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WARNING

High voltage exists at several points in the instrument. Normal precautions consistent with good practice should be taken to reduce shock hazard.

A potential shock hazard exists when ungrounded power source or ungrounded case operation is employed. Persons operating the instrument should be made aware of and take precautions against this condition.

North Atlantic Industries, Inc. cannot be held responsible for damage to person or property in the process of or as a result of maintenance, calibration, or setting up of the instrument.

1. In section 1, Table 1-1 (Specifications), change the following entry:

Item	Specification
Accuracy	$\pm 0.03^\circ$ (47 to 440 Hz) standard

2. In section 4, Table 4-1 (Test Equipment Required), revise the following table entry:

Equipment	Manufacturer	Model Number
Synchro/Resolver Simulator	North Atlantic Instruments	5300

Throughout section 4, revise any references to Synchro/Resolver Simulator to reflect equipment listed above.

3. In section 4, paragraph 4.5.3 (Resolver Accuracy Test), sub-paragraph d, change the NOTE following the paragraph to the following:

NOTE

The Model 801 display indication should be accurate to within ± 0.03 degrees of the input angle.

In SECTION 6 - UNIT SCHEMATICS change Figure 6-4. LED Dimmer CCA A3, Schematic Diagram as shown:

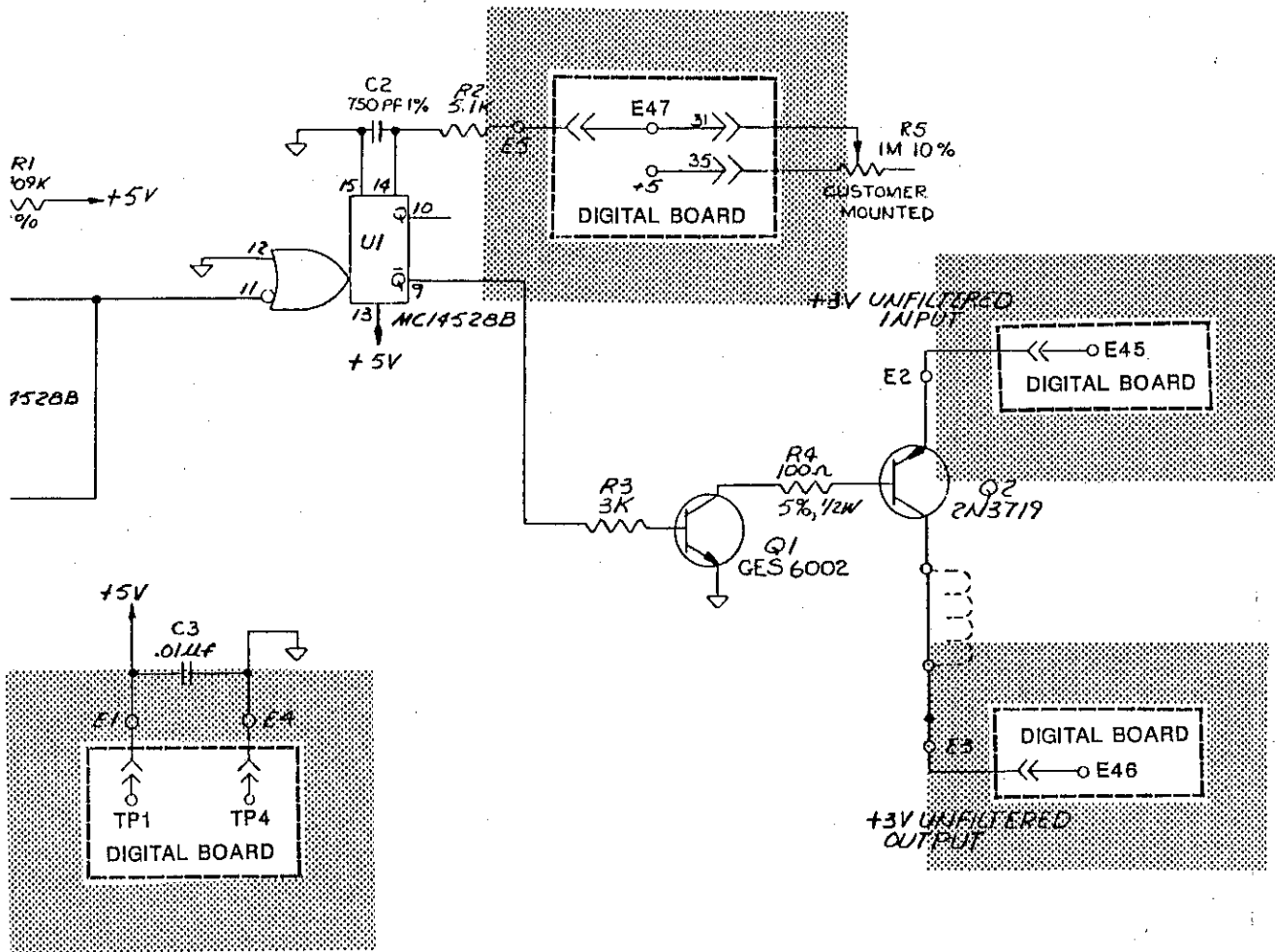


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INFORMATION FOR UNITS SOLD WITHIN THE EUROPEAN UNION

GENERAL

Information contained within the following paragraphs supplements and in some cases supersedes information contained throughout this Manual. Where there is a conflict between information contained in these paragraphs and information contained elsewhere in the manual, these paragraphs take precedence for units sold within the European Union.

SPECIFICATIONS

Add to the list of specifications the following information:

Environmental

Temperature, operating	0° to 50° C
Temperature, non-operating	-55° to 75° C
Relative Humidity	95%, non condensing
Altitude	3050 Meters operating, 12,000 Meters non-operating
Overvoltage/Installation Category	Category II
Pollution Degree	Degree 1

Fuses

Fuses are not serviceable by the OPERATOR
Maintenance personnel should refer to REPLACEMENT
PARTS LIST section.

INSTALLATION AND MAINS INPUT

The Model 801 API is designed for permanent panel-mount installation. It is not recommended that the Model 801 be used in bench-top applications. When the Model 801 is used in a permanent panel-mount installation with only the front panel accessible to the operator and mains supply applied to the rear panel card-edge connector, there is no high quality safety (earth) ground provided for the chassis. If such a ground is desired in your application, connect safety (earth) ground to one of the standoffs for the card-edge connector using an AWG 16 wire and lug.

For continued safe operation of the model 801 API, observe the following:

- a. Mains input wiring to rear panel card-edge connector must include a disconnect device such as a switch (2 pole), or circuit breaker easily accessible to the operator.
- b. Insulation rating for all wires connected to rear panel card-edge connector must be consistent with the applied mains supply .
- c. Mains supply may not be applied to the rear panel card-edge connector for bench-top use.

IMPROPER USAGE

If the equipment is installed or used in a manner not specified safety may be impaired.

REAR PANEL CONTROLS AND ADJUSTMENTS

Any controls or adjustments on the rear panel of the unit are not available to the OPERATOR. Refer any adjustment or changes to rear panel controls to qualified maintenance personnel.

MAINTENANCE

The OPERATOR only has access to the exterior of the unit. All maintenance, including any procedures that require removal of covers, must be referred to qualified maintenance personnel

TECHNICAL ASSISTANCE

Contact your local Sales Representative for any technical assistance. Alternately, contact the Factory at:

North Atlantic Instruments, Incorporated
170 Wilbur Place
Bohemia, NY 11716 USA

Telephone: (516) 567-1100
Fax: (516) 567-1823

WARNING

SAFETY SUMMARY

GENERAL SAFETY NOTICES

The following general safety notices supplement the specific warnings and cautions appearing elsewhere in this manual. They are recommended precautions that must be understood and applied during operation and maintenance of the equipment covered herein.

DO NOT REPAIR OR ADJUST ALONE

Under no circumstances should repair or adjustment of energized equipment be attempted alone. The immediate presence of someone capable of rendering aid is required.

HIGH VOLTAGE IS USED IN THE OPERATION OF THIS EQUIPMENT

DEATH ON CONTACT may result if personnel fail to observe safety precautions. Learn the areas containing high voltage on this equipment. Be careful not to contact high-voltage connections when installing, operating, or maintaining this equipment.

SECTION 1

GENERAL DESCRIPTION

1.1 INTRODUCTION

This manual contains general description, installation and operating instructions, theory of operation, replacement parts lists, and schematic diagrams for the Synchro Panel Meter, Model 801, hereinafter referred to as the Model 801.

state D/A conversion circuits and state-of-art error processing circuits to insure the ultimate in analog-to-digital conversion.

The converted synchro or resolver data is presented in two forms:

1.2 PHYSICAL DESCRIPTION

The Model 801 (figure 1-1) is housed in a 1.9" x 3.8" x 8.1" enclosure and is used as a panel mounted unit for system or test set applications.

- o Front LED display
- o Tri-state, bussable BCD output at rear connector

1.3 FUNCTIONAL DESCRIPTION

The Model 801 is a synchro/resolver-to-digital converter. It combines LSI technology, sophisticated transformers, solid

Intended for portable, system, or test set applications, the Model 801 has 0.01° resolution and can operate directly off the stator and rotor input signals, requiring no separate power. Standard accuracy is 0.05°. A broad frequency range of 47-440 Hz and rear-panel switch programming for all standard synchros and resolvers results in maximum versatility for the user.

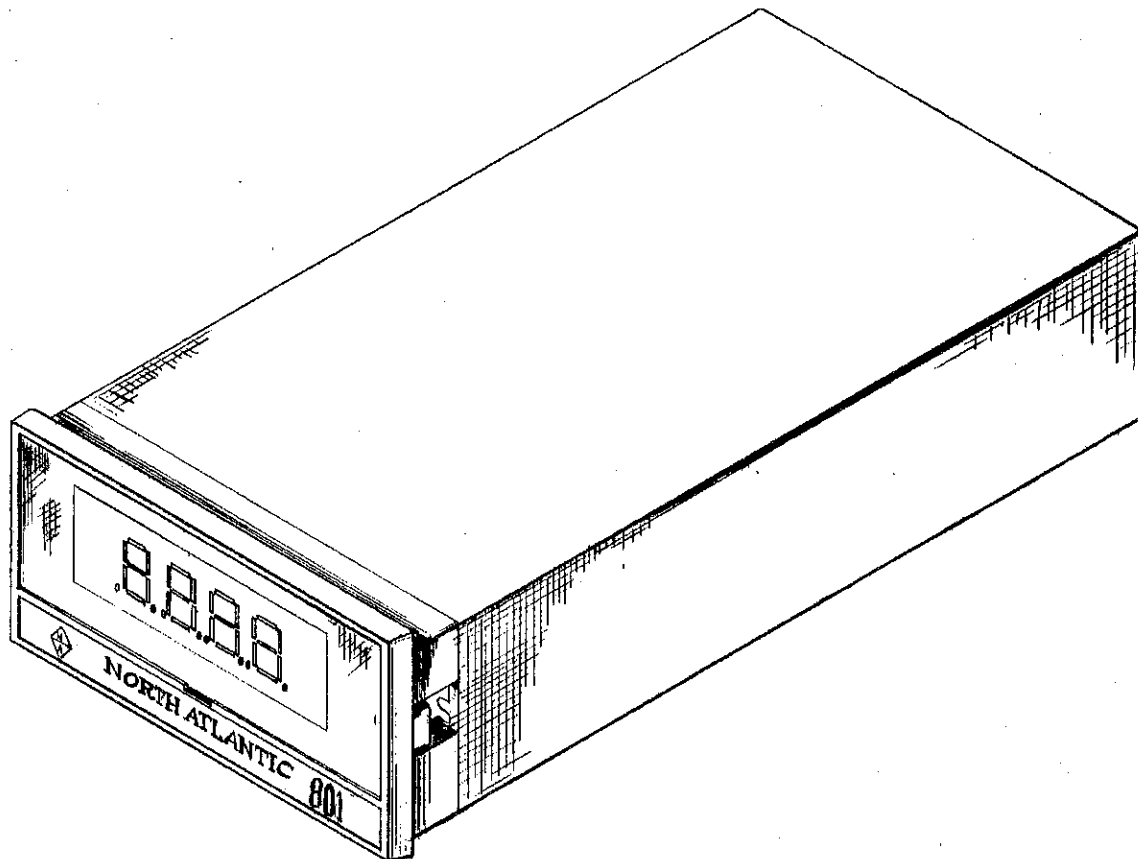


Figure 1-1. Synchro Panel Meter, Model 801

The Model 801 uses a Type II tracking servo loop, which results in no tracking lag error up to its maximum tracking rate of 180°/s. The bright and very large .56" LED display allows easy readability even under the most difficult conditions. In addition, a tri-state five digit parallel BCD output is available at the rear panel connector for remote use; a busy signal indicates when the data of Model 801 are valid. This allows data transfer to a computer or other digital device without having to freeze the converter.

