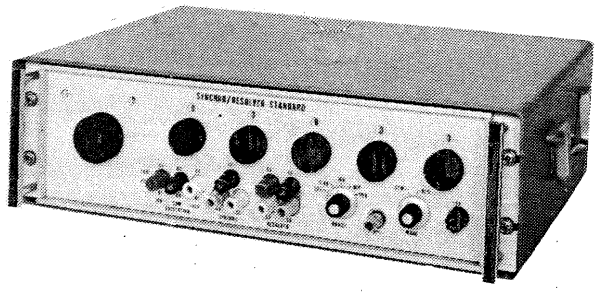
TECHNICAL MANUAL

asi

decade synchro/resolver standards

MODEL SERIES

Model No.	Resolution:
A1202 S/R-1	1°
A1202 S/R-.1	.1°
A1202 S/R-.01	.01°
A1202 S/R-.001	.001°
A1202 S/R-.0001	.0001°



Advanced Instrumentation

astrosystems, inc.

6 Nevada Drive/Lake Success, New York 11040/516/328-1600/TWX 510/223-0411
Washington, D.C.:Suite 5031/1629 K Street, N.W./Washington, D.C. 20006/202/296-4380
West Coast: 4301 West Commonwealth Avenue/Fullerton, California 92633/714/523-0820

CERTIFICATION

Astrosystems certifies that its products are thoroughly tested and inspected and meet applicable published specifications when shipped from the factory. The accuracy of all test equipment is traceable to the National Bureau of Standards.

WARRANTY

Astrosystems uses only the highest quality materials and workmanship in manufacturing. All products are guaranteed against defects in materials and workmanship for a period of one year from the invoice date. This warranty does not extend to any of our products which have been subjected to misuse, neglect, accident or improper installation or application. Nor shall it extend to products which have been repaired or altered outside the factory without factory consent.

REPAIR POLICY

Maintenance Manuals are provided with Astrosystems converters to provide routine hook-up, interface information, periodic calibration, and adjustment.

Factory repair service is provided at rates which reflect the parts and labor actually supplied. For service under the above warranty, please advise promptly the factory, or representative if outside the United States, of all pertinent details. The unit must be returned to the factory pre-paid.

APPLICATION ASSISTANCE

Astrosystems maintains a staff of application engineers to assist customers in the use and application of its equipment. Contact the factory for assistance in the solution of the problems that arise in the use of this equipment that are not covered in this manual.

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SAFETY NOTICE

CAUTION

In operating this instrument, certain precautions must be observed:

Never pass DC through any of the windings. This may cause significant and permanent deterioration of the transformer core material.

Never reverse-excite the output, as this may develop destructive internal voltage levels, causing breakdown and consequent permanent damage to the insulation of the components.

Never apply more than the rated output voltage to the input terminals.

Never apply input signals of substantially different frequency than the rated frequency or frequency range. Small variations (±10%) are not harmful.

SECTION I

INTRODUCTION

1-1. SCOPE

1-2. This manual describes the Synchro/Resolver Standard Models listed in table 1-1. This description includes physical description, theory of operation, installation, operating instructions, maintenance instructions and reference drawings and a parts list. This manual is in effect upon receipt and extracts from this publication may be used to facilitate the preparation of Department of Defense publications. Any use of this manual other than to support Department of Defense publication is prohibited without express written consent of Astrosystems, Inc.

1-3. PURPOSE

1-4. The Synchro/Resolver Standard, is designed to provide 3-wire synchro or 4-wire resolver signals that define angles from 0^{o} to 360^{o} increments of 1^{o}, 0.1^{o}, 0.01^{o}, 0.001^{o}, or 0.0001^{o}, depending on the Model. Refer to table 1-1. The accuracy of a selected angle for all models is ± 2 seconds of arc. A series of front panel knobs are used to select the angle which is displayed on a front panel decimal readout. All connections are made at terminals on the front panel.

1-5. CAPABILITIES

1-6. The capabilities of the Synchro/Resolver Standard are listed in table 1-2.

