |
| 7        |                | 43                  | 35                   |
|          |                | 18                  | 36                   |
| 8        |                | 44                  | 37                   |
|          |                | 19                  | 38                   |
| 9        |                | 45                  | 39                   |
|          |                | 20                  | 40                   |
| 10       |                | 46                  | 41                   |
|          |                | 21                  | 42                   |
|          | Control Enable | 47                  | 43                   |
|          | Strobe line    | 22                  | 44                   |
|          | Deselect Buss  | 48                  | 45                   |
|          | Deselect       | 23                  | 46                   |
|          | LED common     | 49                  | 47                   |
|          | Display Enable | 24                  | 48                   |
|          | +5 VDC pullup  | 50                  | 49                   |
|          | +5 VDC pullup  | 25                  | 50                   |

Note that the last 8 connections listed above can optionally be routed through the AUXiliary connector (both connectors can also be active simultaneously) by the placement of internal jumpers as described in section 3.4.

## PROGRAM SWITCHERS

### 3.3.3 AUXILIARY CONNECTOR

The 25 pin AUXILIARY connector provides an alternate access to the audio outputs (normally on the SIGNAL connector), and several of the control functions (normally on the REMOTE connector). Refer to the previous section for an explanation of the functions available. The following list provides the pin numbers for this DB-25 connector.

Note that all of these lines are normally routed through either the SIGNAL or REMOTE connectors (the defaults are shown below in parenthesis), and are rerouted through this connector by the relocation of internal jumpers as described in section 3.4.

#### AUXILIARY CONNECTOR

| <u>FUNCTION</u>                 | <u>DB-25 AUX. CONNECTOR PIN #</u> |
|---------------------------------|-----------------------------------|
| Audio Out Left + (signal)       | 1                                 |
| Audio Out Left - (signal)       | 14                                |
| N/C                             | 2                                 |
| N/C                             | 15                                |
| Audio Out Right + (signal)      | 3                                 |
| Audio Out Right - (signal)      | 16                                |
| N/C                             | 4                                 |
| N/C                             | 17                                |
| Control Enable (remote)         | 5                                 |
| Strobe line (remote)            | 18                                |
| Deselct Buss (remote)           | 6                                 |
| Deselect (remote)               | 19                                |
| Report back LED Common (remote) | 7                                 |
| Output Enable (remote)          | 20                                |
| +5 VDC pullup (remote)          | 8                                 |
| +5 VDC pullup (remote)          | 21                                |
| N/C                             | 9                                 |
| N/C                             | 22                                |
| N/C                             | 10                                |
| N/C                             | 23                                |
| N/C                             | 11                                |
| Ground                          | 24                                |
| Ground                          | 12                                |
| Ground                          | 25                                |
| Ground                          | 13                                |

# PROGRAM SWITCHERS

## 3.4 JUMPER OPTIONS

The Program Switchers have several options which allow you to tailor the Program Switcher to your specific needs.

The options are set by internal jumpers on the main printed circuit board; their functions are explained in the following sections. The jumper options which select either the REMOTE or AUX connectors can have a jumper in BOTH positions, resulting in that line being routed through both connectors simultaneously.

The locations of these jumpers are illustrated on Diagram 3 below, and are labelled JOx (x corresponds to the option number). Note that the two positions of the jumpers are labelled A and B, and that JO4 and JO9 have "Top" and "Bottom" halves as well (the "top" half is closest to the rear panel of the Switcher). Jumpers on the Diagram are illustrated in the positions in which they are shipped from the factory.

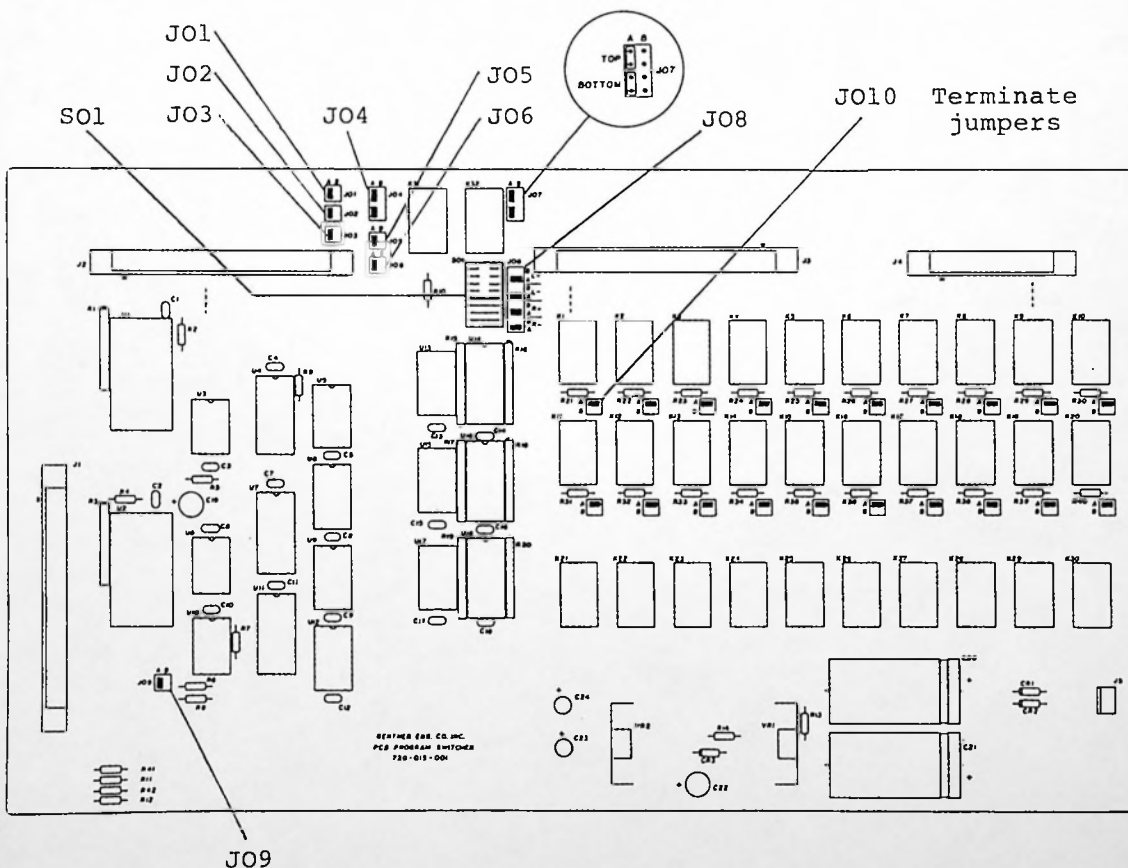


Diagram 3 - Jumper Placement

## PROGRAM SWITCHERS

### 3.4.1 JUMPER OPTION 1: CONTROL ENABLE

The Control Enable function can be remotely actuated through the rear panel. The "Control Enable" line must be pulled low in order to select a new source. This option selects through which connector on the rear panel the external control enable function will be provided.

Position A, the Remote connector, is the default position. To change the input to the Auxiliary connector, move the jumper to the position B. This input can be provided through both connectors simultaneously by having jumpers in both the A and B positions.

### 3.4.2 JUMPER OPTION 2: DESELECT

The DESELECT function of the front panel switch is also provided through either the Remote or Auxiliary connector. This option selects through which connector on the rear panel the deselect function will be provided.

Position A, the Remote connector, is the default position. To change the input to the Auxiliary connector, move the jumper to the position B. This input can be provided through both connectors simultaneously by having jumpers in both the A and B positions.

### 3.4.3 JUMPER OPTION 3: DESELECT BUSS

The Deselect Buss line is both an input and an output, and is generally used in a Matrix Switcher in which these lines on all the Program Switchers are tied together. When a source is selected on one Program Switcher, this line goes low, pulling it low on all the other Switchers, and thus deselecting the previously selected source in the matrix. This option selects through which connector on the rear panel the deselect buss function will be provided.

Position A, the Remote connector, is the default position. To change this function to the Auxiliary connector, move the jumper to the position B. The deselect bus can be provided through both connectors simultaneously by having jumpers in both the A and B positions.

## PROGRAM SWITCHERS

### 3.4.4 JUMPER OPTION 4: LAMP CONTROL

The indicator lamps in the front panel are normally enabled directly from within the Program Switcher. They can be externally enabled through the DISPLAY ENABLE inputs on either the Remote or Auxiliary connectors by providing a ground to the DISPLAY ENABLE pin on which ever connector has been selected for this function (see below).

This jumper option consists of two parts: the first selects internal or external control of the LEDs, and the second selects which connector is used as the input for this function.