To aid in system zeroing, the Model 801 has a 2.0° offset screw adjustment accessible at the rear panel. A display readout in degrees and minutes, rather than the standard degrees and decimal degrees, is also available.

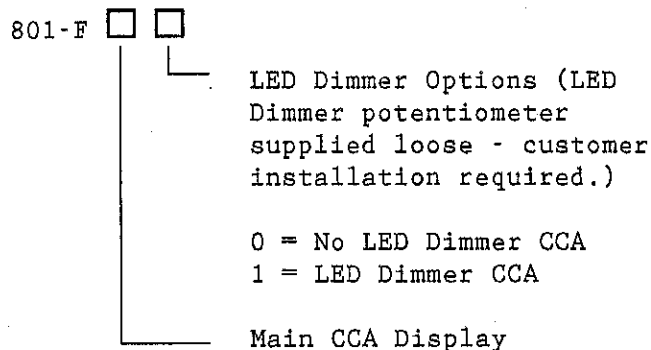
1.4 CONFIGURATION OPTIONS

The Model 801 is comprised of the following major assemblies:

- Analog Circuit Card Assembly (CCA)
- Digital CCA
- Readout CCA
- LED Dimmer CCA (Optional)

The unit is available in one major configuration with various display options.

Options are specified by a two-digit number following the model number as follows:



- 1 = Not Available - Display: Decimal Degrees Standard Accuracy (Red)
- 2 = Not Available - Display: Degrees and Minutes Standard Accuracy (Red)
- 3 = Display: Decimal Degrees, (Red)
- 4 = Display: Degrees and Minutes, (Red)
- 5 = Not Available - Display: Decimal Degrees, Standard Accuracy (Green)
- 6 = Display: Decimal Degrees, (Green)

1.5 SPECIFICATIONS

Table 1-1 provides the electrical and physical specifications for the synchro panel meter.

Table 1-1. Specifications

Item	Specification
Input data	Synchro or resolver (switched programmed) 11.8 V, 26 V, or 90 V L-L (switched programmed)
Data reference frequency	47 to 1200 Hz
Reference voltage	3 V to 126 V rms
Angular range	000.0 to 359.99° (degree-decimal) (standard) 000.00 to 359°59' (degrees-minutes) (option)
Accuracy	0.05° (47 to 440 Hz) (standard); 0.03° (47 to 440 Hz) (optional)

Table 1-1. Specifications (Continued)

Item	Specification
Resolution	0.01°
Data input impedance	1 Meg (min.)
Reference input impedance	100 k (min.)
Tracking speed (full accuracy)	180°/s
Settling time	1.5s for 180° step
Digital output	5 decade BCD, +5 V (true); 0 V (false) 10 TTL loads, tristate bussable (0 V on disable line enables that appropriate digit. Ground all disable lines if parallel data is desired.)
Converter busy	+5 V = busy; 0 V = not busy (3 TTL loads), 2-4 μ s wide. Data may be transferred on falling edge of converter busy signal.
Data freeze input (\overline{DF})	0 V or gnd = freeze; +5 V or open = track TTL/CMOS compatible
Offset adjustment:	±2°
Power	115 V, 47 to 440 Hz, 0.1 A, or 26 V, 47 to 440 Hz, 0.5 A
Reference tap	26 V tap on power transformer may be used to provide 26 V synchro reference (100 ma, max.)
Operating temperature	0 to 50°C
Size	1.9" x 3.8" x 8.1"
Weight	2-1/4 lb. (max.)

1.6 EQUIPMENT REVISION LEVEL STATUS

Table 1-2 lists the major assemblies of the Model 801 and the current revision

level status of each assembly. For subsequent updates to Model 801 assemblies refer to Section 7 - UPDATE INFORMATION.

Table 1-2. Revision Level Status of Major Assemblies

Ref Des	Description	NAI P/N	Current Revision
A1	Analog Circuit Card Assembly (CCA)	783003	H
A1A1	Readout CCA	787001-1,-2	C
A2	Digital CCA	787002-1,-2,-3	H
A3	LED Dimmer CCA	787129	A

SECTION 2

PREPARATION FOR USE

2.1 INTRODUCTION

This section provides instructions for unpacking, inspecting, and installing the Model 801.

2.2 UNPACKING AND INSPECTION

This instrument has been thoroughly tested, inspected, and evaluated at the factory before shipment. Care has been taken in the design of the wrapping and packaging material to insure no damage results from mishandling.

Inspect the instrument externally. Check the front panel for signs of damage. Check covers for damage and loose screws. If the instrument passes this inspection, install it and place it in operation. If damage is found, refer to the warranty in the back of the manual.

2.3 INSTALLATION

Mount the synchro panel meter as follows:

- a. Cut out hole in panel (B, figure 2-1).
- b. Remove front lens by inserting a screwdriver at the bottom of the lens, pushing it upwards and prying out lens (figure 2-2).
- c. Retract cams to their disengaged position using a Phillips head screwdriver (figure 2-3).
- d. Turn the two mounting screws clockwise to bring cams forward and lock unit to panel.
- e. Replace lens, masked side inward, by bowing slightly and resting the edges into the unit edge grooves (figure 2-4). Release lens, allowing it to snap into place.

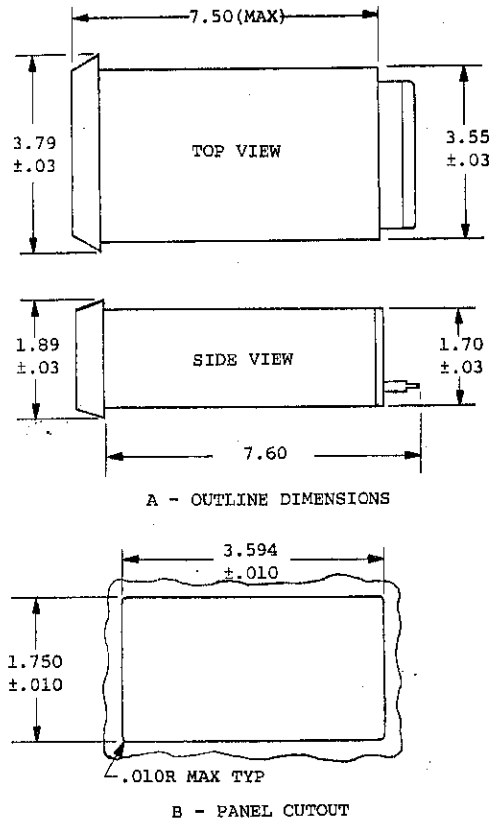


Figure 2-1. Installation Drawings

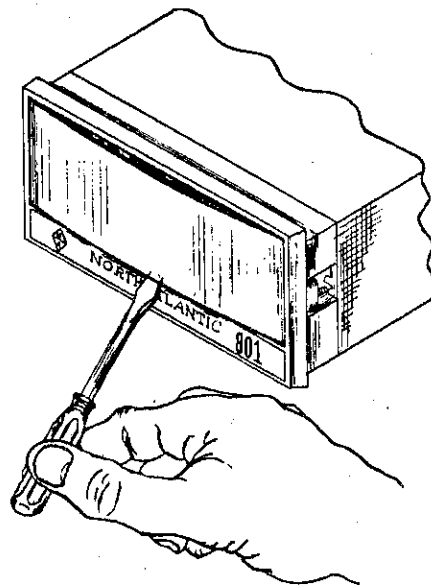


Figure 2-2. Removal of Lens

Table 2-1. Connector Pin Assignments

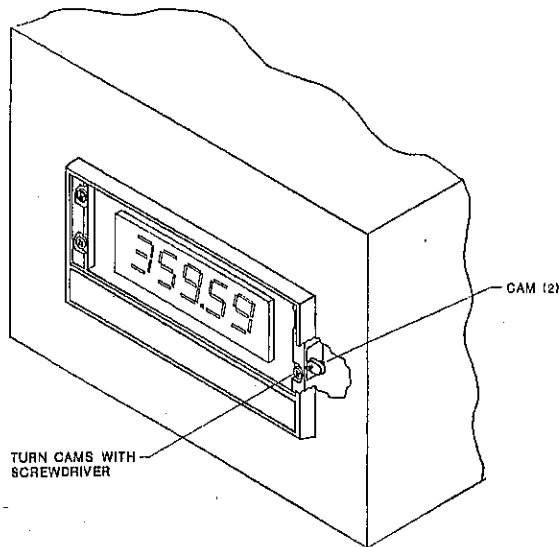


Figure 2-3. Installing Model 801

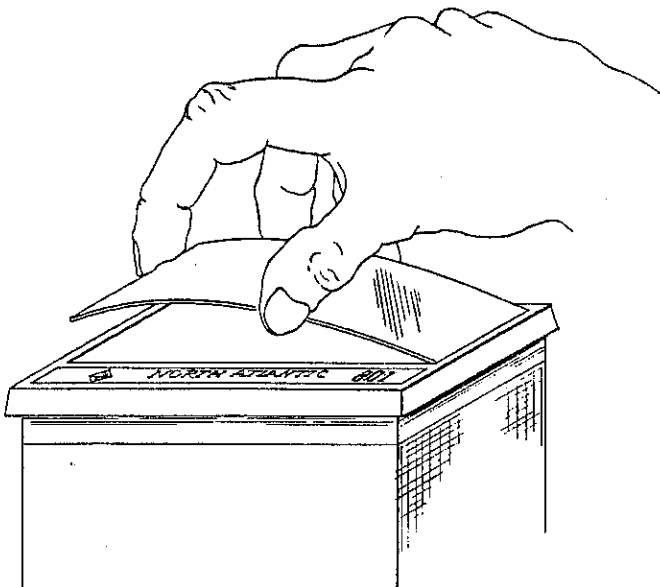


Figure 2-4. Replacement of Lens

2.4 CONNECTOR PIN ASSIGNMENTS

Table 2-1 provides I/O pin assignments for connector P1 which is located on the Digital CCA.

Pin	Signal Name
19	Spare
21	Spare
23	200
17	100
25	Disable hundreds*
34	80
30	40
26	20
38	10
42	Disable tens*
24	8
28	4
32	2
36	1
40	Disable units*
16	.8
14	.4
12	.2
10	.1
20	Disable tenths*
29	.08
15	.02
18	.04
11	.01
33	Disable hundredths*
22	Logic ground
4	Busy signal
13	Data freeze, \overline{DF} (0 or ground = freeze; high or open = track)
41	S1, synchro or resolver
48	S2, synchro or resolver
44	S3, synchro or resolver
46	S4, resolver (open for syn)
8	R1 (Ref HI)
6	R2 (Ref LO)
47	115 V power HI
43	115 V or 26 V power LO
45	26 V power HI or 26 V output tap
2	Chassis ground**
37	Lamp test, LT (0 or gnd = test; high or open = normal)
31	Spare (E5)
35	+5 V
1	Chassis ground**
49	Chassis ground

*Tie low to enable data output
 **P1 Pins 1 & 2 only connect to chassis ground when unit is installed in case.

2.5 MATING CONNECTORS

Edge connector P1 (on rear of unit) (figure 2-5) mates with EDAC connector which includes contacts. The connector may be supplied as NAI part number 808516.

Qty	EDAC P/N
1 connector	345-050-500-202
2 keying plugs	345-240-318

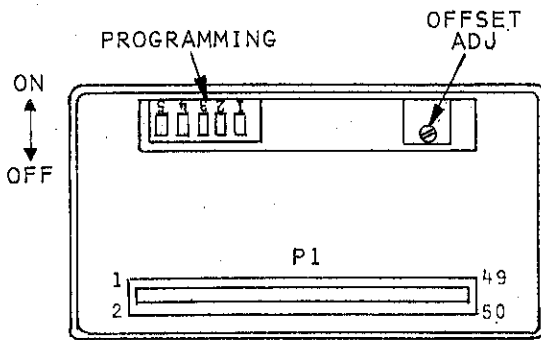


Figure 2-5. Connector Pin Identification, Rear View

2.6 INPUT CONNECTIONS

To operate, the Model 801 must have synchro or resolver stator inputs, reference inputs, and power input.

2.6.1 Stator Inputs

The synchro or resolver stator inputs (P1) for S1, S2, S3, and S4 (resolver only) are shown in table 2-1.

2.6.2 Reference Inputs

The synchro or resolver reference inputs are connected to pin 8 for Ref Hi and to pin 6 for Ref Lo. If a 26 V or 115 V source is available, it can also be used to power the Model 801 by jumping pins on connector P1 as shown in table 2-2.

NOTE 1

If the power line is used as a reference source, it must be the same source from which the synchro or resolver excitation signal is derived.

NOTE 2

The Model 801 draws approximately 500 mA from the 26 V and 100 mA from the 115 V source.

Table 2-2. Reference Inputs

26 V Ref		115 V Ref	
From	To	From	To
8	45	8	47
6	43	6	43

If desired, the Model 801 can also be powered from an external 115 V ac or 26 V ac source.