1-7. MODEL DIFFERENCES

1-8. The only functional difference between the models described in this manual is that of resolution and this difference :vs: Model is listed in table 1-1.

1-9. RERERENCE DATA

1-10. All models of the Synchro/Resolver Standard described herein are designed for either case or rack mounting and have the following dimensions: height=5-1/2", width=19", and depth=13-1/2". The standard units are case mounted while the rack mounted units are designated by the letter "R" at the end of their respective model number. Weights and shipping weights are given in table 1-1.

TABLE 1-1. MODEL DIFFERENCES

MODEL NO. A1202-S/R-	RESOLUTION (DEGREE)	WEIGHT (lbs)	SHIPPING WEIGHT (lbs)
1	1.0	46.0	63.0
.1	0.1	46.5	63.5
.01	0.01	47.0	64.0
.001	0.001	47.5	64.5
.0001	0.0001	48.0	65.0

TABLE 1-2. SYNCHRO/RESOLVER STANDARD CAPABILITIES

PARAMETER	CHARACTERISTICS
Angular Range	0 to 360 degrees
Angular Accuracy	±2 seconds of arc
Output Voltage	115, 90, 26, and 11.8 volts rms
Frequency Range	200 to 800 Hz
Resolution by Model:	
A1202-S/R-1	1.0°
A1202-S/R-.1	0.1°
A1202-S/R-.01	0.01°
A1202-S/R-.001	0.001°
A1202-S/R-.0001	0.0001°
Transformer Ratio Variation	±1%
Maximum Effective Output Impedance Unbalance	115 and 90 volts = 0.05 + j0.005 ohm 26 and 11.8 volts = 0.01 + j0.001 ohm
Output Quadrature and Harmonics	±0.005%

SECTION II

DESCRIPTION

2-1. PHYSICAL DESCRIPTION

2-2. A top and front view of the Synchro/Resolver Standard is shown in ASI Drawing 101-2315 in Section 6 . All controls, the fuse, and input and output connection terminals are mounted on the front panel. The chassis is secured to front panel and both slide into a shell-type case and the unit secured in the case by four Phillips-head machine screws. The cover and chassis can easily be separated after removing the screws by sliding the front panel forward while holding the case. The case comes equipped with two handles on each side for ease of handling.

2-3. THEORY OF OPERATION

2-4. REVIEW OF RESOLVER FUNDAMENTALS. Resolvers normally include two stator and two rotor windings. In a resolver control transmitter, the referenced voltage is applied to one of the stator windings which functions as a primary. The secondary produces two separate voltages that are a function of the angular position of the rotor. One voltage is proportional to the sine of rotational angle the second is proportional to the cosine of the rotor angle as shown in figure 2-1. The angular accuracy of such a device can be briefly defined as the difference between the

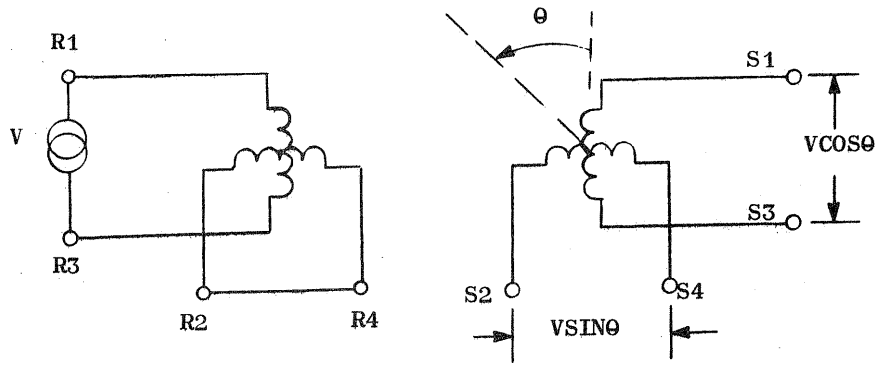

Figure 2-1. Symbolic Representation of a Resolver

mechanical position and the electrical error and is expressed in angular units. The accuracy is of course dependent on many design factors, such as rotor electrical balance, winding compensation, loading, effect of temperature variations, etc. Thus, the electrical position defined by the resolver is: $\tan^{-1} \theta = V \sin \theta / V \cos \theta$. It is important to note that it is the RATIO that defines θ and the magnitude of the actual voltages are relatively unimportant in determing the angle. In practice, the voltages would be maintained close to normal values.