Internal or external DISPLAY ENABLE of the front panel is selected with the "Bottom" half of the jumper. The unit is delivered configured for INTERNAL control of the LEDs, with the jumper in the A position; to select External Control, place this jumper in the B position.

If external control has been selected with the "Bottom" half of this option, the connector through which this is controlled is selected with the "Top" half of J04. Position A, the Remote connector, is the default position. To change the input to the Auxiliary connector, move the jumper to the position B. This input can be provided through both connectors simultaneously by having jumpers in both the A and B positions.

### 3.4.5 JUMPER OPTION 5: +5 VDC OUTPUT

The +5 VDC (28 mA maximum) source is available through the Remote or Auxiliary connectors; Position A, the Remote connector, is the default position. To change the input to the Auxiliary connector, move the jumper to the position B. This input can be provided through both connectors simultaneously by having jumpers in both the A and B positions.

### 3.4.6 JUMPER OPTION 6: STROBE

The Strobe output provides a low when a source selection is performed.

This output is available through the Remote or Auxiliary connectors on the rear panel. Position A, the Remote connector, is the default position. To change the input to the Auxiliary connector, move the jumper to the position B. This input can be provided through both connectors simultaneously by having jumpers in both the A and B positions.

## PROGRAM SWITCHERS

### 3.4.7 JUMPER OPTION 7: REPORT BACK ENABLE

This jumper option has two parts: the "bottom" section, closest to the front panel, selects whether the Report Back is internally or externally enabled, while the "top" section selects the connector through which external Report Back Enable is accepted.

The Program Switcher is delivered with Internal Report Back selected, with the "bottom" section of J07 having the jumper in the A position. To change this to external Report Back, place this jumper in the B position.

If External Report Back has been selected with the "Bottom" half of this option, the connector through which this is controlled is selected with the "top" half of J04. Position A, the Remote connector, is the default position. To change the input to the Auxiliary connector, move the jumper to the position B. This input can be provided through both connectors simultaneously by having jumpers in both the A and B positions.

### 3.4.8 JUMPER OPTION 8: SWITCHER OUTPUT

The output signal of the Program Switcher is normally routed through the Signal connector on the rear panel. When the Program Switchers are used in a Matrix Switcher, the Signal connectors are daisy-chained together, making it impossible to gain access to the selected output of each individual Program Switcher. In this application, the outputs of the individual Program Switchers can be routed through the AUXILIARY connectors.

Thus, jumper option 8 selects either the SIGNAL or AUXILIARY connects for the output signal; the SIGNAL connector (position A) is the default. This option consists of four parts: one for each of the four wires in the Stereo Switcher. These are Left channel + and -, and Right channel + and -. Each wire may be outputted to either the Signal (position A) or Auxiliary (position B) connector.

To have an output line go through the Auxiliary connector, place the jumper for that line in the B position. For example, to have the Left - line go to the Auxiliary connector, move the jumper on L- from the A to the B position. If all lines are to go to the Auxiliary connector, place all four jumpers in the B position.



## PROGRAM SWITCHERS

### 3.4.9 JUMPER OPTION 9: PERMANENT CONTROL ENABLE

Normally, the front panel "Control Enable" button must be pressed in conjunction with the desired source switch in order to select a new active route. This function can be disabled with internal jumper option 9 (JO9).

This option is controlled by the position of jumper 9, which is delivered in position A. To disable the requirement of having to press the Control Enable switch when selecting channels, place JO9 in the B position.

### 3.4.10 JUMPER OPTION 10: SOURCE TERMINATION

The input sources for all the channels which are not selected are terminated with a 600 ohm load (1/8 watt maximum). If you do not want this load applied across the deselected sources, it can be removed from each channel. Each channel has a separate resistor, with a jumper option for removing it from circuit, as illustrated below.



In the above example, for channel 1, relay K1 switches the signal, R21 is the load resistor, and the jumper selects whether or not the load is placed on the source when the channel is deselected. As delivered, all the channels are configured with this option enabled, with the jumpers for each channel in position A. To remove the load from a channel, place the jumper for that channel in the B position.

The relays correspond to channel numbers as listed on the next page.

## PROGRAM SWITCHERS

| Relay Number | 10A Stereo | 20A Mono |
|--------------|------------|----------|
| K1           | 1L         | 1        |
| K2           | 1R         | 2        |
| K3           | 2L         | 3        |
| K4           | 2R         | 4        |
| K5           | 3L         | 5        |
| K6           | 3R         | 6        |
| K7           | 4L         | 7        |
| K8           | 4R         | 8        |
| K9           | 5L         | 9        |
| K10          | 5R         | 10       |
| K11          | 6L         | 11       |
| K12          | 6R         | 12       |
| K13          | 7L         | 13       |
| K14          | 7R         | 14       |
| K15          | 8L         | 15       |
| K16          | 8R         | 16       |
| K17          | 9L         | 17       |
| K18          | 9R         | 18       |
| K19          | 10L        | 19       |
| K20          | 10R        | 20       |

### 3.4.11 JUMPER OPTION 11: USING A 20A AS A 10A

A 20A Mono Switcher can operate as a 10A Stereo Switcher by reversing the position of a "programmable shunt", S01. The normal position of S01 is shown in Diagram 4, with the four unbroken leads closest to the front panel. To make the 20A operate as a 10A, unplug S01, turn it around so that the unbroken leads are closest to the rear of the Program Switcher.

## PROGRAM SWITCHERS

When operating your 20A in this configuration, only every second channel selection switch on the front panel will operate. The following chart shows which channel selection on the Mono Switcher correlates with which channel number when in the Stereo Switcher Mode.

| 20A Front Panel Switch | Channel selected |
|------------------------|------------------|
| 1                      | 1                |
| 3                      | 2                |
| 5                      | 3                |
| 7                      | 4                |
| 9                      | 5                |
| 11                     | 6                |
| 13                     | 7                |
| 15                     | 8                |
| 17                     | 9                |
| 19                     | 10               |

# PROGRAM SWITCHERS

## 3.5 240 VAC OPERATION

The PROGRAM SWITCHERS can easily be modified for operation from 240 Volts. Unless otherwise specified, units are delivered configured for 120 VAC.

To modify the unit for 240 VAC, a small wiring change needs to be made to the transformer wiring. Loosen (do not remove) the four screws holding the cover to the chassis. Remove the cover, and locate the transformer. Rewire the primary (pins 1 to 4) of the transformer as illustrated below in Diagram 4.

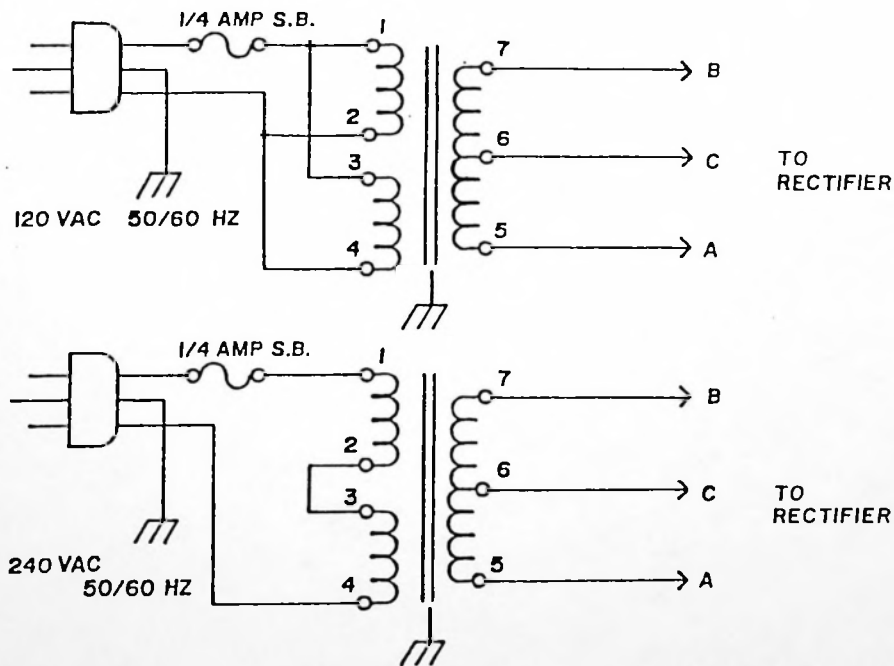


Diagram 4 - Power Selection

## PROGRAM SWITCHERS

### 4.0 OPERATION

Normal operation of the Program Switchers from the front panel is very simple.

#### SINGLE CHANNEL SELECTION

To switch from the present source to a new source, depress the CONTROL ENABLE switch and the desired source switch simultaneously.

To deselect all sources, depress the CONTROL ENABLE and DESELECT switches simultaneously.