If a 26 V ac reference is needed to excite the synchro or resolver in the system but only 115 V ac is available, it can be obtained from the internal auto-transformer (100 mA, max.) as follows:

- Connect 115 V ac to pins 47 (Hi) and 43 (Lo).
- 26 V ac is now available on pins 45 (Hi) and 43 (Lo).
- Connect the 26 V ac reference signal obtained in step b to pins 8 and 6.

2.6.3 Grounding

In a synchro/resolver-to-digital converter, it is necessary for both chassis and digital ground to be tied together (table 2-1). Ground loops should be avoided in system applications.

In bench applications, chassis and digital ground should be tied together and connected to the low side of the signal source to the synchro or resolver.

In system applications the separate pins make connections to other parts possible. When not used, tie them together at the connector.

CAUTION

In order to prevent accidental damage to the instrument, insert polarizing keys between pins 9 and 11 and between pins 35 and 37.

2.7 NONSTANDARD L-L LEVELS

Resistor R24, on the Analog CCA, determines gain for 90 V L-L; R25 for 26 V L-L; R26 for 11.8 V L-L.

For other line-to-line levels use the following formula to determine the appropriate resistor value:

$$R = \frac{78.3M}{E_{L-L}}$$

Replace R24, R25, or R26 with the new resistor.

NOTE

E_{L-L} must be between 6 V and 100 V rms.

2.8 DIP SWITCH PROGRAMMING

A DIP switch, located on the Analog CCA and accessible from the rear of the unit (figure 2-6), is used to program L-L voltages and selection of synchro or resolver. Table 2-3 provides programming data.

NOTE

Accidental use of wrong combinations of the switch will prevent normal operation but will not cause damage to the equipment.

If desired, the DIP switch can be removed and connections made from the former switch location to rear connector P1 for external programming.

Table 2-3. DIP Switch Programming

Switch					Function
5	4	3	2	1	
ON	OFF	OFF	-	-	90 V
OFF	ON	OFF	-	-	26 V
OFF	OFF	ON	-	-	11.8 V
-	-	-	-	ON	SYN
-	-	-	-	OFF	RES
-	-	-	ON	-	+ Offset
-	-	-	OFF	-	- Offset

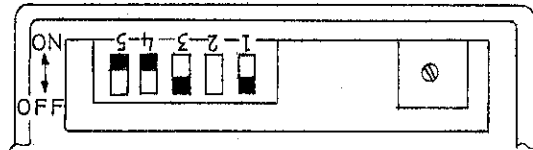


Figure 2-6. DIP Switch Programming (11.8 V L-L Synchro)

2.9 DIMMER DISPLAY OPTION (FX1)

All Model 801 configurations can utilize the Dimmer Display option which enables adjustment of front panel display intensity. The Dimmer circuit card assembly is factory installed but the dimmer potentiometer (R5) is supplied loose and must be installed by the user.

2.9.1 Installation

To install the Dimmer Display option proceed as follows:

- a. Remove screws securing rear cover (figure 5-1) and slide unit out of case.
- b. Determine location for remote dimmer potentiometer (R5) and cut two pieces of wire the desired length.
- c. Locate Analog CCA (A1) and solder wires to P1 connector pins 31 and 35.
- d. Referring to figure 6-4, solder other end of wires to potentiometer R5.
- e. Mount potentiometer in desired location.

SECTION 3

THEORY OF OPERATION

3.1 THEORY

The synchro panel meter employs a Type II closed-loop servo design which continuously tracks analog input data. The heart of the unit (a custom LSI TRIG-LOGIC™ processor chip) contains analog switches, an up/down counter, and trigonometric digital circuitry. For the following discussion refer to figure 3-1.

Input synchro or resolver signals are fed into a precision transformer and resistor network bridge assembly. The output of this bridging process is an ac error signal fed into a null circuit which uses an input reference signal. The null circuit performs both phase-sensitive detection and clock pulse generation (with frequency proportional to input signal rate). These clock pulses drive the up/down counter; the output digitally closing the loop with the bridge circuits.

The counter's BCD digital word drives the display decoder-drivers and goes through tri-state bussable output buffers.

In operation, whenever the input synchro or resolver accelerates, an ac error buildup causes a corresponding increase in rate of clock pulses in the direction (up/down) to reduce the error signal magnitude. When errors are reduced to zero (plus or minus threshold voltages), both the digital output and display then match the input synchro or resolver angle, and the unit will continue to track the input

data without lag error until the data rate changes again.

3.2 SYNCHRO AND RESOLVER CONVENTIONS

The synchro panel meter operates in accordance with the following conventions:

Synchro per MIL-S-20708:

$$\begin{aligned} S3-S1 &= \sin \theta \sin \omega t \\ S2-S3 &= \sin (\theta + 120^\circ) \sin \omega t \\ S1-S2 &= \sin (\theta + 240^\circ) \sin \omega t \end{aligned}$$

Angles are for an R1 (HI) R2 (LO) excited transmitter (CX).

Resolver per MIL-R-21530:

$$\begin{aligned} S3-S1 &= \sin \theta \sin \omega t \\ S2-S4 &= \cos \theta \sin \omega t \end{aligned}$$

Angles are for an R2 (HI) R4 (LO) excited transmitter (RX).

For an alternate convention (R1-R3) excited transmitter, convert terminations as follows: Change S1 to S4, S2 to S1, S3 to S3, and S4 to S3.

NOTE

For both synchro and resolver conventions, counterclockwise rotation, as viewed from the shaft end of the component, is increasing angle.

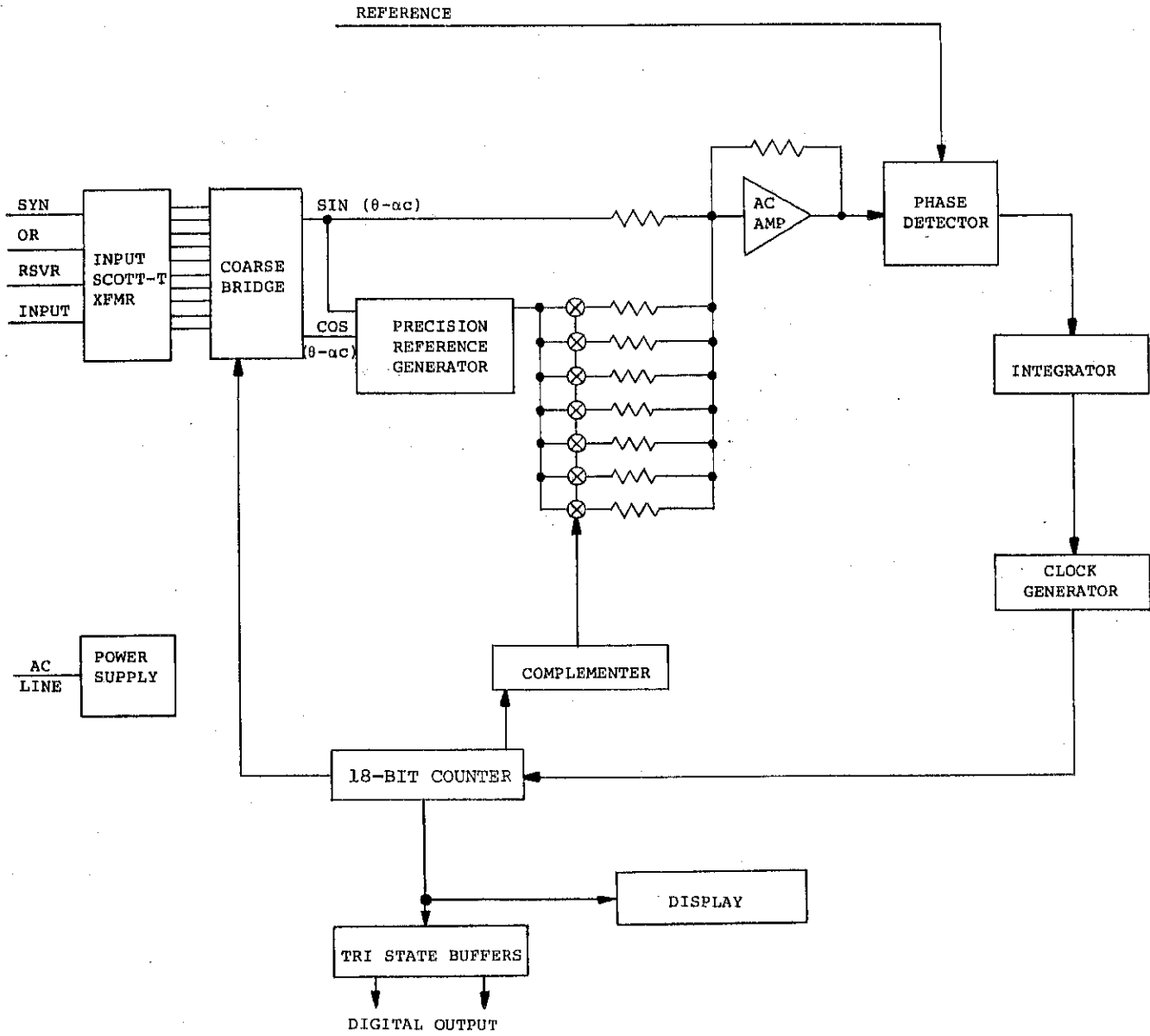


Figure 3-1. Synchro Panel Meter, Block Diagram

SECTION 4
MAINTENANCE

4.1 INTRODUCTION

This section contains cleaning, lubrication, adjustment, and removal and replacement procedures for the Model 801.

4.2 CLEANING AND LUBRICATION

This unit does not require lubrication. No special cleaning procedures or fluids are required. Apply good housekeeping rules to maintain the instrument free of dust and dirt.

4.3 ZERO OFFSET ADJUST

NOTE

Once zero offset adjustment and switch SW1-2 are set, do not change settings while making other system measurements.

A zero offset screw adjustment is located at the rear panel. This adjustment has a nominal range of 2.0° . The unit is furnished with this adjustment set to zero. In some applications it may be desirable to offset this adjustment to compensate for some system error or minor synchro misalignment. Simply insert a small screwdriver or alignment tool through the hole provided and adjust as necessary (figure 4-1). Set switch SW1-2 to ON for a + (plus) offset and to OFF for a - (minus) offset.

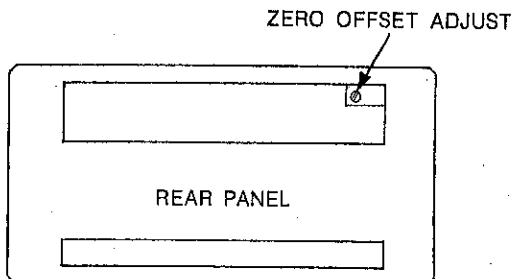


Figure 4-1. Zero Offset Adjust

4.4 REMOVAL AND REPLACEMENT

The case need not be removed from the user's panel in order to disassemble (figure 5-1).

- a. Remove the two rear cover mounting screws and remove rear cover (1) from the unit.
- b. Grasp the edge connector and slide the entire assembly out of the housing.

WARNING

If the unit is operated outside of the housing for troubleshooting purposes, observe proper precautions to avoid shorting of circuit points to the work surface and to avoid electrical shock. 115 V appears at points on the circuit board when the unit is in operation, even when it is powered by 26 V.

4.5 CALIBRATION

The following paragraphs contain procedures to calibrate the Model 801. The procedures test both the synchro and resolver accuracy of the unit and should be performed as needed.

4.5.1 Test Equipment

Table 4-1 lists standard test equipment required to calibrate the Model 801. The equipment listed or their equivalents may be used.

4.5.2 Equipment Setup

Set up equipment as shown in figure 4-2 observing the following pretest conditions:

- a. Turn off all test equipment.
- b. Set amplitude control on power amplifier to zero.
- c. Turn on test equipment and let it warm up.
- d. Adjust input to synchro/resolver simulator to 115 V rms $\pm 5\%$ at 400 Hz $\pm 5\%$.