2-5. REVIEW OF SYNCHRO FUNDAMENTALS. In perfect synchro device, figure 2-2 the relationship between the three line-to-line (stator) voltages and the mechanical angle of the rotor with respect to electrical zero are:

(1) $V_{(S3-S1)} = V \sin (\theta)$

(2) $V_{(S2-S3)} = V \sin (\theta + 240^{o})$

(3) $V_{(S1-S2)} = V \sin (\theta + 120^{o})$

Where, θ is the rotor angle and V is proportional to rotor excitation.

2-6. The term V is called the effective (RMS) stator (line-to-line) voltage whose maximum value is dependent on the type of synchro (model) used. A representation of these voltages are shown in Figure 2-3.

2-7. Three wire synchro signals can be developed from four wire resolver transmitter signals (V sin θ, V cos θ) by use of a Scott-T connected transformer. The connections and ratios for such a transformation are shown in figure 2-4. Astrosystems Synchro/Resolver Standard develops resolver type signals for resolver mode and employs the Scott-T technique to obtain synchro signals for synchro mode of operation.

2-8. FUNCTIONAL DESCRIPTION (See Figure 2-5) All models of the Synchro/Resolver Standard employ the same design technique for developing four wire resolver-type signals (sin θ, cos θ). For synchro mode of operation these signals are converted to synchro type signals by use of Scott-T connected transformers. This design consists of multi-tapped high precision toroidally