The CONTROL ENABLE switch prevents accidental selection of channels. It can be disabled with jumper option 9, as described in section 3.4.9 of the manual.

#### MULTIPLE CHANNEL SELECTION

Multiple active channels can be can be selected by pressing the Control Enable switch while all the desired source switches simultaneously. Note that on the 10A Stereo Switcher, any combination of channels can be selected, while on the 20A Mono Switcher, any combination of either even or odd numbered channels can be selected.

## PROGRAM SWITCHERS

### 5.0 APPLICATIONS

The PROGRAM SWITCHERS can be used to route a variety of signals, including audio, telephone, digital and control signals. The Mono Switcher routes two wires through the unit, and the Stereo Switcher routes four wires.

Each source input line which is not selected is terminated with a 600 ohm load. Many applications require that these loads be removed from the circuit. Refer to section 3.4.10 for instructions on switching the loads with the individual channel jumpers.

### 5.1 AUDIO ROUTING

Your Gentner Program Switcher may be used to route virtually any audio source. Recommended levels are -20 to +20 dBm. Due to the passive nature of the switching, distortion and noise are almost non-existent.

Typical audio switching applications include selecting: Transmitter Inputs, Monitor Inputs, Audio Outputs, Taped Music Sources and Music Automation.

An example of a Source Selector for a transmitter input is shown below in Diagram 5.

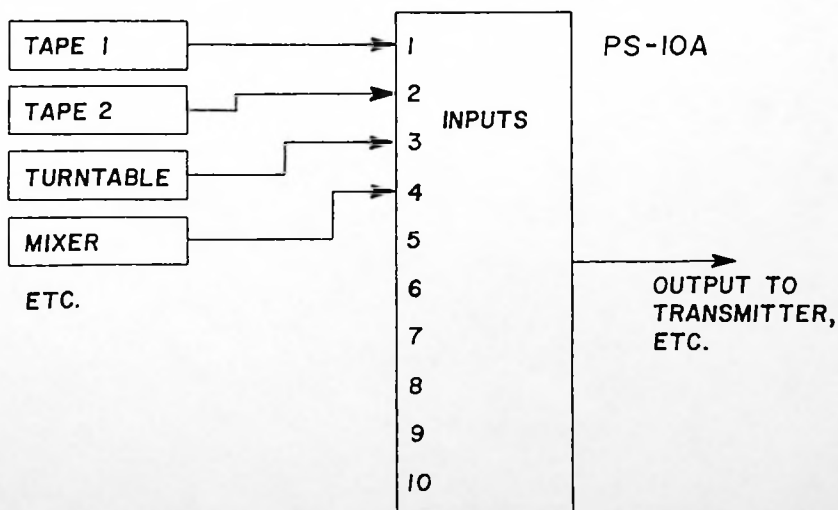


Diagram 5 - Audio Routing

## PROGRAM SWITCHERS

### 5.2 DIGITAL ROUTING

Digital signals are easily selected with a Gentner Program Switcher. Different pieces of digital equipment may be quickly and conveniently selected, eliminating the need to change cables each time a different source/destination is needed. Use your Switcher to select modems, printers and terminals.

When switching digital signals, the 600 ohm load resistors for each channel must be jumpered out of circuit. Refer to section 3.4.10 of this manual for information on this process.

If just 3-wires (transmit data, receive data and ground) are to be switched, a 20A Mono Switcher can be used to switch one common piece of equipment to 20 others. The two data lines are routed through the Program Switcher, and all the grounds are tied together. This application is shown below in Diagram 6.

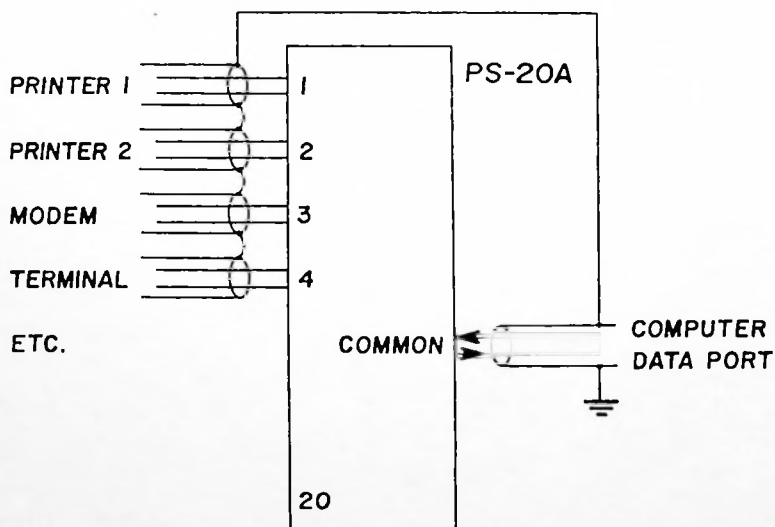


Diagram 6 - Digital Routing

If your digital communications lines also include clear-to-send (CTS) and ready-to-send (RTS), use a 10A Stereo Switcher to switch all four lines from one common piece of equipment to a maximum of 10 others. Once again, all the ground lines are tied together. In this application, the Left channel could switch the data lines, and the right channel switch the CTS/RTS lines.

## PROGRAM SWITCHERS

### 5.3 CONTROL LINE SWITCHING

This application is essentially identical to switching digital signals as described in the last section, except that DC control voltages are switched instead of data signals.

The 10A Stereo Switcher can switch 4 wires to 10 different positions; the 20A Mono Switcher can switch 2 wires to 20 positions. The maximum power switching capacity of the relays is 60 watts, and they can withstand surge voltages of 1500 V. The maximum current capacity is 2 Amps.

When switching control signals, the 600 ohm load resistors for each channel must be jumpered out of circuit. Refer to section 3.4.10 of this manual for information on this process.

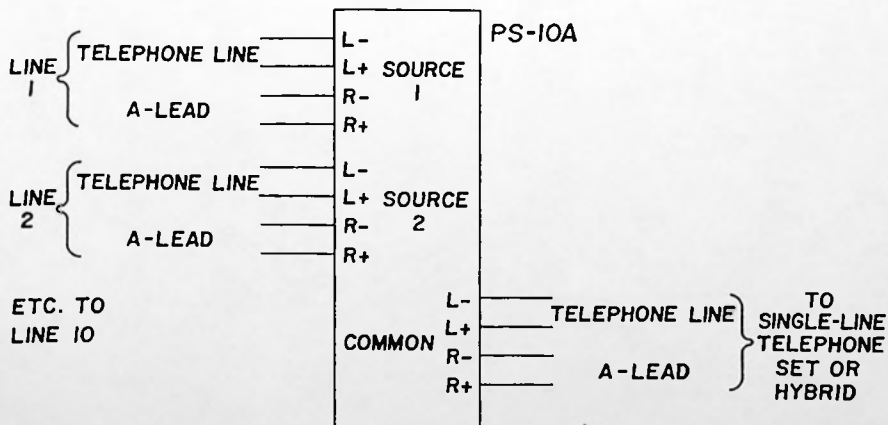
### 5.4 TELEPHONE LINE ROUTING

The 10A Stereo Switcher can be used as a call director for up to 10 telephone lines when used with a 1A2 KSU; the left channel selects the line, while the right channel controls the A-lead. This application is illustrated in Diagram 7.

If lamp report-back and hold features are desired, an LDHC (Lamp Detect/Hold Control) interface is available through your broadcast distributor.

When switching control signals, the 600 ohm load resistors for each channel must be jumpered out of circuit. Refer to section 3.4.10 of this manual for information on this process.

Other telephone routing functions include Hybrid Send/Receive selection and IFB selection.





## PROGRAM SWITCHERS

### 5.5 CONTROL THROUGH THE REMOTE CONNECTOR

The Program Switchers can be controlled from a remote location. The switches and indicator LEDs are brought out through the REMOTE connector (pinouts in section 3.2). Switches, when actuated, must provide a closure to ground. The Report Back function of the LEDs is provided through an open collector output which goes low to indicate the selected source.

#### 5.5.1 STANDARD REMOTE CONTROL

This simply amounts to electrically duplicating the front panel at a remote location. A 10A Stereo Switcher would need 10 momentary SPST switches for source selection, and 10 LEDs to indicate which source is active. A 20A Mono Switcher would need 20 of each, and is shown in the example below (diagram 8). Note that the individual switches could be replaced with a rotary switch that grounds the desired line (which would not actually be selected until the Control Enable switch is pushed).