Table 4-1. Test Equipment Required

Equipment	Manufacturer	Model No.
Synchro/Resolver Simulator	North Atlantic Industries	5310
Oscillator	Hewlett-Packard	HP200CD
Power Amplifier	Krohn-Hite	DCA10R
Multimeter	Fluke	75 (1% ac accuracy or better)

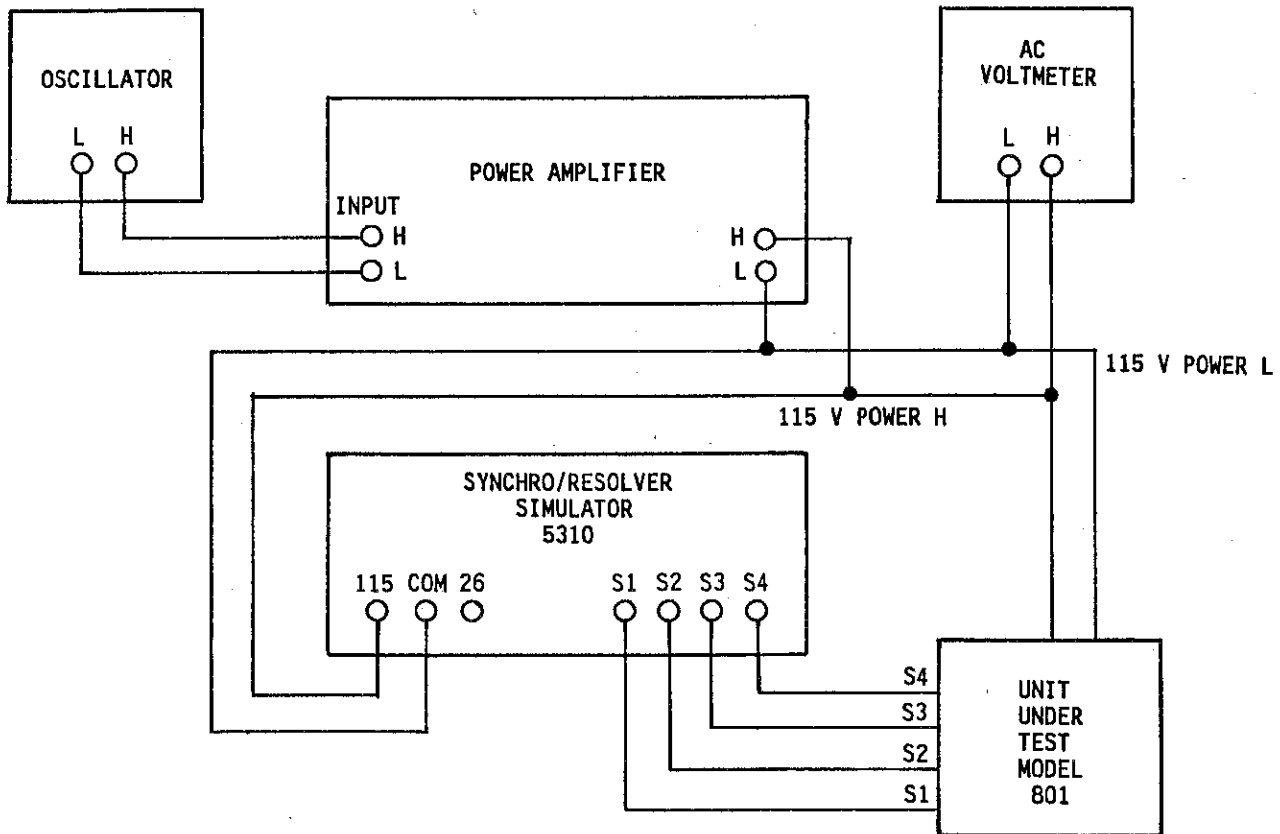


Figure 4-2. Calibration Test Equipment Setup

4.5.3 Resolver Accuracy Test

NOTE

a. Set synchro/resolver simulator as follows:

- (1) Select 115 V, 400 Hz reference input
- (2) Select Resolver mode
- (3) Select 11.8 V Line-to-Line output
- (4) Set front panel leverwheel switches to 000.00 degree

b. Set Model 801 rear panel programming DIP switch as follows (refer to table 2-3 and figure 2-6):

The Model 801 display indication should be accurate to within ± 0.05 degrees of the input angle (± 0.03 degrees for higher accuracy units).

- (1) 10 degree steps (000.0 - 350 degrees)
- (2) 1 degree steps (1 - 9 degrees)
- (3) .1 degree steps (.1 - .9 degrees)
- (4) .01 degree steps (.01 - .09 degrees)

NOTE

The Model 801 will not operate properly if switches SW1-3, -4, and -5 are all set to the ON or OFF position at the same time.

Switch	Position	Function
SW1-1	OFF	Resolver mode set <u>+</u> Offset
SW1-2	as required	
SW1-3	ON	11.8 V L-L
SW1-4	OFF	
SW1-5	OFF	

c. Adjust rear panel reference offset potentiometer for an exact 000.00 reading on the Model 801 front panel display (refer to figure 4-1). To obtain the correct reading, DIP switch SW1-2 +Offset (Table 2-3) may need to be set either to the ON (+) or OFF (-) position depending upon the offset needed.

d. Sequentially step the synchro/resolver simulator leverwheel switches and record the resultant Model 801 display readings. Step the synchro/resolver simulator in the following exact order.

4.5.4 Synchro Accuracy Test

a. Set synchro/resolver simulator as follows:

- (1) Select 115 V, 400 Hz reference input
- (2) Select Synchro mode
- (3) Select 90 V Line-to-Line output
- (4) Set front panel leverwheel switches to 000.00 degree.

b. Set Model 801 rear panel programming DIP switch as follows (refer to table 2-3 and figure 2-6):

NOTE

The Model 801 will not operate properly if switches SW1-3, -4, and -5 are all set to the ON or OFF position at the same time.

Switch	Position	Function
SW1-1	ON	Synchro mode set <u>+</u> Offset
SW1-2	as required	
SW1-3	OFF	90 V L-L
SW1-4	OFF	
SW1-5	ON	

c. Adjust rear panel reference offset potentiometer for an exact 000.00 reading on the Model 801 front panel display (refer to figure 4-1). To obtain the correct reading, DIP switch SW1-2 Offset (table 2-3) may need to be set either to the ON (+) or OFF (-) position depending upon the offset needed.

- (1) 10 degree steps (000.0 - 350 degrees)
- (2) 1 degree steps (1 - 9 degrees)
- (3) .1 degree steps (.1 - .9 degrees)
- (4) .01 degree steps (.01 - .09 degrees)

d. Sequentially step the synchro/resolver simulator degree indicator switches and record the resultant Model 801 display readings. Step the synchro/resolver simulator in the following exact order.

NOTE

If any of the previous recorded resolver or synchro readings are not within specifications, adjust Display Offset (figure 4-1) potentiometer located at rear of unit so that the largest positive and negative errors are of equal magnitude. If, after balancing the worst case positive and negative errors, the unit does not perform to rated specifications (±.05 or ±.03), consult the factory.

NOTE

The Model 801 display indication should be accurate to within ±.05 degrees of the input angle (±.03 degrees for higher accuracy units).

SECTION 5

PARTS LIST

5.1 INTRODUCTION

This section contains replacement parts lists, federal supply codes of manufacturers (FSCM), parts location diagrams, and a list of manufacturers of parts used for the Model 801 Synchro Panel Meter.

The Model 801 is available in one major configuration with the following three options:

- a. F3X - Display: Decimal Degrees (Red)
- b. F4X - Display: Degrees and Minutes (Red)
- c. F6X - Display: Decimal Degrees (Green)

All of the above configurations are also available with a LED Dimmer Option (FX1) or without (FX0).

5.2 PARTS LIST

The parts list contains only replaceable parts for the Model 801. It is prepared in tabular form and is divided into six columns as follows:

5.2.1 Column 1 - Ref Des. Lists alpha numerical reference designations for replaceable parts shown on schematic and parts location diagrams.

5.2.2 Column 2 - Description. Contains descriptions which identify replaceable parts.

5.2.3 Column 3 - NAI P/N. Lists North Atlantic Industries part numbers assigned to replaceable parts.

5.2.4 Column 4 - FSCM. Lists Federal Supply Code for Manufacturers. The FSCM identifies manufacturer or government agency whose number is listed in the manufacturers' part number column. If a FSCM is not assigned to a manufacturer, a

five letter code is given and alphabetically referenced (AAAAA, BBBBB, etc.) to the List of Manufacturers table within this manual.

5.2.5 Column 5 - Mfr P/N. Lists manufacturers' part numbers of replaceable parts or data to aid in determining parts substitution.

5.2.6 Column 6 - UOC (Usable on Code). This column contains codes to identify specific equipment configurations (model, assembly, etc.). When a part applies to all configurations, no coding system is used. The coding system is as follows: A, B, C, ... and continues with double, AA through AZ, BA, BB, etc., when necessary.

5.3 LIST OF MANUFACTURERS

This list contains the names, addresses, FSCMs, and other identifying codes of manufacturers referenced in the parts list. It is arranged numerically using the manufacturers' FSCMs provided in the Federal Supply Code for Manufacturers, Cataloging Handbooks H4-1, H4-2, and H4-3.

The list is prepared in tabular form as follows:

a. Column 1 contains FSCMs of all manufacturers referenced in the parts list.

b. Column 2 contains the names and addresses of manufacturers applicable to FSCMs listed in column 1.

5.4 PARTS LOCATION ILLUSTRATIONS

Parts location illustrations are provided to give the user a quick and positive method for locating parts on specific assemblies being repaired. Each illustration provides corresponding location index numbers and each parts location diagram provides reference designations for circuit card components.

Table 5-1. Model 801-F1X Feature 1, Option 1 - Display:
 Decimal Degrees, Standard Accuracy, Red
 (Not Available)

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
A1	Analog Circuit Card Assembly (CCA)	787003	07342	787003	
A2	Digital CCA	787002-1	07342	787002-1	
J1	Connector, 50 pin, PC, Edge	808535	31781	345-050-500-202	
MP1	Bezel Kit Assembly	500946	07342	500946	
MP2	Lens, Synchro Panel Meter	206019-1	07342	206019-1	
MP3	Name Plate, Front	297718	07342	297718	
P1	Plug, Keying	808536	31781	345-240-31	

Table 5-2. Model 801-F2X Feature 1, Option 2 - Display:
 Degrees and Minutes, Red
 (Not Available)

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
A1	Analog CCA	787003	07342	787003	
A2	Digital CCA	787002-2	07342	787002-2	
J1	Connector, 50 pin, PC, Edge	808535	31781	345-050-500-202	
MP1	Bezel Kit Assembly	500946	07342	500946	
MP2	Lens, Synchro Panel Meter	206019-1	07342	206019-1	
MP3	Name Plate, Front	297718	07342	297718	
P1	Plug, Keying	808536	31781	345-240-31	

TM-I-5024A

Table 5-3. Model 801-F3X Feature 1, Option 3 - Display:
Decimal Degrees, Red

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
A1	Analog CCA	787003	07342	787003	
A2	Digital CCA	787002-1	07342	787002-1	
J1	Connector, 50 pin, PC, Edge	808535	31781	345-050-500-202	
MP1	Bezel Kit Assembly	500946	07342	500946	
MP2	Lens, Synchro Panel Meter	206019-1	07342	206019-1	
MP3	Name Plate, Front	297718	07342	297718	
P1	Plug, Keying	808536	31781	345-240-31	

Table 5-4. Model 801-F4X Feature 1, Option 4 - Display:
Degrees and Minutes, Red

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
A1	Analog CCA	787003	07342	787003	
A2	Digital CCA	787002-2	07342	787002-2	
J1	Connector, 50 pin, PC, Edge	808535	31781	345-050-500-202	
MP1	Bezel Kit Assembly	500946	07342	500946	
MP2	Lens, Synchro Panel Meter	206019-1	07342	206019-1	
MP3	Name Plate, Front	297718	07342	297718	
P1	Plug, Keying	808536	31781	345-240-31	

Table 5-5. Model 801-F5X Feature 1, Option 5 - Display:
 Decimal Degrees, Standard Accuracy, Green
 (Not Available)

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
A1	Analog CCA	787003	07342	787003	
A2	Digital CCA	787002-3	07342	787002-3	
J1	Connector, 50 pin, PC, Edge	808535	31781	345-050-500-202	
MP1	Bezel Kit Assembly	500946	07342	500946	
MP2	Lens, Synchro Panel Meter	206019-2	07342	206019-2	
MP3	Name Plate, Front	297718	07342	297718	
P1	Plug, Keying	808536	31781	345-240-31	

Table 5-6. Model 801-F6X Feature 1, Option 6 - Display:
 Decimal Degrees, Green

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
A1	Analog CCA	787003	07342	787003	
A2	Digital CCA	787002-3	07342	787002-3	
J1	Connector, 50 pin, PC, Edge	808535	31781	345-050-500-202	
MP1	Bezel Kit Assembly	500946	07342	500946	
MP2	Lens, Synchro Panel Meter	206019-2	07342	206019-2	
MP3	Name Plate, Front	297718	07342	297718	
P1	Plug, Keying	808536	31781	345-240-31	

Table 5-7. Model 801-FX0 Feature 2, Option 0 - LED Dimmer CCA - Unique Parts

NOTE

Units with Option 0 (FX0) do not contain LED Dimmer Circuit Card Assembly or any related components.

Table 5-8. Model 801-FX1 Feature 2, Option 1 - LED Dimmer CCA - Unique Parts

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
A3	LED Dimmer CCA	787129	07342	787129	
R5	Resistor, Variable, 1 M, 2 1/2 W, +10%	808587	01121	JAIN056S105UA	

NOTE: AFTER COVER (MP1) IS REMOVED, A NEW LABEL (MP3) MUST BE INSTALLED.