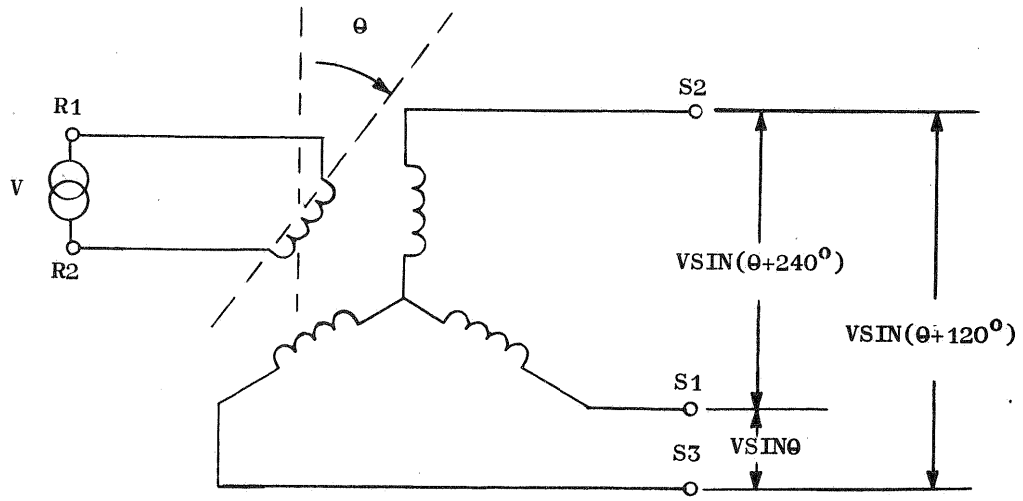

Figure 2-2. Schematic Diagram of a Synchro Control Transmitter

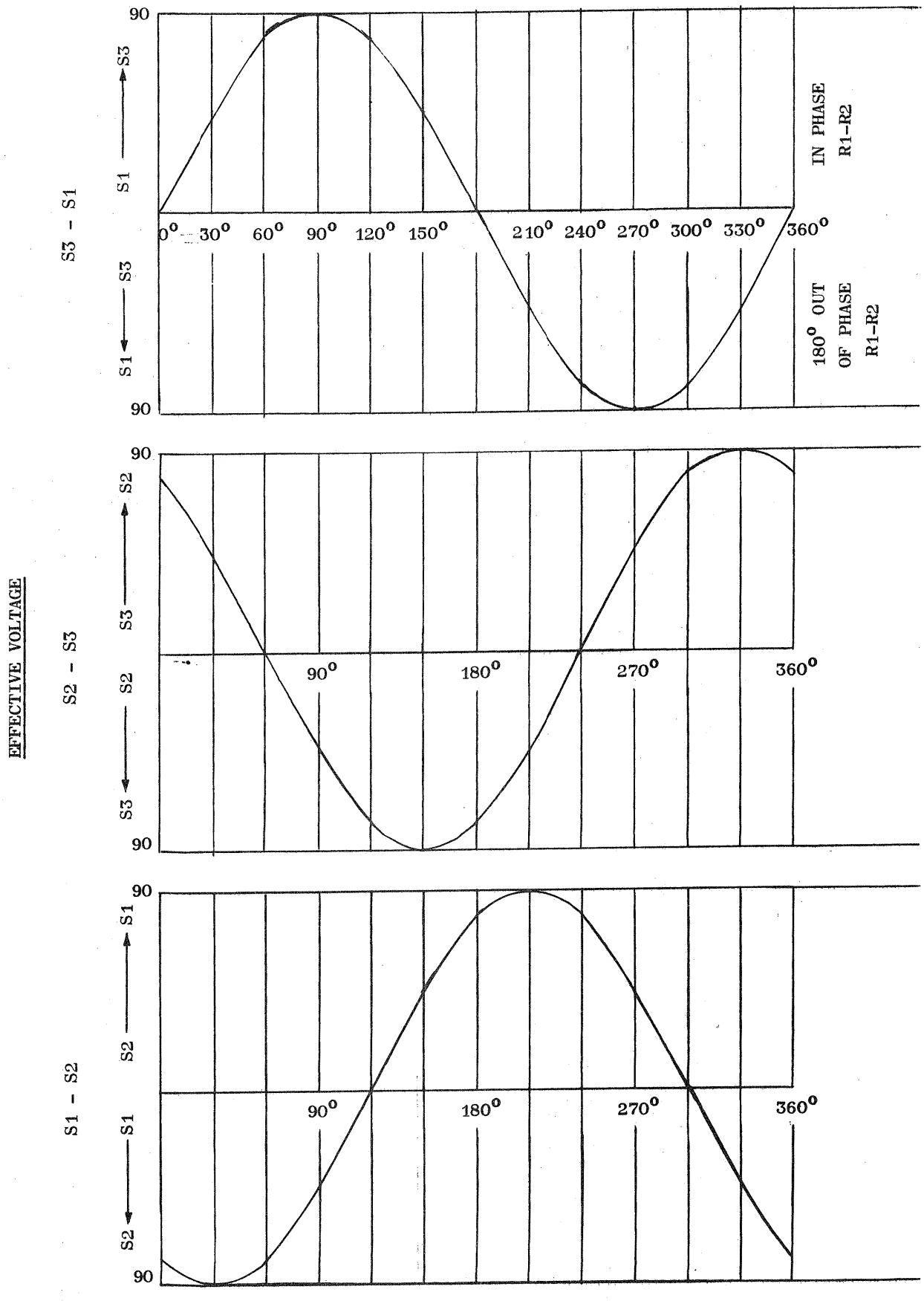

Figure 2-3. Synchro Control Transmitter Stator Voltages

wound ratio transformers that are connected into a bridge circuit configuration by means of the front panel decade switches. Since the only difference between models is the degree of resolution, the number of switches and transformers vary from model to model accordingly.