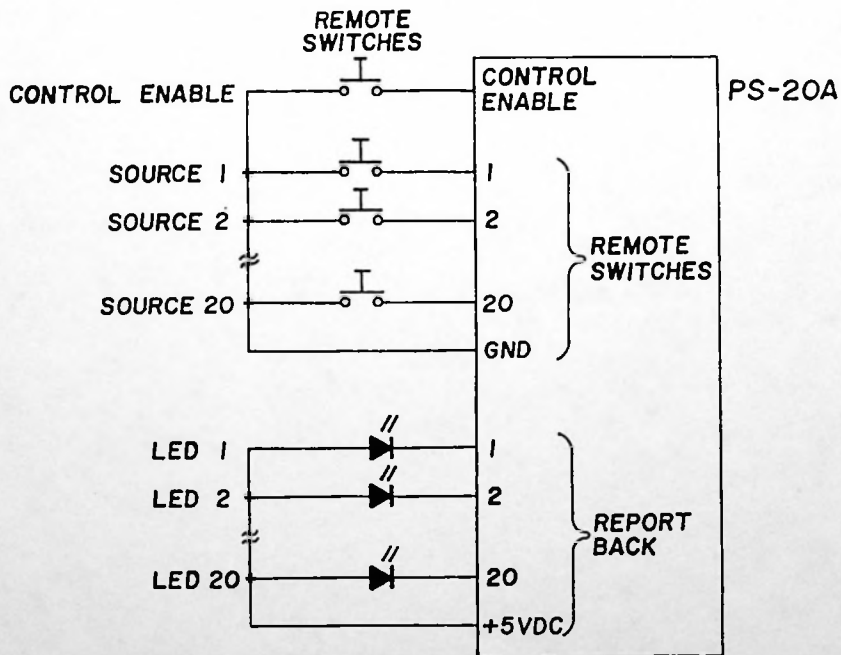


Diagram 8 - Standard Remote Control

## PROGRAM SWITCHERS

### 5.5.2 THUMBWHEEL REMOTE CONTROL

An alternate to the bank of single switches would use a BCD encoded thumbwheel switch. A block diagram of this application is shown below in diagram 9. Note that the thumbwheel switch can be rotated to the next desired position, but the Program Switcher would only switch when the Control Enable switch is pressed. The report back LEDs are the same as in section 5.5.1, although they could be replaced with a simple logic interface to control a seven-segment LED readout.

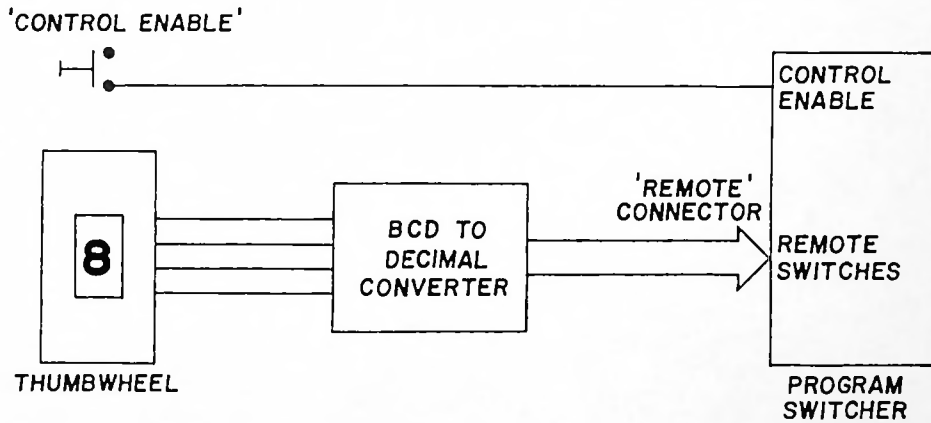


Diagram 9 - Thumbwheel Remote Control

## PROGRAM SWITCHERS

### 5.5.3 REMOTE CONTROL VIA TELEPHONE

The Gentner Program Switchers can be remotely controlled over a standard dial-up telephone line. This application requires the use of a Gentner Engineering TC-100 automatic telephone coupler with the optional Touch-Tone decoder.

The TC-100 automatically answers the telephone line when it rings. The Touch-Tone decoder provides a separate closure to ground for each of the 16 standard tones. Each output line is connected to a channel selection input on the Program Switcher via the rear panel Remote connector.

In Diagram 10, the common output of the Program Switcher is tied to the "Send" input of the TC-100, permitting the selected audio to be monitored over the telephone. The TC-100 input can be set to bridge the audio if it is not configured as the only load.

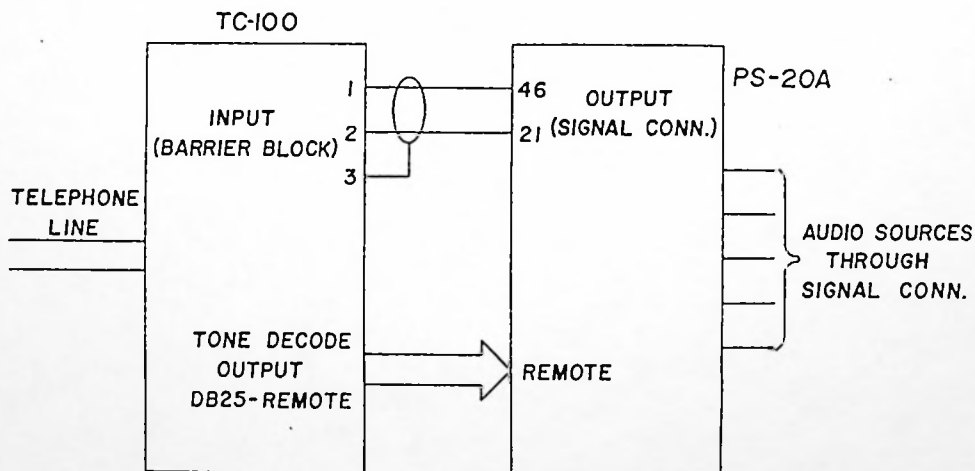


Diagram 10 - Control via Telephone line

# PROGRAM SWITCHERS

## 5.6 MATRIX SWITCHING

Multiple Program Switchers can be linked together to form a Matrix Switcher. This is accomplished by routing the outputs through the Auxiliary connector (see section 3.4.8), and paralleling the Signal connectors with a ribbon cable (available from Gentner Engineering). The example below in diagram 11 shows a matrix of four Program Switchers; if 20A Switchers are used, a 20 x 4 Mono Matrix Switcher would be created, and if 10A Switchers are used, a 10 x 4 Stereo Matrix Switcher would be created.

More complex arrangements are possible. Contact Gentner Engineering Customer Service at (801) 268-1117 for further information.