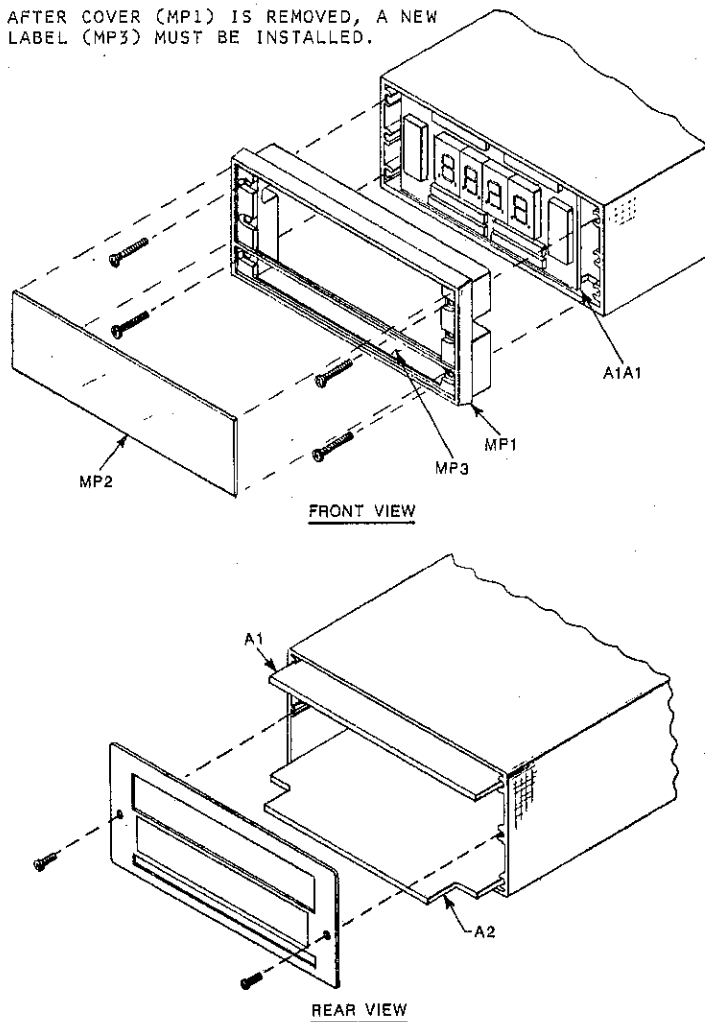


Figure 5-1. Model 801 Synchro Panel Meter (P/N 408110), Exploded View

Table 5-9. Analog Circuit Card Assembly A1 - 787003

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
A1A1	Readout CCA	787001-1,-2	07342	787001-1,-2	
C1	Capacitor, Electrolytic, Tantalum, 2.2 uf, 25 V, <u>+10%</u>	883743	56289	199D225X9025AA1	
C2	Same as C1				
C3	Capacitor, Ceramic, 0.068 uf, 50 V, <u>+10%</u>	884941	81349	CK05BX683K	
C4	Capacitor, Ceramic, 0.33 uf, 50 V, <u>+10%</u>	882457	81349	CKR06BX334KP	
C5	Capacitor, Ceramic, 620 pf, 100 V, <u>+2%</u>	884944	31433	C052CG21G5CA	
C6	Capacitor, Mica, 7 pf, 300 V, <u>+1</u> pf	806246	72136	DM5-070	
C7	Capacitor, Ceramic, 68 pf, 200 V, <u>+10%</u>	882036	81349	CK05BX680K	
C8	Capacitor, Ceramic, 39 pf, 200 V, <u>+10%</u>	808624	81349	CKR05BX39OKL	
C9	Same as C8				
C10	Capacitor, Ceramic, 0.1 uf, 50 V, <u>+10%</u>	807730	81349	CK05BX104K	
C11	Capacitor, Ceramic, 0.01 uf, 100 V, <u>+10%</u>	883357	81349	CK05BX103K	
C12-C18	Same as C11				
CR1	Diode, Signal In	808974	07263	1N4148	
CR2-CR13	Same as CR1				
Q1	Transistor, MOSFET, N-Chan	884545	04713	3N169	
R1	Resistor, Composition, 10 k, 1/8 W, <u>+5%</u>	880830	01121	BB1035	
R2	Resistor, Composition, 100 k, 1/8 W, <u>+5%</u>	805104	81349	RC05GF104J	
R3	Resistor, Composition, 1.6 k, 1/8 W, <u>+5%</u>	805787	81349	RC05GF162J	

Table 5-9. Analog Circuit Card Assembly A1 - 787003 (Continued)

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
R4	Resistor, Composition, 18 k, 1/8 W, $\pm 5\%$	805108	81349	RC05GF183J	
R5	Resistor, Metal Film, 402 k, 1/10 W, $\pm 1\%$	808187	01121	CC4023F	
R6	Resistor, Metal Film, 274 k, 1/8 W, $\pm 1\%$	807741	91637	RN55E2743 1%	
R7	Resistor, Metal Film, 412 ohm, 1/10 W, $\pm 1\%$	807630	91637	MF 1/10 412 $\pm 1\%$	
R8	Same as R2				
R9	Potentiometer, 100 k, $\pm 20\%$	807625	02111	62-1-1-104	
R10	Resistor, Metal Film, 147 k, 1/10 W, $\pm 1\%$	808364	81349	RN55C1473F	
R11	Resistor, Metal Film, 130 k, 1/10 W, $\pm 1\%$	808994	07716	CEA-T2-130K-1%	
R12	Same as R2				
R13	Resistor, Variable, 5 k, ± 10 ppm/C	884927	18612	1240P-5K	
R14	Resistor, Metal Film, 90.9 k, 0.1 W, $\pm 1\%$	884928	19701	UPR5023ZA90.9KF	
R15	Resistor, Metal Film, 100 k, 1/20 W, $\pm 1\%$	808637	06947	MMC TO 100K	
R16	Resistor, Metal Film, 93.1 k, 0.1 W, $\pm 5\%$	885022	19701	UPR5023ZA93.1KF	
R23	Resistor, Metal Film, 536 k, 1/10 W, $\pm 1\%$	807642	91637	MF 1/10 546K 1%	
R24	Resistor, Metal Film, 887 k, 1/10 W, $\pm 1\%$	808475	91637	CMF YID 887K TI	
R25	Resistor, Metal Film, 3.01 M, 1/10 W, $\pm 1\%$	808476	19701	5053YL 3M010F	
R26	Resistor, Metal Film, 6.65 M, 1/10 W, $\pm 1\%$	808477	19701	5053YL 6M650F	

Table 5-9. Analog Circuit Card Assembly A1 - 787003 (Continued)

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
R27	Resistor, Metal Film, 100 k, 1/10 W, <u>+0.5%</u>	808992	81349	RN55C103D	
R28	Resistor, Metal Film, 95.3 k, 1/10 W, <u>+0.5%</u>	808991	81349	RN55C9532D	
R29	Resistor, Metal Film, 160 k, 1/10 W, <u>+0.5%</u>	808993	07716	CEA-T2-160K- <u>+0.5%</u>	
R30	Resistor, Composition, 1 M, 1/4 W, <u>+5%</u>	880100	01121	CB1055	
R31-R33	Same as R1				
R34	Resistor, Composition, 5.1 k, 1/8 W, <u>+5%</u>	880576	01121	BB5125	
R35	Resistor, Composition, 20 k, 1/8 W, <u>+5%</u>	805479	81349	RC05GF203J	
R36	Same as R34				
R37	Resistor, Composition, 3.3 k, 1/8 W, <u>+5%</u>	805103	81349	RC05GF332J	
SW1	Switch, Piano, 5-pos DIP	884740	81073	76PSB05	
T1	Transformer (set of 2), 47-440 Hz, 11.8 V to 90 V L-L	808261-1	07342	808261-1	
T2	Same as T1				
U1	IC, Linear Quad Op Amp	808545	06665	OP 11FY	
U2	IC, LSI, TRIG-LOGIC TM	888068	07342	888068	
U3	Same as U1				
U4	IC, Quad Op Amp, 14-pin	808496	01295	TL084CN	
U5	Same as U4				
U6	IC, Quad Comparator, 14-pin, Std. Temp	807626	01295	LM339N	
U7	IC, CMOS, 2 Channel Analog Multiplexer, 16-pin DIP	808304-MOS	02735	CD4053BE	

Table 5-9. Analog Circuit Card Assembly A1 - 787003 (Continued)

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
U8,U9	Same as U7				
U10	IC, CMOS, Quad 2-Input OR Gate	807702	04713	MC14071	
U11	IC, CMOS, BCD Up/Down Counter	808987	04713	MC14510BCP	
U12	IC, Linear Dual Op Amp	885026	01295	TL082ACP	
XU2	Socket, Strip, 25-pin	808694	06776	SB-25-100-T	
Z1	Resistor, Network, 100 k, 8-pin, 4 Res, $\pm 2\%$	808628	32997	4308R-102-104	
Z2	Resistor, Network, 3.3 k, 6-pin, 3 Res, SIP, Low Profile	884755	32997	4306R-102-332	
Z3	Resistor, Network, 10 k, 6-pin, 3 Res, SIP, Low Profile	884756	32997	4306R-102-103	
Z4	Resistor, Network, 100 k, 10-pin, 5 Isolated Res, SIP, Low Profile	884840	32997	4310R-102-104F	
Z5	Resistor, Network, 47 k, 10-pin, 5 Res, SIP	884742	32997	4310R-102-473	
Z6	Resistor, Network, 7-pin	297745	07342	297745	
Z7	Resistor, Network, 5-pin	297838	07342	297838	
Z8	Resistor, Network, 4-pin	297743	07342	297743	
Z9	Resistor, Network, 4-pin	297744	07342	297744	
Z10	Resistor, Network, 6-pin	297821	07342	297821	
Z11	Resistor, Network, 100 k, 8-pin, 4 Res, SIP	884926	19647	T914-100K-100-05	