2-9. The following simplified description of the operation of the bridge circuit will deal with the model A1202-S/R-.1. See figure 2-5. Reference power is applied to transformer T2 in the bridge circuit through transformer T1. Ratio transformer T2 is tapped to provide accurate voltage ratios that are scaled to represent the sine and cosine of angles from zero degree to 90 degrees in 10-degree steps. This range of angles are designated angle A. Section A of ratio transformers T3 and T4 are tapped to provide accurate voltage ratios that are scaled to represent angles from zero degree to 9 degrees in 1-degree steps. This range of angles are designated angle B. Section B of transformers T3 through T4 are similarly tapped to provide scaled voltage ratios that are used to obtain the lower order voltage values for the desired degree of resolution of the angle dialed on the front panel controls. The basic bridge circuit, however, consists of transformers T2 and section A of transformers T3 and T4 and it is this bridge that develops voltages representing angles A and B.

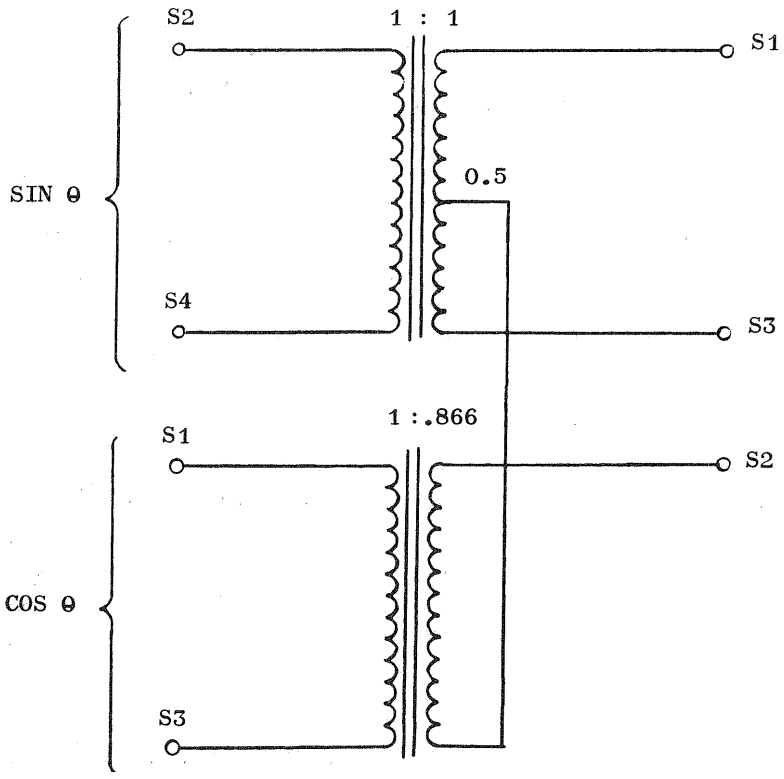

Figure 2-4. Scott-T Transformer Connections

2-10. The bridge circuit essentially solves two trigonometric identities, the results of which are voltages representing sin (θ) and cos (θ), where θ is the angle dialed on the front panel controls. These identities are:

$\sin (A + B) = \sin A \cos B + \cos A \sin B$

$\cos (A + B) = \cos A \cos B - \sin A \sin B$

The output expressions are sin (A+B) and cos (A+B). The angles (A+B) represent the analog equivalents of the decimal data set on the front panel dials.

2-11. Thus far in the discussion of the development of output signals we have been dealing with angles in the first quadrant and within the range of 0 to 89 degrees. Before dealing with angles in the remaining quadrants, the explanation will deal with obtaining the .1-degree resolution for the model being described. The .1-degree resolution is obtained using a Kelvin-Varley type connection to obtain a linear interpolation between the 1-degree increments provided by section A of transformer T4. This connection is made by double arm switch S2-B which connects the output of section A of transformer T4 across Section B of transformer T4. Thus, each 1-degree increment is sub-divided into 10 parts representing angles in the range of .1 to .9 degrees. The voltages produced by section B of transformer T4 are algebraically added to the output of section A of transformer T4. The voltage output at the arm of switch S3-B represents the sine of angles in the range of 0.0 to 89.9 degrees. The scheme employed for the generation of the required degree of resolution for the cosine signal voltage is the same as that described for the sine signal.

2-12. The linear interpolation technique and Kelvin-Varley connections are used to obtain higher orders of resolution provided by models A1202-S/R-.01, -.001, and -.0001. All that is required to obtain the specified resolution are additional transformers and switches.