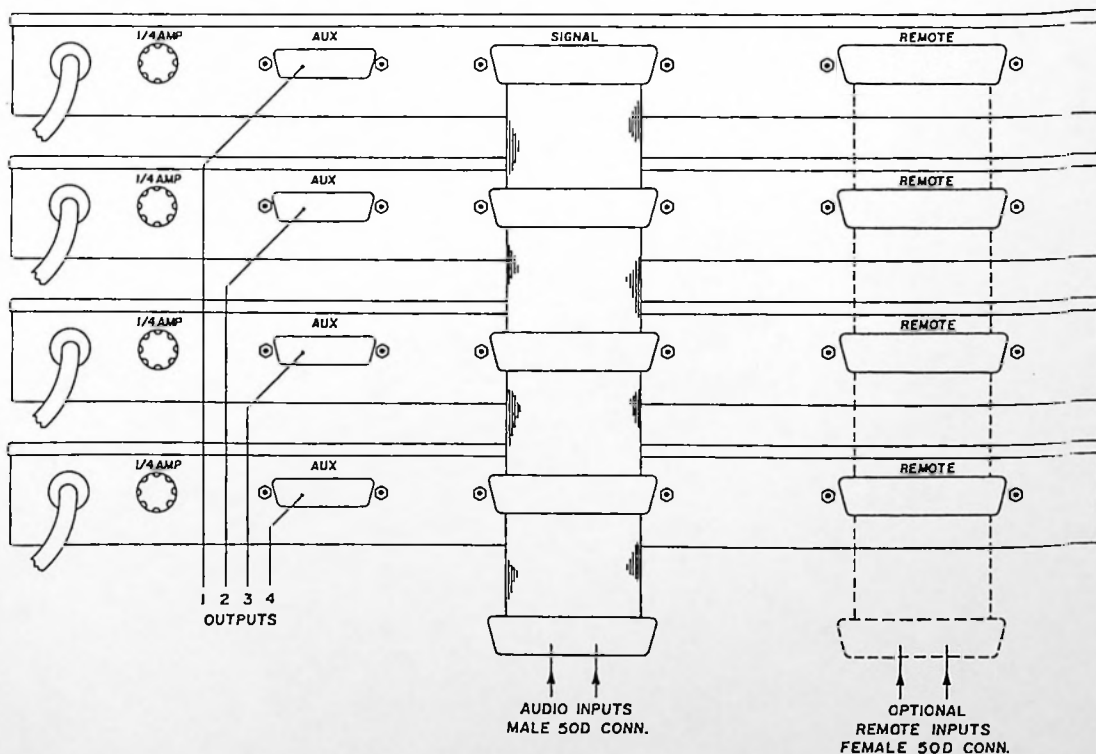


Diagram 11 - Matrix Switcher

## PROGRAM SWITCHERS

### 6.0 QUICK REFERENCE GUIDE

#### BASIC INSTALLATION

1. Set-up the desired jumper options as described in section 3.4 of the manual. These are (with their defaults):
  - 3.4.1 Control Enable - Remote connector
  - 3.4.2 Deselect - Remote connector
  - 3.4.3 Deselect Buss - Remote connector
  - 3.4.4 Lamp Control - Internal, Remote connector
  - 3.4.5 +5 VDC output - Remote connector
  - 3.4.6 Strobe - Remote connector
  - 3.4.7 Report Back - Remote connector, internal control
  - 3.4.8 Output - Signal connector
  - 3.4.9 Permanent Control Enable - not selected
  - 3.4.10 Source load - 600 ohms selected
2. Mount the unit in the desired location.
3. Connect your equipment to the Program Switcher through the rear panel connectors (punch block cable assemblies available as an option).

#### OPERATION

##### SELECTING A CHANNEL

To select a channel, press the desired channel and "Control Enable" switches simultaneously.

##### DESELECTING ALL CHANNELS

To deselect all channels, press the "Deselect" and "Control Enable" switches simultaneously.

## PROGRAM SWITCHERS

### 7.0 TECHNICAL INFORMATION

This section is provided to assist you in trouble-shooting your Program Switcher, and to provide you with a better concept of the internal operation of the unit. Diagram 12 at the end of this section provides a block diagram of the operation of the Program Switchers. The schematics are in section 7.2 of the manual.

### 7.1 TECHNICAL DESCRIPTION

A description will be given for the operation of a 10A Stereo Program Switcher. The same main circuit board is used for both the 10A and 20A. An explanation of the difference will be given in the final paragraph.

#### STEREO PROGRAM SWITCHER

Refer to schematic #2 in the following discussion.

All switching for each input is accomplished through the use of three relays, which are considered to be one cell. Relays K1, K11, & K21 constitute the first cell. K1 switches the left channel signal onto the signal buss, K11 switches the right channel signal onto the signal buss, and K21 is used for the reportback function. Notice that the set and reset coils of these three relays are paralleled together. A ground at pin 16 of any relay will put all three in to their set position, (the set position is the active position for an input cell). A ground at pin 15 of any relay will place all three into their reset (unselected) position.

There are a total of ten switching cells in the Program Switcher. Each of these cells have their outputs paralleled together on the signal buss. For example, pins 8 & 9 of relays K1, K2, K3, K4, K5, K6, K7, K8, K9, & K10 are all tied together, making the left channel signal buss. The same is also true for relays K11, K12, K13, K14, K15, K16, K17, K18, K19, & K20 which make the right channel signal buss. Pins 8 & 9 of relays K21, K22, K23, K24, K25, K26, K27, K28, K29, & K30 are also paralleled together making the reportback buss. This buss and its function will be described later.

## PROGRAM SWITCHERS

Refer to schematic #1 in the following discussion.

The heart of the logic for the Program Switcher are the two 82S103 programable logic arrays, U1 & U2. U1 generates the logic signals to drive switching cells 1-5, strobe and the deck signals. U2 generates the logic signals to drive switching cells 6-10, strobe and deck signals. The strobe and deck signals from U1 are cascaded through U2; thus the strobe and deck signals coming from U2 contain the strobe and deck signals from U1 as well.

The logic outputs of U1 & U2 connect to three 74HC373 latches, U4, U7 & U11, which are used as tri-state output drivers. The outputs of these drivers then connect directly to ULN2003 buffers which provide the current handling capability necessary to drive the set and reset coils of the switching cell relays.

The strobe signal is routed through the control & deselect logic to the output enable of all the 74HC373 drivers. When this signal goes low at the 74HC373s, the logic levels present at the input (D) is present at the output (Q). This state will remain for as long as the output enable line is held low. When the output enable goes high, the output of the 74HC373's will go tri-state.

The control and deselect circuitry consists of U10 & one gate of U12. The strobe output is brought to pin 3 of U10, pin 2 of U10 is tied to the control enable switch on the front panel. When the control enable switch is depressed, pin 2 of U10 is grounded, and the output of this gate inverts the signal present at pin 3. The signal will then go through the inverter U12F and the inverter U10C and be present at pin 12 of U10D. The NOR function of gate U10C will invert the signal once more and direct it to the output enable of the 74HC373s. The strobe signal is active low and will remain low for however long a front panel switch remains depressed. Therefore, only when the control switch is depressed will the strobe signal be routed through to the output drivers.

The deselect switch on the front panel provides a ground to U10B, which is configured as an inverter. The output of U10B ties to pin 11 of U10D; this NOR gate will invert the signal and send it on to the output enable of the output drivers. Since there are no front panel switches depressed at the time that the deselect button is depressed, all relays will be reset.

## PROGRAM SWITCHERS

Now let's trace the signal for one input cell of the Switcher. Refer to schematic #1.

When switch #1 on the front panel is depressed, a ground is applied to pin 8 of U1 through the J1 connector. With a low at pin 8, a high will be at pin 18 of U1. This signal, along with an inverted signal, are sent to the output driver U4 pins, 18 and 3, creating the set and reset signals. Remember that the output drivers are tri-state drivers that are only active when the output enable is pulled low. Therefore the control enable switch has to be depressed simultaneously, allowing the strobe signal to enable the drivers. When the strobe signal enables the drivers, pin 19 of U4 will go high and pin 2 of U4 will go low, causing the set coil to be activated through the ULN2003, which will activate switching cell #1. By inverting each output signal from the PAL and connecting it to the reset coils through the output driver, the reset function is such that when any switching cell is selected all others are deselected.

Refer to schematic #3 in the following discussion.

The front panel lamps and the external report back function as follows. A control ground is brought through the DECK relay K31 and routed to the reportback buss. When a switching cell is activated, the report back relay will route this ground from the buss to the front panel lamp through J1, turning it on. It will also route this ground to the input of a 74HC240 tri-state inverter which is connected to a ULN2003 open collector inverter. The output of ULN2003 is used for the external reportback. Since the 74HC240 is a tri-state inverter, its enable has to be brought low before a signal can pass through. This enable is brought out for external or internal control. Note that the reportback function is an open collector output that can sink 20mA and a voltage no higher than 48 VDC.

### 20A MONO SWITCHER

There are only two differences between the Stereo Program Switcher and the Mono Program Switcher: these are the front panel and the programmable socket S01. The Stereo Switcher front panel has 10 input switches, a control-enable switch, and a deselect switch. The Mono Switcher has 20 input switches, a control-enable switch, and a deselect switch. In the Stereo Switcher, the programmable dip is placed in S01 with the four broken buss bars to the bottom of the socket (closest to the rear panel). In the Mono Switcher, the programmable dip is placed in S01 with the broken buss bars to the top.



## PROGRAM SWITCHERS

The difference in the way that signals are routed to the output is made via the DECK relay K32 and the programmable socket S01. Refer to the lower right hand corner of schematic #3. In this schematic, S01 is shown as programmed for the Stereo Switcher. Notice that the right and left signal busses are routed through the top four pins of S01 to the output. When the programmable socket S01 is rotated such that the bottom four pins are bussed through to the output, the signal busses are first routed through the DECK relay K32 then to S01, and that the left and right signal busses are shorted together at S01, creating one output.

When switch #1 is depressed, the Switcher will operate identically to the Stereo Switcher. Switching cell #1 will be activated and the signal will be routed to the signal busses. Note that the DECK relay K32 will also be set; this will route the signal on the left channel buss to the output and leave the right channel buss deselected. When switch #2 is depressed, switching cell #1 will be selected again but the DECK relay K32 will be reset, now routing the right channel signal buss to the output. This operation is the same for all switching cells with the left channel corresponding to all the odd input switches and the right channel corresponding to all the even input switches.

The reportback function operates in the same fashion using DECK relay K31 to route the ground signal to the even or the odd buss.