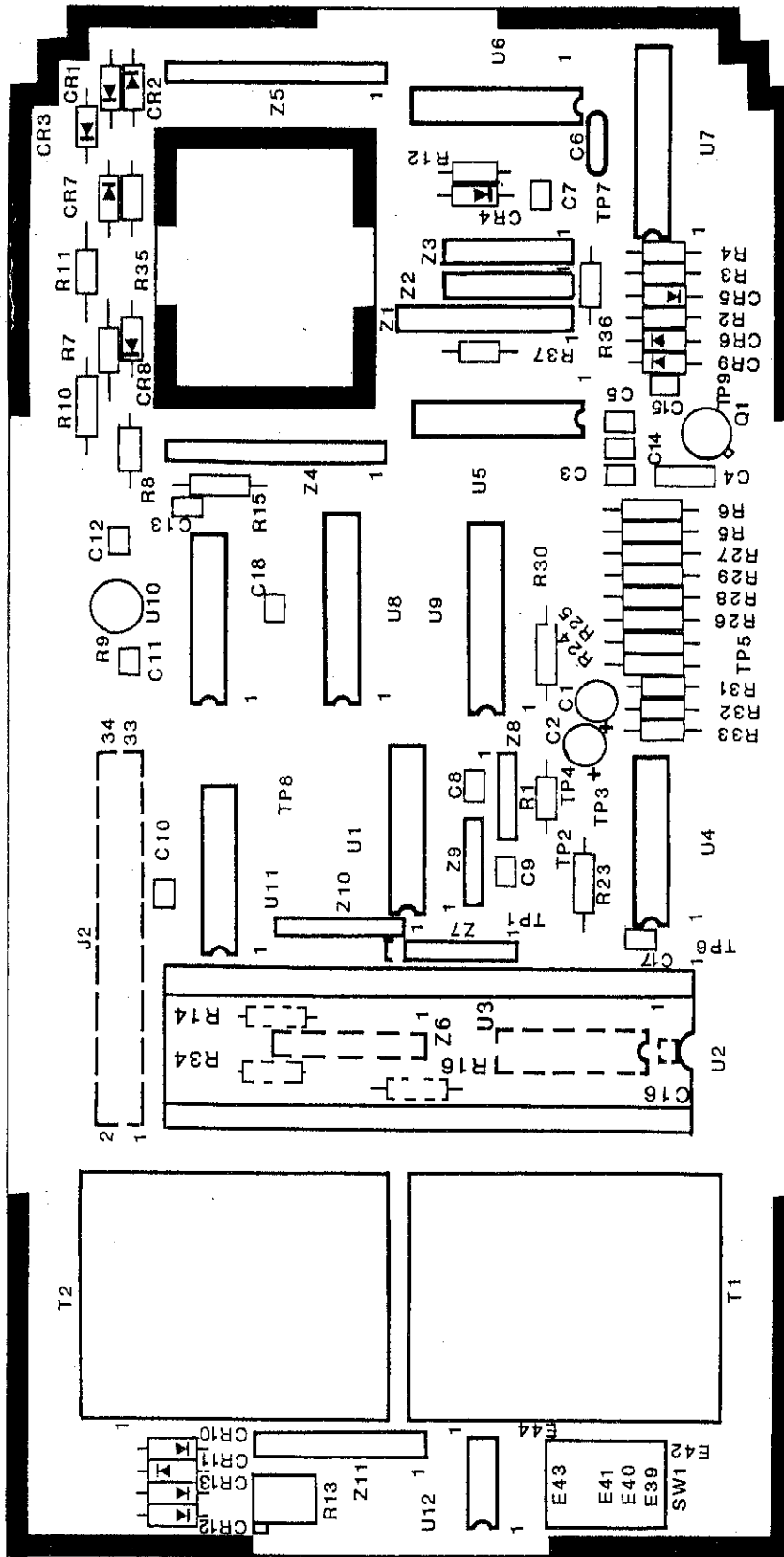


Figure 5-2. Analog CCA A1, Parts Location Diagram

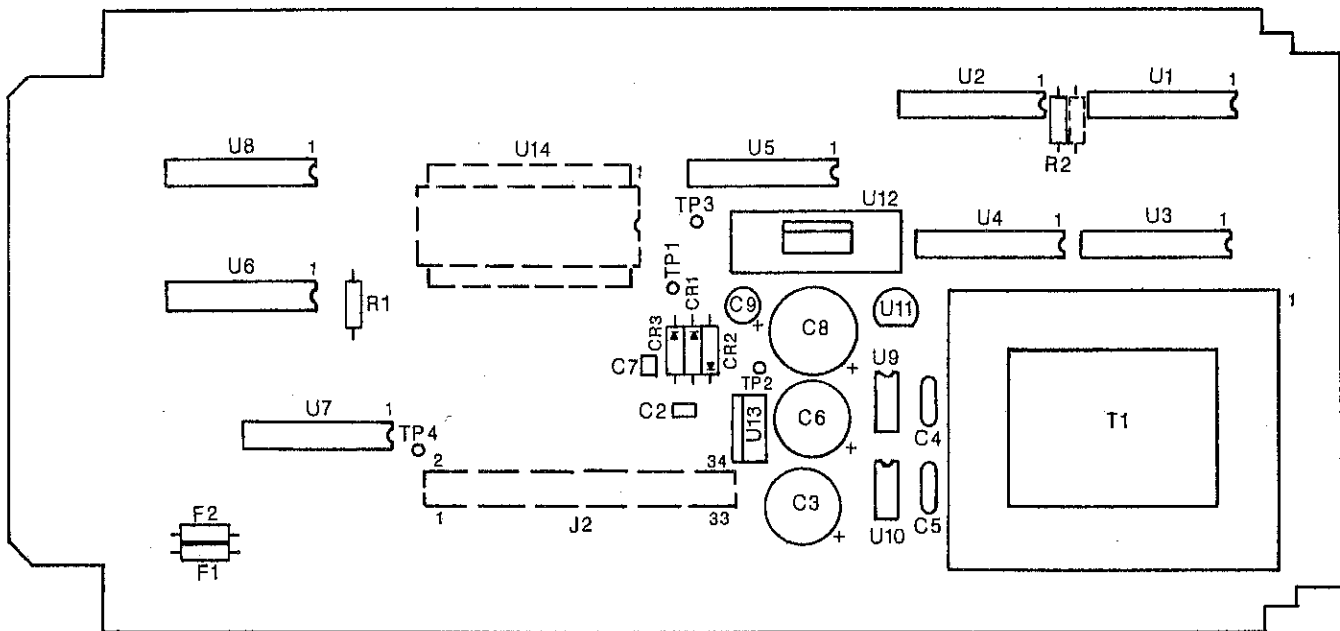
787003-H

Table 5-10. Digital Circuit Card Assembly A2 - 787002-1, -2, -3

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
A2	Digital Circuit Card Assembly (CCA)	787002-1	07342	787002-1	A
A2	Digital CCA	787002-2	07342	787002-2	B
A2	Digital CCA	787002-3	07342	787002-3	C
C2	Capacitor, Ceramic, 0.1 uf, 50 V, $\pm 10\%$	807730	81349	CK05BX104K	
C3	Capacitor, Electrolytic, Aluminum, 1000 uf, 16 V, -10+50%	885310	74840	108CKR016MPX	
C4	Capacitor, Ceramic, 0.01 uf, 100 V, $\pm 10\%$	883357	81349	CK05BX103K	
C5	Same as C4				
C6	Capacitor, Aluminum, 100 uf, 63 V, -10+75%	808494	74840	107CKR063M-PX	
C7	Same as C2				
C8	Capacitor, Electrolytic, Aluminum, 220 uf, 35 V, -10+75%	808491	56289	502D227G035DG5C	
C9	Capacitor, Electrolytic, Tantalum, 1.0 uf, 35 V, $\pm 20\%$	807192	56289	196D105X9035HA1	
CR1	Diode, Power Rectifier	880112	04713	1N4002	
CR2,CR3	Same as CR1				
F1	Fuse, .25 Amp, 125 V	808502	75915	275.250	
F2	Fuse, 1 Amp, 125 V, Subminiature Picofuse	808517	75915	275001	
R1	Resistor, Composition, 10 k, 1/8 W, $\pm 5\%$	880830	01121	BB1035	
R2	Resistor, Composition, 100 ohm, 1/8 W, $\pm 5\%$	882538	81349	RC05GF101J	
T1	Transformer, Power, 26 V and 115 V	808447	07342	808447	
U1	IC, TTL, BCD to 7-segment Decoder/Driver	808501	01295	SN74LS347N	

Table 5-10. Digital Circuit Card Assembly A2 - 787002-1, -2, -3 (Continued)

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
U2-U5	Same as U1				
U6	IC, TTL, Hex Bus Driver	883506	01295	74LS367N	
U7,U8	Same as U6				
U9	IC, Diode, Bridge Rectifier, 50 V	807704	30857	VM08	
U10	Same as U9				
U11	IC/L, Voltage Regulator, +12 V	808499	12040	LM340LAZ-12	
U12	IC/L, Voltage Regulator, -12 V	808500	12040	LM320T-12	
U13	IC/L, Voltage Regulator, +5 V	808498	12040	LM340T-5.0	
U14	IC, EPROM, Programmed	886907	07342	886907	B
XU12	Heat Sink, TO-220, (Screw Mounted on U12)	885280	30161	5771B	
XU14	Socket, 24-pin	808004	00779	2-640361-3	B



787002-H

Figure 5-3. Digital CCA A2, Parts Location Diagram

Table 5-11 Readout CCA A1A1 - 787001-1, -2

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
A1A1	Readout CCA	787001-1	07342	787001-1	A
A1A1	Readout CCA	787001-2	07342	787001-2	B
DS1	LED Display, 7 Segment, Common Anode, Red	885642	AAAAA	LTS 6960HR	A
DS2-DS5	Same as DS1				
DS1	LED/Digital/Display Tube, Common Anode, 7 Segment, Green	885220	14936	MAN-6460	B
DS2-DS5	Same as DS1				
Z1	Resistor, Network, 100 ohm, 2%, 10-pin, 5 Res, SIP	808480	32997	4310R-102-101	
Z2-Z7	Same as Z1				

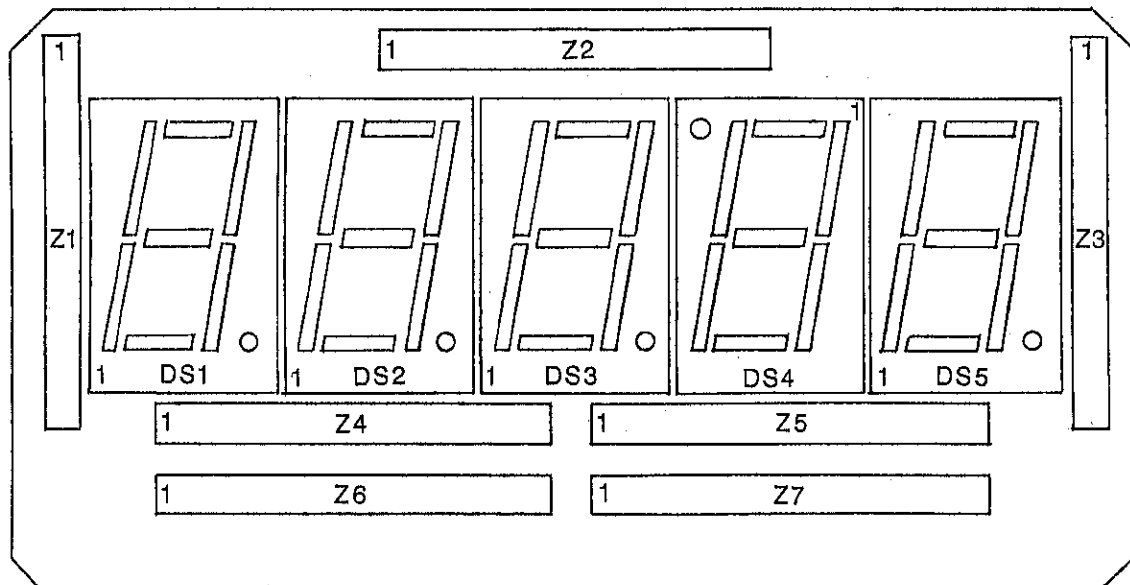


Figure 5-4. Readout CCA A1A1, Parts Location Diagram

Table 5-12. LED Dimmer Circuit Card Assembly A3 (Option FX1) - 787129

<u>Ref Des</u>	<u>Description</u>	<u>NAI P/N</u>	<u>FSCM</u>	<u>Mfr P/N</u>	<u>UOC</u>
C1	Capacitor, Mica, 750 pf, 300 V, <u>+1%</u>	807352	72136	DM15F751F	
C2	Same as C1				
C3	Capacitor, Ceramic, 0.01 uf, 200 WVDC, <u>+10%</u>	808487	56289	CKR06BK103KL	
Q1	Transistor, Signal, NPN	808190	5L401	2N3566	
Q2	Transistor, Power, PNP	808585	04713	2N3719	
R1	Resistor, Metal Film, 909 k, 1/4 W, <u>+1%</u>	808584	91637	CMF55909KT1 1%	
R2	Resistor, Composition, 5.1 k, 1/4 W, <u>+5%</u>	880089	01121	CB5125	
R3	Resistor, Composition, 3 k, 1/4 W, <u>+5%</u>	880784	01121	CB3025	
R4	Resistor, Composition, 100 ohm, 1/2 W, <u>+5%</u>	880601	01121	EB1015	
R5	Resistor, Variable, 1 M, 2 1/4 W, <u>+10%</u> (NOTE: Supplied loose - requires customer installation)	808587	01121	JA1N056S105UA	

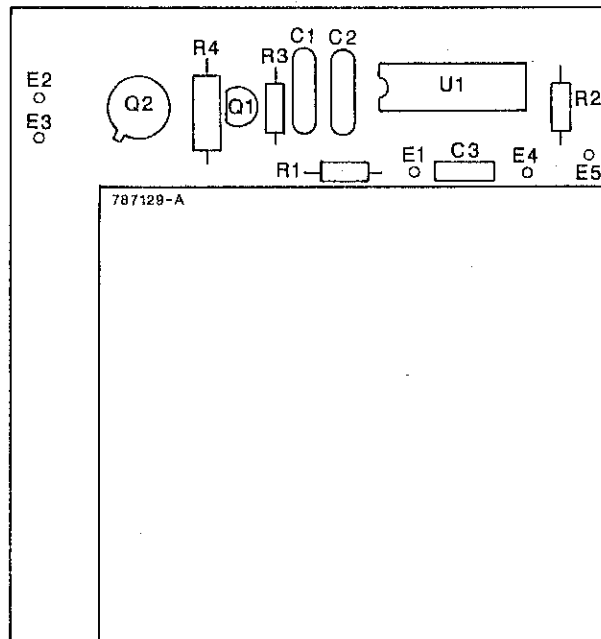


Figure 5-5. LED Dimmer CCA A3, Parts Location Diagram

Table 5-13. List of Manufacturers

<u>Code</u>	<u>Name and Address</u>	<u>Code</u>	<u>Name and Address</u>
00779	Amp, Inc. P.O. Box 3608 Harrisburg, PA 17105	14936	General Instrument 600 West John Street Hicksville, NY 11802
01121	Allen Bradley 1201 South 2nd Street Milwaukee, Wisconsin 53204	18612	Vishay Intertechnology Inc. Vishay Resistor Prods. Group 63 Lincoln Highway Malvern, PA 19355
01295	Texas Instrument Semiconductor Component Div. 13500 North Central Expressway Dallas, TX	19647	Caddock Electronics Inc. 1717 Chicago Avenue Riverside, CA 92507
02111	Spectrol Electronics Corp. Subsidiary of Carrier Corp. 17070 E. Gale Avenue City of Industry, CA 91745	19701	Mepco/Electra Inc. A North American Philips Co. P.O. Box 760 Mineral Wells, TX 76067
02735	RCA Corp. Solid State Route 202, Somerville, NJ	30161	Aavid Engineering, Inc. 30 Cook Court Laconia, NH 03246
04713	Motorola Semiconductor Products 5005 East McDowell Road Phoenix, AZ	30857	Varo Inc. 900 North Shiloh Road Garland, TX
06665	Precision Monolithics 1500 Space Park Road Santa Clara, CA 95050	31433	Union Carbide Corporation Electronics Division Highway 276 S E P.O. Box 5928 Greenville, SC 29606
06776	Robinson Nugent Inc. E. 8th St., New Albany, IN 47150	31781	EDAC Inc. 20 Railside Road Don Mills, Ont., Canada M3A 1A4
06947	TRW Equipment Co. Cleveland, OH	32997	Bourns Inc. 1200 Columbia Avenue Riverside, CA
07263	Fairchild Camera and Instrument Corp. Semiconductor Division 401 Ellis Street P.O. Drawer 7284 Mountain View, CA 94042	5L401	Solid State, Inc. 46 Farrand Street Bloomfield, NJ 07003-2516
07342	North Atlantic Industries, Inc. 60 Plant Avenue Hauppauge, NY 11788	56289	Sprague Electric Company 335 Marshall Street North Adams, MA
07716	IRC, Div. TRW Inc. 2850 Mt. Pleasant Road Burlington, IA	72136	Elmenco South Park & John Streets Willimantic, CT
12040	National Semiconductor Corporation Commerce Drive, P.O. Box 443 Danbury, CT 06810		