2-13. The description of operation has delt with angles in the first quadrant. An inspection of the sine and cosine waveforms for the first and second quadrant reveals that the sine function in the second quadrant is identical to the cosine function of the first quadrant, and similarly, the cosine function for the second quadrant is identical to the sine function of the first quadrant if a polarity reversal is provided. Similar cases can be made for the remaining two quadrants. All that is required therefore to produce sine and cosine data for all angles in the range of 0 to 360 degrees is to provide quadrant switching. Four-arm switch S1, shown in the schematic diagram in Section 6, is used to perform quadrant switching in addition to selecting the 10-degree sine and cosine voltage ratios.

2-14. For the example given above (second quardant), the sine and cosine outputs of transformer T2 must be interchanged in the bridge circuit and the sine value must be reversed in polarity. An inspection of the connections shown for switch S1 in the schematic shows that this is the case. For angles in the second quadrant (90 to 179.9 degrees), arm B of switch S1 selects the maximum output of transformer T2 (cosine) which is fed into the sine channel. Arm C of switch S1 selects the minimum output of transformer T2 (sine) which is fed into the cosine channel. Notice that arm A is connected to ground providing the voltage reversal of the sine signal that is required if this signal is to be used to simulate the cosine function in the second quadrant.

2-15. The outputs of the bridge circuit are sine and cosine signals that represent the angle set on the front panel switches.