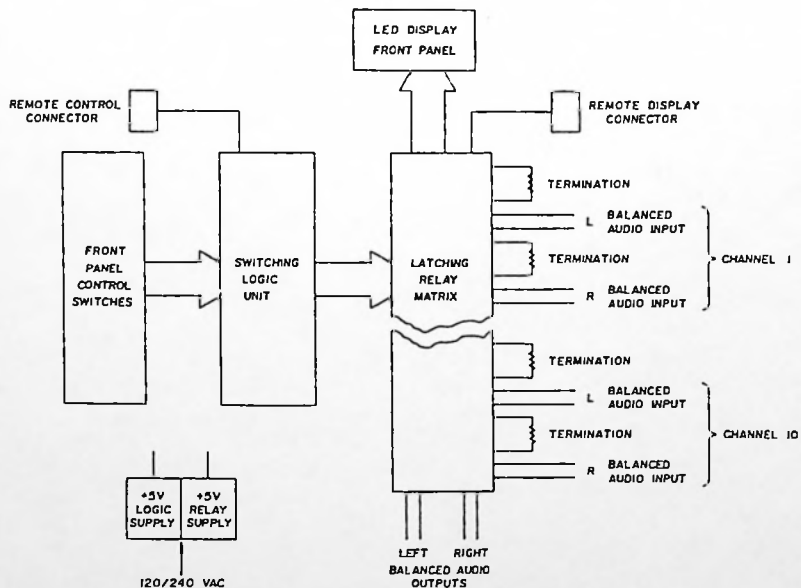


Diagram 12 - Block diagram

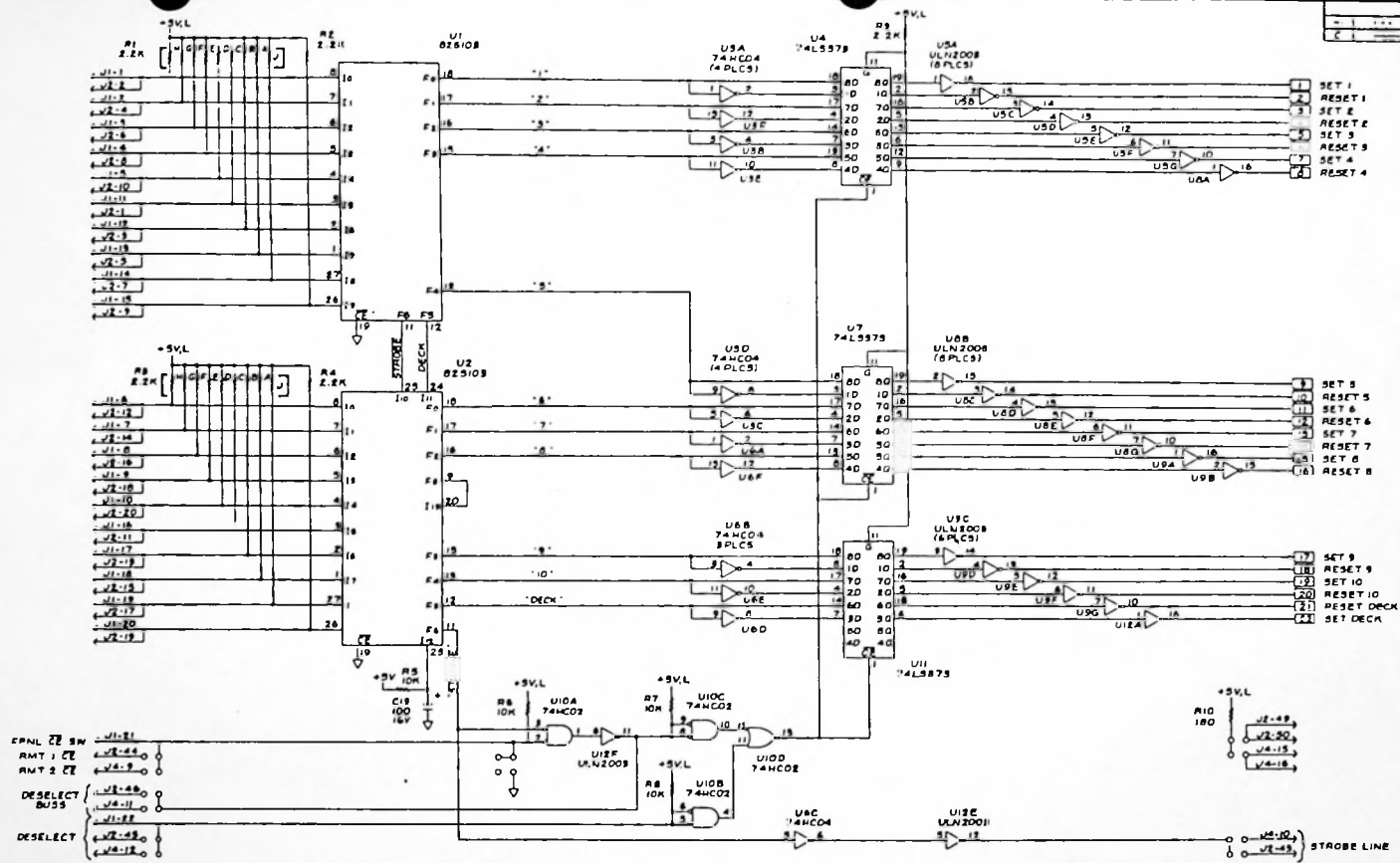
## PROGRAM SWITCHERS

### 7.2 SCHEMATICS

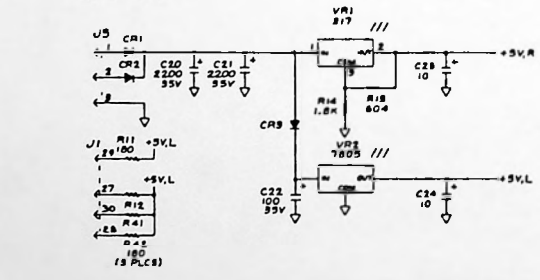
Four schematic sheets are provided. The first three have the wiring diagrams for the circuit boards, and the fourth has the interconnection information between the individual boards.

### 7.3 COMPONENT LAYOUT

Component layout is provided for the main circuit board, showing location of the jumpers.



NOTES:  
 1. UNLESS OTHERWISE SPECIFIED:  
 A. RESISTORS ARE 1/4 WATT.  
 B. RESISTANCE VALUES ARE IN OHMS, 25V.  
 C. CAPACITANCE VALUES ARE IN MICROFARA  
 D. DIODES ARE 1N4004B.  
 E. [Symbol] [Symbol] ETC INDICATES CONNECTIONS BETWEEN SHEETS OF THIS DWG.