Table 5-13. List of Manufacturers (Continued)

<u>Code</u>	<u>Name and Address</u>	<u>Code</u>	<u>Name and Address</u>
72982	Erie Technological 644 West 12th Street Erie, PA	91637	Dale Electronics, Inc. Box 609 Columbus, NB
75915	Littelfuse, Inc. 800 E.N.W. Highway Des Plaines, IL	95750	Republic Electronic Industries 575 Broad Hollow Road Farmingdale, NY 11746
81349	Military Specification promulgated by Military Departments/Agencies under Authority of Defense Stan- dardization Manual	AAAAA	LITON (Lite-On Corp.) Suite 570 - 4951 Airport Pkwy. Dallas, TX 75248

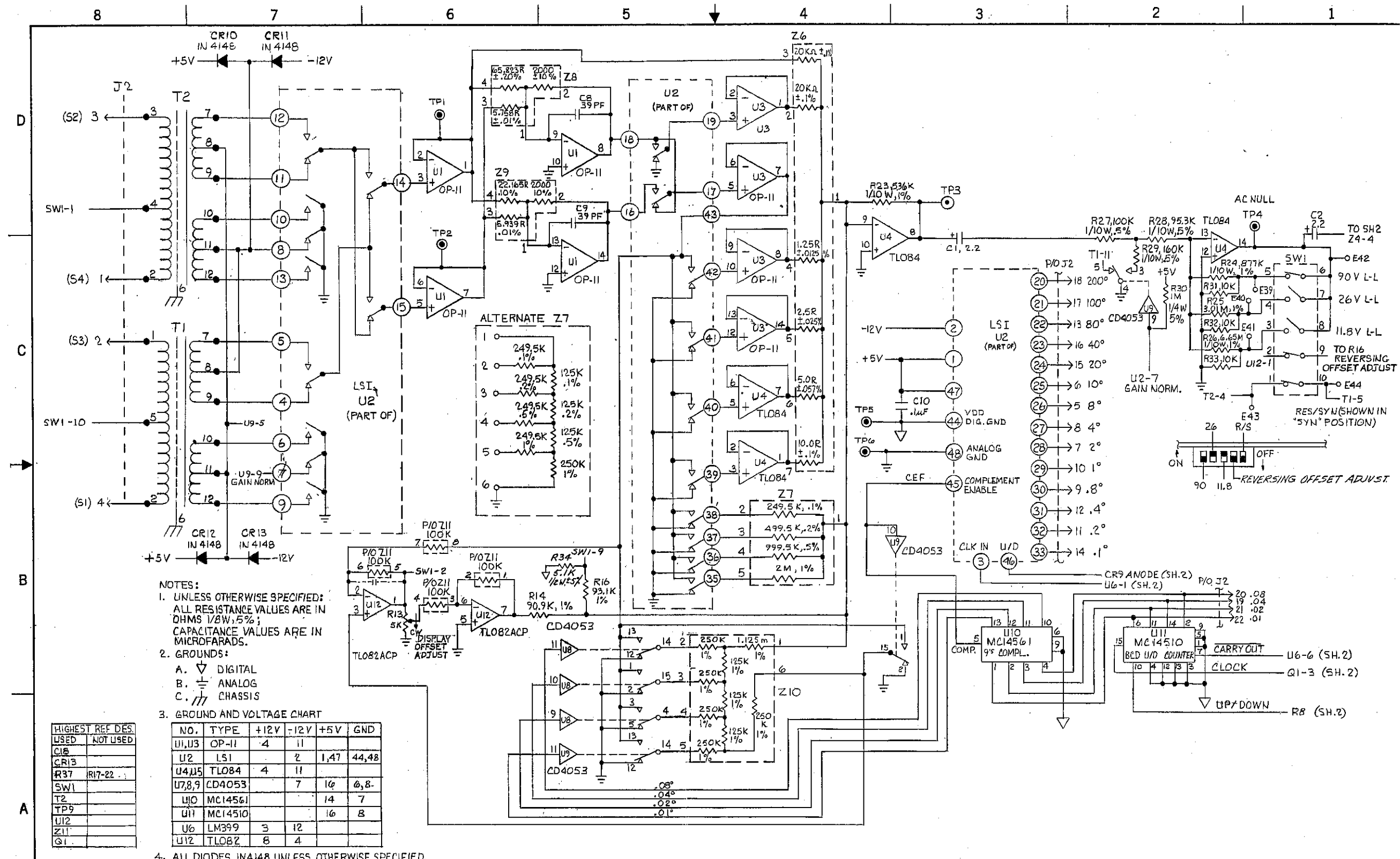
SECTION 6

UNIT SCHEMATICS

6.1 INTRODUCTION

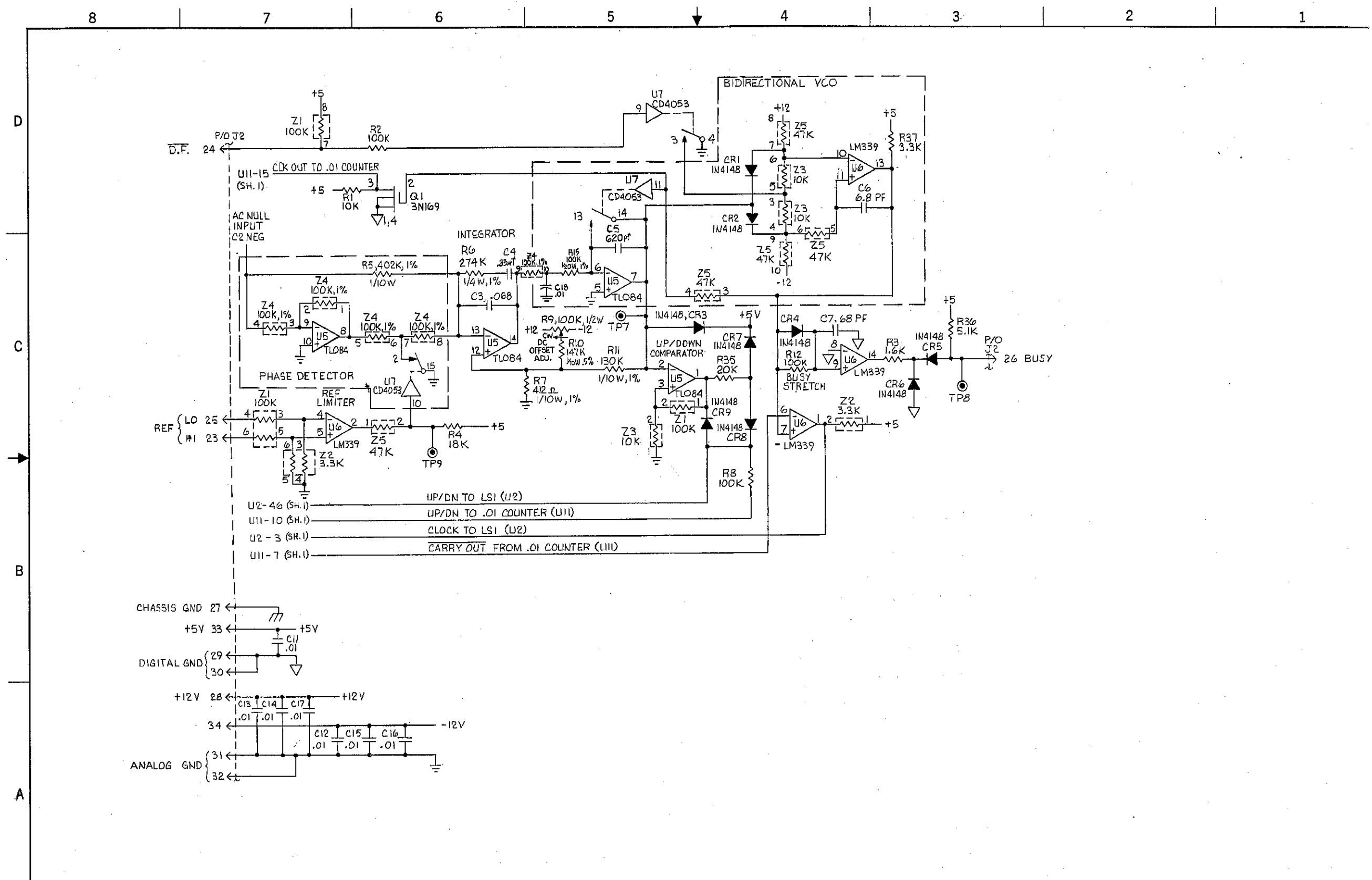
This section contains schematic diagrams for the Model 801 Synchro Panel Meter.

<u>Figure</u>	<u>Title</u>	<u>Page</u>
6-1	Analog Circuit Card Assembly (CCA) A1, Schematic Diagram	6-3
6-2	Digital CCA A2, Schematic Diagram	6-7
6-3	Readout CCA A1A1, Schematic Diagram	6-9
6-4	LED Dimmer CCA A3, Schematic Diagram	6-11



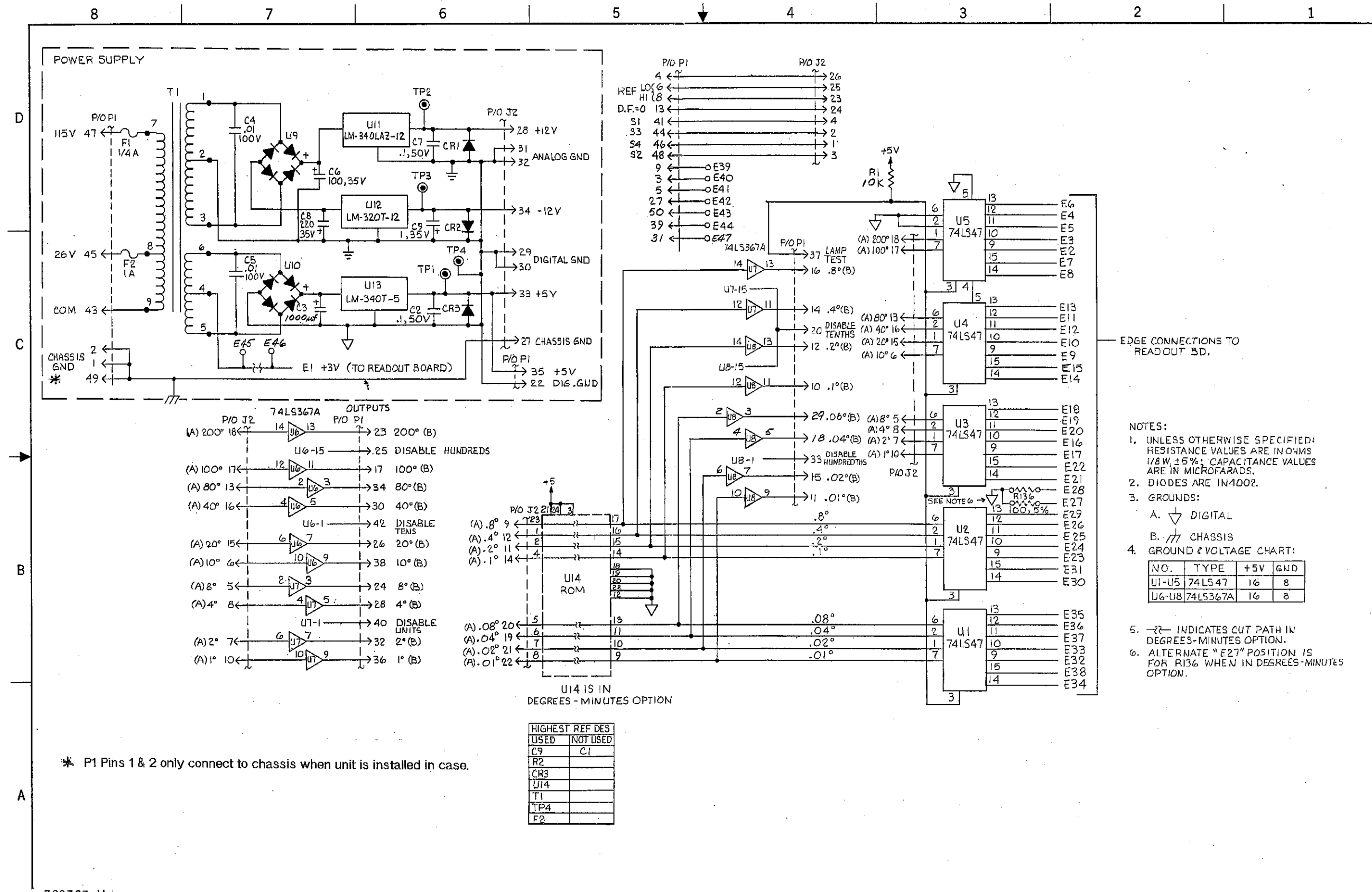
768728-1-H

Figure 6-1. Analog CCA A1, Schematic Diagram (Sheet 1 of 2)



768728-2-C

Figure 6-1. Analog CCA A1, Schematic Diagram (Sheet 2 of 2)



* P1 Pins 1 & 2 only connect to chassis when unit is installed in case.