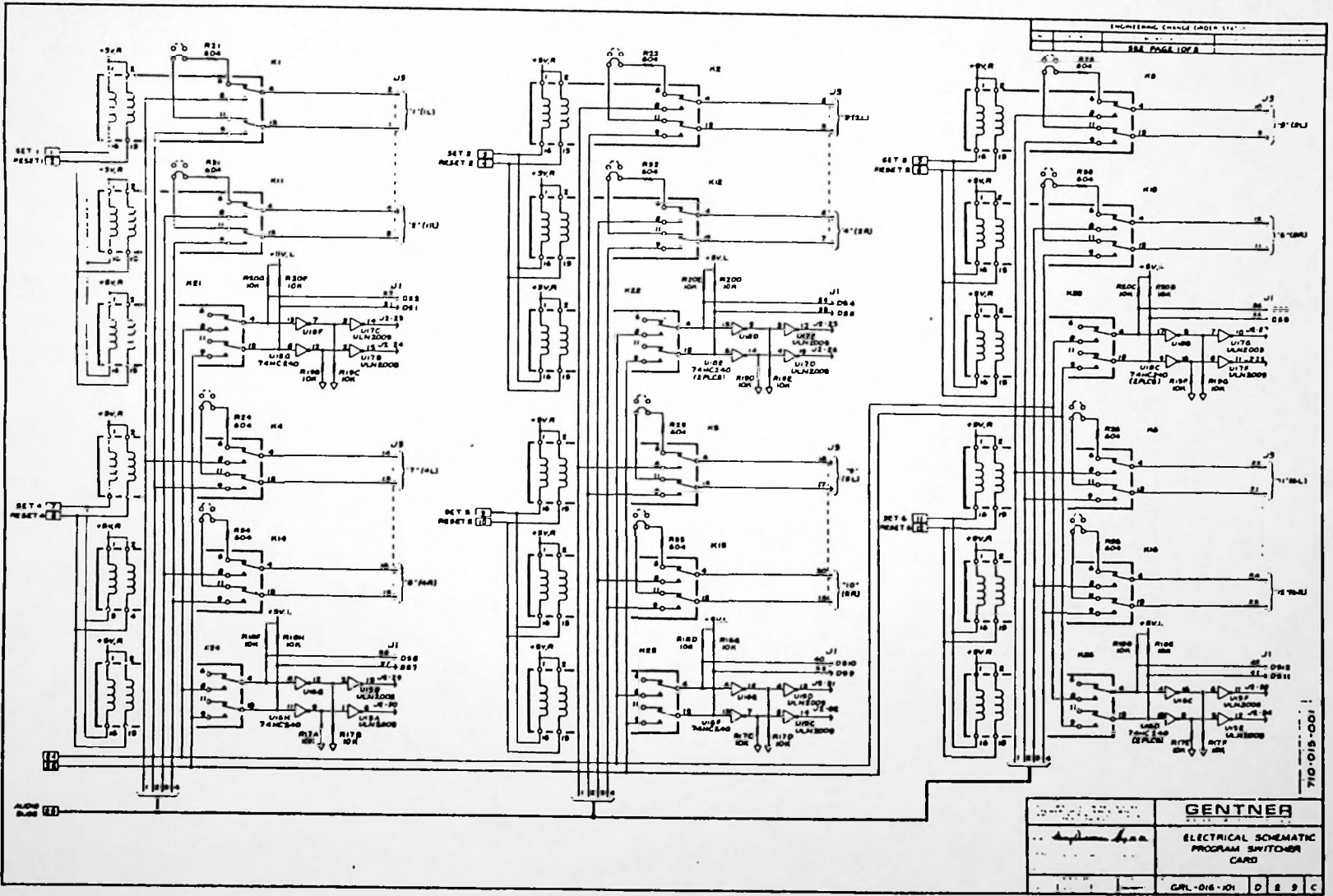
LAST NUMBER USED

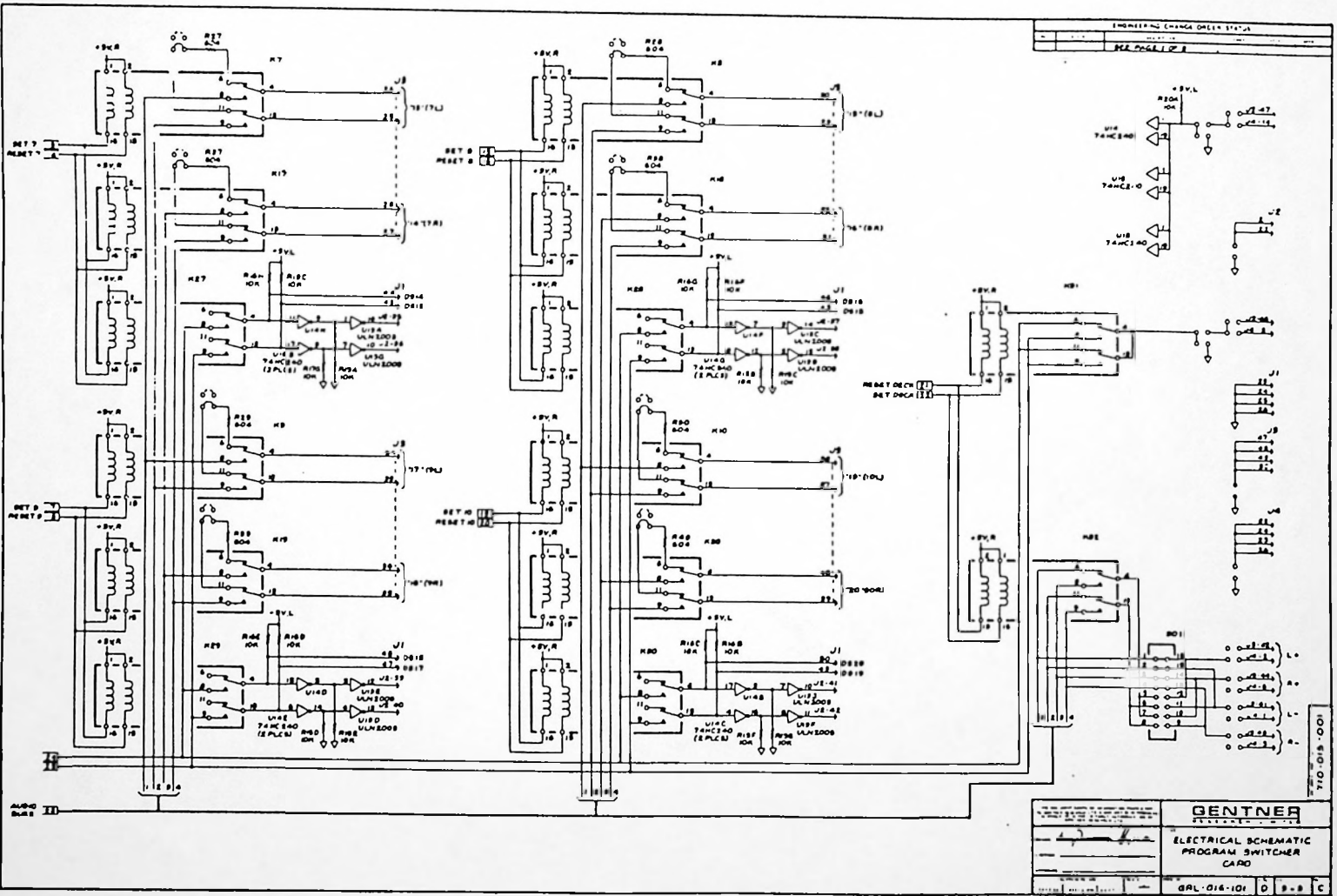
| COMPONENT | REF. | USED |
|-----------|------|------|
| RESISTOR  | R42  | ---  |
| CAPACITOR | C24  | ---  |
| RELAY     | R52  | ---  |
| T.C.      | U10  | ---  |

INTEGRATED CIRCUITS

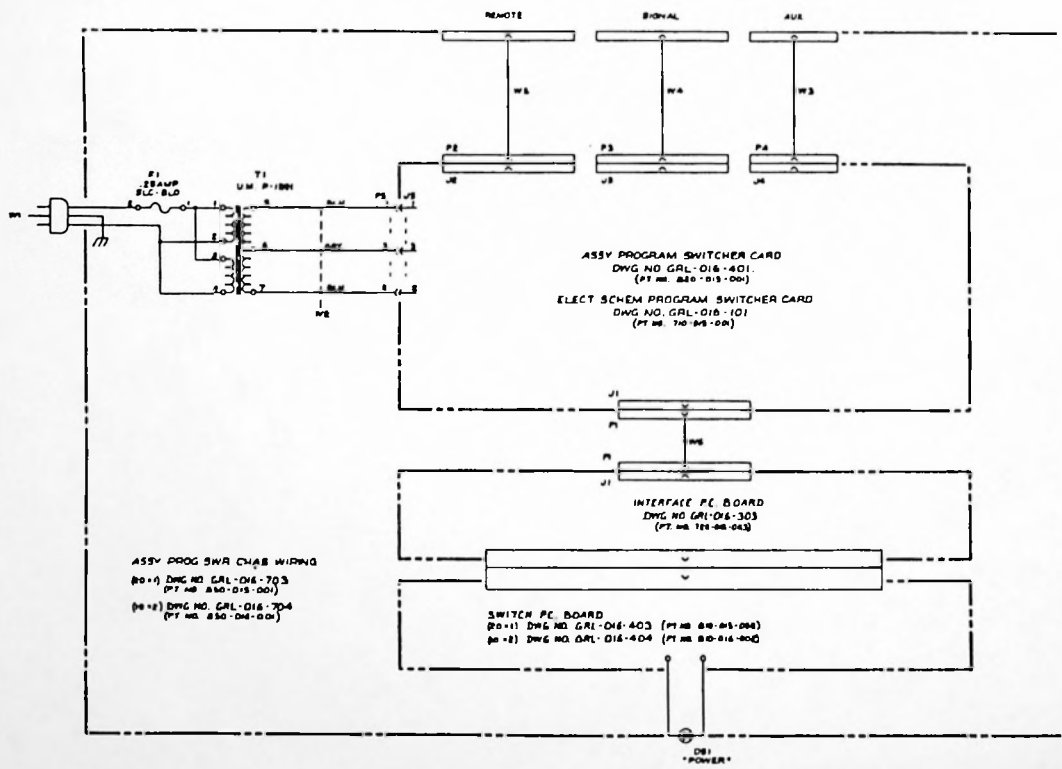
| TYPE    | REF. | +5V.L | QND | BRASS # | 1.  |
|---------|------|-------|-----|---------|-----|
| 825105  | U1   | 20    | 1A  |         | C1  |
| 825109  | U2   | 20    | 1A  |         | C2  |
| 74HC04  | U8   | 1A    | 7   |         | C3  |
| 74LS979 | U6   | 20    | 10  |         | C4  |
| ULN2003 | U5   | 8     | 8   |         | C5  |
| 74HC04  | U4   | 1A    | 7   |         | C6  |
| 74LS979 | U7   | 20    | 10  |         | C7  |
| ULN2003 | U9   | 8     | 8   |         | C8  |
| ULN2003 | U9   | 8     | 8   |         | C9  |
| 74HC02  | U10  | 1A    | 7   |         | C10 |
| 74LS979 | U11  | 20    | 10  |         | C11 |
| ULN2003 | U12  | 8     | 8   |         | C12 |
| ULN2003 | U13  | 8     | 8   |         | C13 |
| 74HC240 | U14  | 20    | 10  |         | C14 |
| ULN2003 | U15  | 8     | 8   |         | C15 |
| 74HC240 | U16  | 20    | 10  |         | C16 |
| ULN2003 | U17  | 8     | 8   |         | C17 |
| 74HC240 | U18  | 20    | 10  |         | C18 |