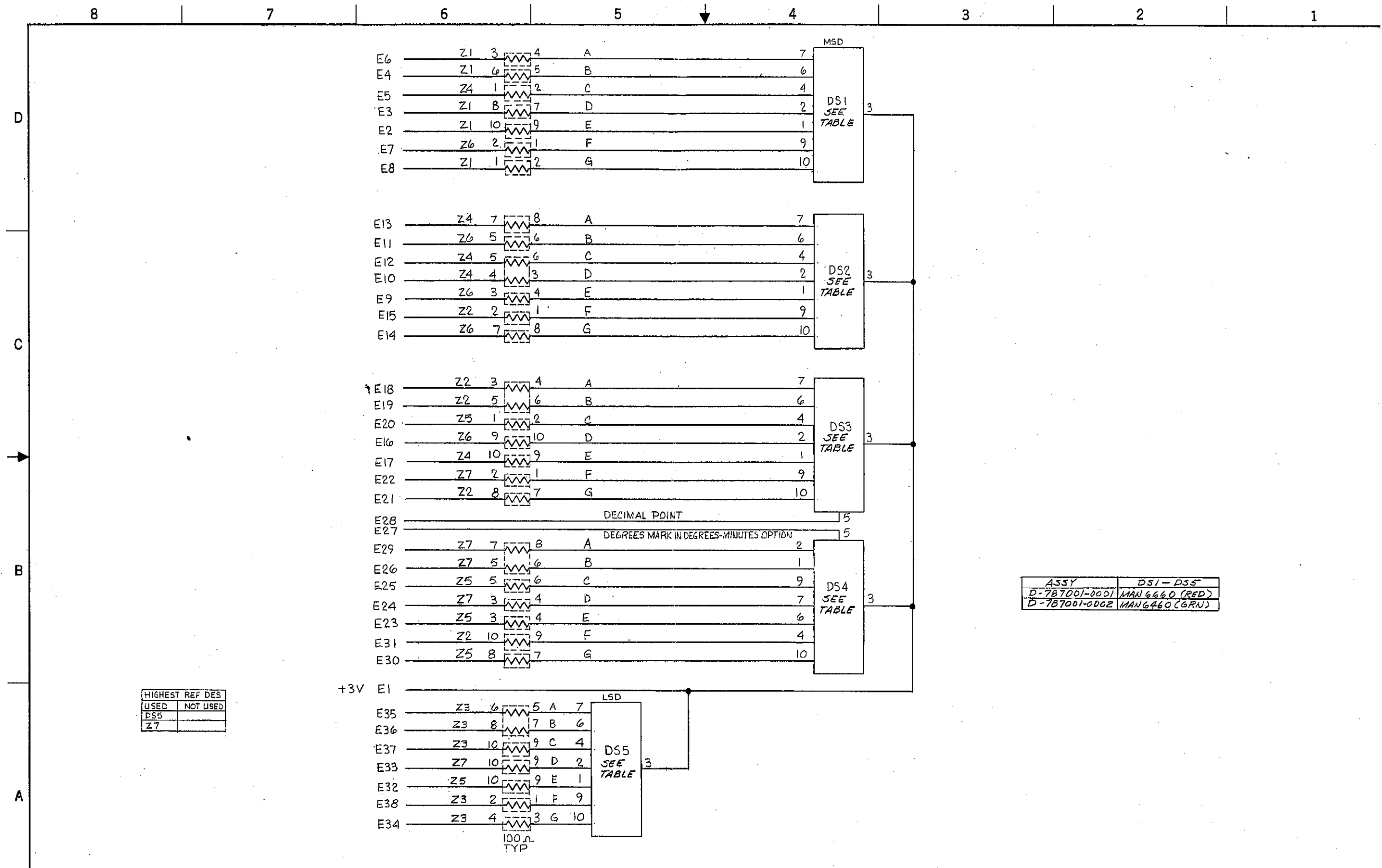
HIGHEST REF DES USED	NOT USED
C9	C1
R2	
CR3	
U14	
T1	
TP4	
F2	

- NOTES:
- UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS 1/8 W, ±5%; CAPACITANCE VALUES ARE IN MICROFARADS.
 - DIODES ARE IN4002.
 - GROUND:
 - A. DIGITAL
 - B. CHASSIS
 - GROUND & VOLTAGE CHART:

NO.	TYPE	+5V	GND
U1-U5	74LS47	16	8
U6-U8	74LS367A	16	8
 - ??- INDICATES CUT PATH IN DEGREES-MINUTES OPTION.
 - ALTERNATE "E27" POSITION IS FOR R136 WHEN IN DEGREES-MINUTES OPTION.

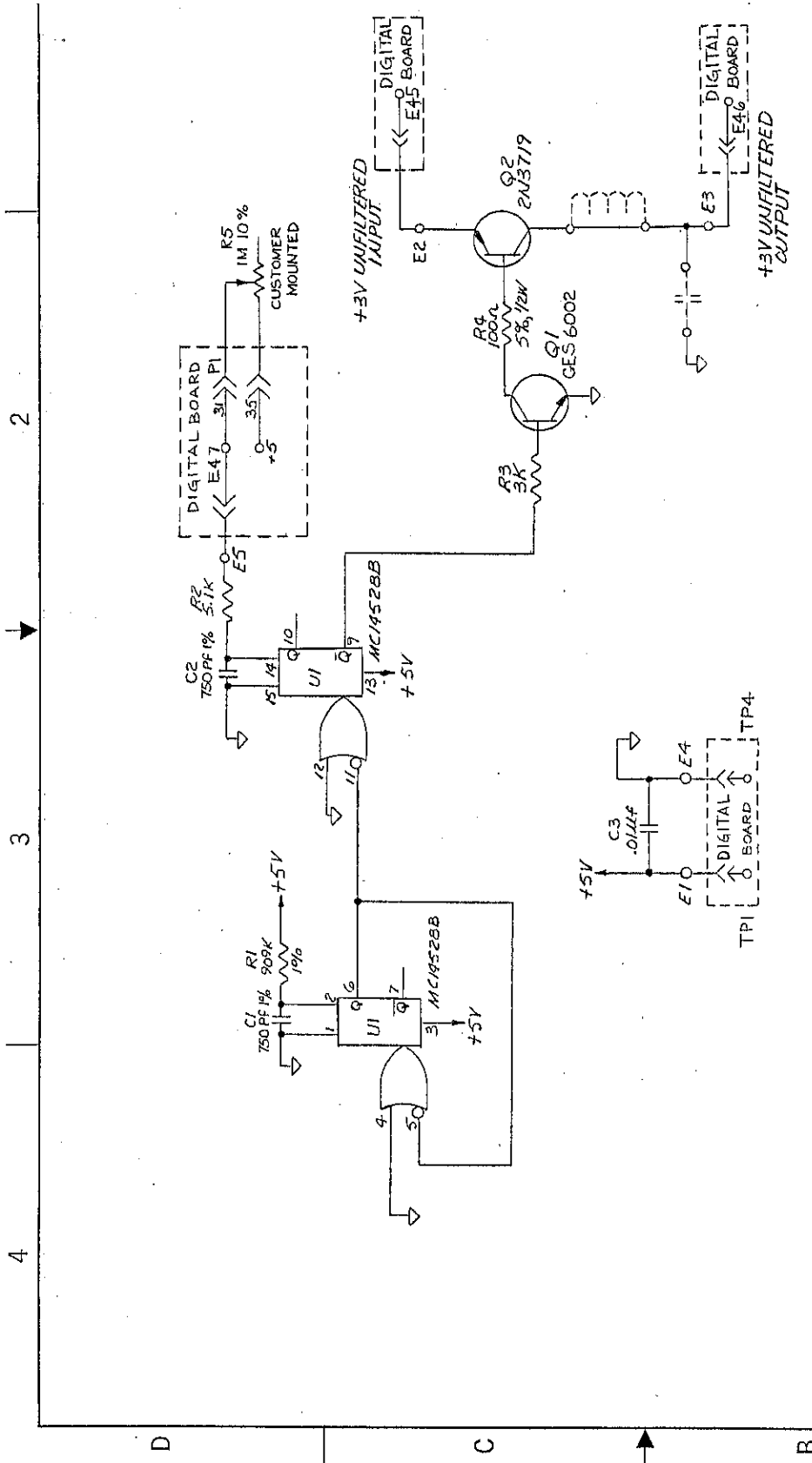
768727-H

Figure 6-2. Digital CCA A2, Schematic Diagram



768726-D

Figure 6-3. Readout CCA A1A1, Schematic Diagram



- NOTES: UNLESS OTHERWISE SPECIFIED:
 1. ALL RESISTORS ARE 1/4 W, 5%
 2. ALL CAPACITORS ARE IN PICOFARADS

768791-B

Figure 6-4. LED Dimmer CCA A3, Schematic Diagram

SECTION 7

UPDATE INFORMATION

7.1 INTRODUCTION

As NAI continues to improve the performance of the Model 801, corrections and modifications to the

manual may be required. This section contains Product Revision Sheet (PRS) data which updates the unit to the most current configuration available.

WARRANTY

- A. The seller warrants products against defects in material and workmanship for one year from the date of original shipment. The seller's liability is limited to the repair or replacement of products which prove to be defective during the warranty period. There is no charge under the warranty except for transportation charges. The purchaser shall be responsible for products shipped until received by the seller.
- B. The seller specifically excludes from the warranty 1) calibration, 2) fuses, and 3) normal mechanical wear, e.g.: end-of-life on assemblies such as switches, relays, gear trains, etc. is dependent upon number of operations or hours of use, and end-of-life may occur within the warranty period.
- C. The seller is not liable for consequential damages or for any injury or damage to persons or property resulting from the operation or application of products.
- D. The warranty is voided if there is evidence that products have been operated beyond their design range, improperly installed, improperly maintained or physically mistreated.
- E. The seller reserves the right to make changes and improvements to products without any liability for incorporating such changes or improvements in any products previously sold, or for any notification to the purchaser prior to shipment. In the event the purchaser should require subsequently manufactured lots to be identical to those covered by this quotation, the seller will, upon written request, provide a quotation upon a change control program.
- F. No other warranty expressed or implied is offered by the seller other than the forgoing.

CLAIMS FOR DAMAGE IN SHIPMENT

The purchaser should inspect and functionally test the product(s) in accordance with the instruction manual as soon as it is received. If the product is damaged in any way, including concealed damage, a claim should be filed immediately with the carrier, or if insured separately, with the purchaser's insurance company.

SHIPPING

On products to be returned under warranty, await receipt of shipping instructions then forward the instrument prepaid to the destination indicated. The original shipping container with their appropriate blocking and isolating material is the preferred method of packaging. Any other suitable strong container may be used providing the product is wrapped in a sealed plastic bag and surrounded with at least four inches of shock absorbing material to cushion firmly, preventing movement inside the container.

DECLARATION OF CONFORMITY

We **NORTH ATLANTIC INDUSTRIES**
110 WILBUR PL.
BOHEMIA, NY 11716-2416

declare under our sole responsibility that the product(s)

800 SERIES SYNCHRO PANEL METERS

to which this declaration relates is in conformity with the following standard(s) or other normative document(s):

EN 50081-1: 1992 EN 55022; CONDUCTED EMISSIONS
EN 55022; RADIATED EMISSIONS

EN 50082-1: 1992 IEC 801-2; 1984 ESD
IEC 801-3; 1984 RADIATED IMMUNITY
IEC 801-4; 1988 EFT BURST

EN 61010-1: 1993/A2: 1995 SAFETY

following the provisions of COUNCIL DIRECTIVE 89/336/EEC
73/23/EEC

Place Bohemia, NY, U.S.A.

Roger V. Maurizio
(Signature)

Date 8/19/08

Roger V. Maurizio
(Full Name)

Quality Manager
(Position)