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 SYSTEMS - LTD. INC.  
 ELECTRICAL SCHEMATIC  
 PROGRAM SWITCHER  
 CARD  
 GRL-016-101 D 1-9





| ENGINEERING CHANGE ORDER STATUS |      |    |      |
|---------------------------------|------|----|------|
| NO.                             | DATE | BY | CHKD |
|                                 |      |    |      |



ASSY PROG SWR CHAS WIRING  
 (P-1) DWG NO. GRL-D16-703  
 (PT NO. 830-018-001)  
 (P-2) DWG NO. GRL-D16-704  
 (PT NO. 830-018-001)

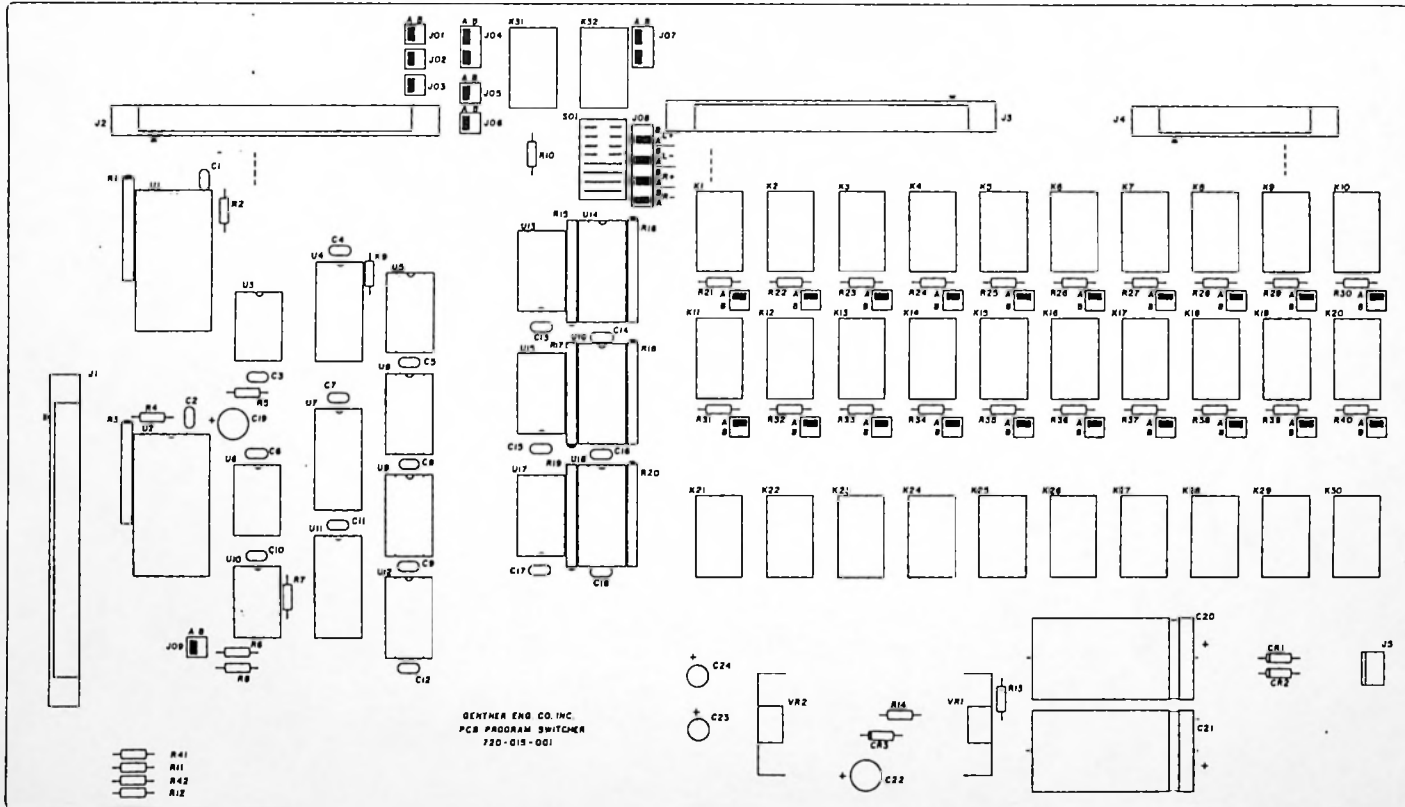
ASSY PROGRAM SWITCHER CARD  
 DWG NO. GRL-D16-401  
 (PT NO. 830-018-001)  
 ELECT SCHEM PROGRAM SWITCHER CARD  
 DWG NO. GRL-D16-101  
 (PT NO. 710-115-001)

INTERFACE PE BOARD  
 DWG NO. GRL-D16-303  
 (PT NO. 111-08-043)

SWITCH PE BOARD  
 (P-1) DWG NO. GRL-D16-403 (PT NO. 80-01-000)  
 (P-2) DWG NO. GRL-D16-404 (PT NO. 80-01-000)

D16-016-001

|  |  |
|--|--|
| <b>GENTNER</b><br>RESEARCH & DEVELOPMENT |  |
| INT DIAG<br>PROGRAM SWITCHER             |  |
| REV: 2 (P-1)                             |  |
| GRL-D16-201 D 1-1                        |  |



PART SIDE



# WARRANTY

GENTNER ELECTRONICS CORPORATION (Manufacturer) warrants that this product is free of defects in both materials and workmanship. Should any part of this equipment be defective, Manufacturer agrees, at its option, to:

A. Repair or replace any defective part free of charge (except transportation charges) for a period of one year from the date of the original purchase, provided the owner returns the equipment to Manufacturer at the address set forth below. No charge will be made for parts or labor during this period.

B. Furnish replacement for any defective parts in the equipment for a period of one year from the date of original purchase. Replacement parts shall be furnished without charge except labor and transportation.

This Warranty excludes assembled products not manufactured by Manufacturer whether or not they are incorporated in a Manufacturer product or sold under a Manufacturer part or model number.

#### THIS WARRANTY IS VOID IF:

A. The equipment has been damaged by negligence, accident, act-of-God or mishandling, or has not been operated in accordance with the procedures described in the operating and technical instructions; or,

B. The equipment has been altered or repaired by other than Manufacturer or by authorized service representative of Manufacturer; or,

C. Adaptations or accessories other than those manufactured or provided by Manufacturer have been made or attached to the equipment which, in the determination of Manufacturer, shall have affected the performance, safety, or reliability of the equipment; or,

D. The equipment's original serial number has been modified or removed.

NO OTHER WARRANTY EXPRESS OR IMPLIED, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE, APPLIES TO THE EQUIPMENT, nor is any person or company authorized to assume any warranty for Manufacturer or any other liability in connection with the sale of Manufacturer products.

Manufacturer does not assume any responsibility for consequential damages, expenses or loss of revenue or property, inconvenience or interruption in operation experienced by the customer due to a malfunction in the purchased equipment. No warranty service performed on any product shall extend the applicable warranty period.

In case of unsatisfactory operation, the purchaser shall promptly notify Manufacturer at the address set forth below, in writing, giving full particulars as to the defects or unsatisfactory operation. Upon receipt of such notice, Manufacturer will give instructions respecting the shipment of the equipment, or such other matters as it elects to honor this warranty as above provided. This warranty does not cover damage to the equipment during shipping and Manufacturer assumes no responsibility for such damage. All shipping costs shall be paid by customer.

This warranty extends only to the original purchaser and is not assignable or transferable.

**GENTNER**  
ELECTRONICS  
CORPORATION

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