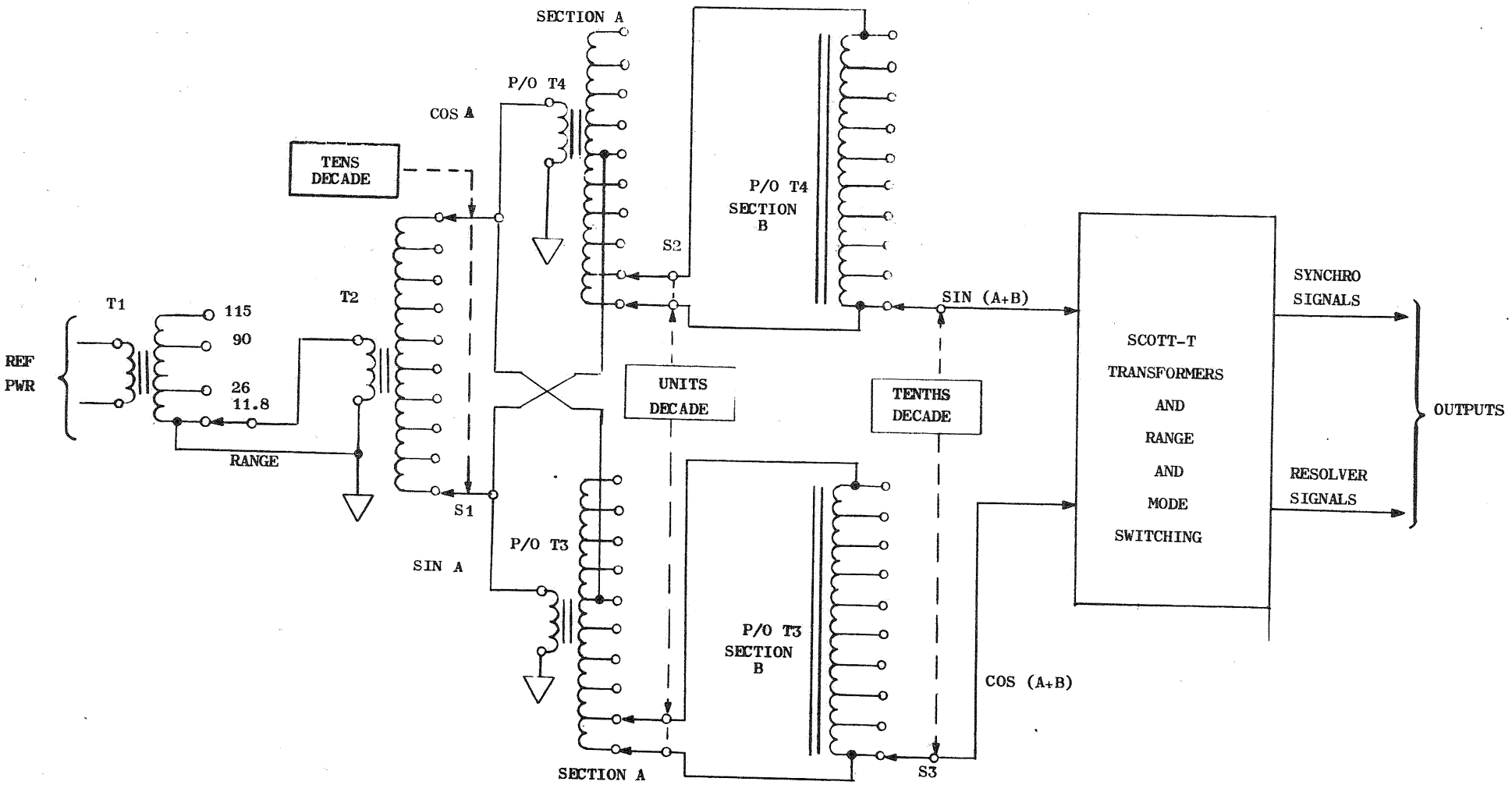

Figure 2-5. Synchro/Resolver Standard, Simplified Schematic Diagram

These signals are routed to "Scott-T" connected transformers. In resolver mode, these transformers do not operate in the Scott-T configuration. These transformers, in conjunction with the RANGE and MODE switches, provide the correct voltages for the resolver signal outputs. In synchro mode, the MODE switch establishes the Scott-T configuration, and the RANGE switch selects the taps on the Scott-T transformers for the correct voltages for the synchro signal outputs.

SECTION III

INSTALLATION

3-1. INSTALLATION

3-2. No special installation instructions are required for the Synchro/Resolver Standard. These units are designed as a portable unit. However, the unit may be rack mounted in a standard 19-inch rack. As all connections are made at its front panel, no electrical connections are necessary. when installing the unit in a rack. When installing a case unit in a rack, the four retaining screws on the front panel must be removed allowing the unit to be removed from the case. The unit is then installed in the rack and secured in place with four retaining screws or other hardware depending on rack requirements.

SECTION IV

OPERATION

4-1. OPERATING CONTROLS AND TEST CONNECTIONS

4-2. This section provides operating instructions for all models of the Synchro/Resolver Standard. Figure 4-1 shows a front panel view of the operating controls, readout, and terminals for test connections. Table 4-1 lists the front panel controls and terminals and provides a description of the function of each.

CAUTION

In operating this instrument, certain precautions must be observed:

Never pass DC through any of the windings. This may cause significant and permanent deterioration of the transformer core material.

Never reverse-excite and output, as this may develop destructive internal voltage levels, causing breakdown and consequent permanent damage to the insulation of the components.

Never apply more than the rated output voltage to the input terminals.

Never apply input signals of substantially different frequency than the rated frequency or frequency range. Small variations (±10%) are not harmful.

TABLE 4-1. OPERATING CONTROLS

CONTROL	POSITION	FUNCTION
MODE Switch	SYNCHRO	Selects synchro mode of operation. The standard provides a 3-wire synchro signal output at terminals S1, S2, and S3.
	RESOLVER	Selects resolver mode of operation. The standard provides a 4-wire resolver signal output at terminals S1-S3 and S2-S4.
RANGE Switch	OFF	Deenergizes the standard.
	11.8V	Selects correct transformer ratio for providing a synchro or resolver signal voltage of 11.8 volts line-to-line.
	26V	Selects correct transformer ratio for providing a synchro or resolver signal voltage of 26 volts line-to-line.
	90V	Selects correct transformer ratio for providing a synchro or resolver signal voltage of 90 volts line-to-line.
	115V	Selects correct transformer ratio for providing a synchro or resolver signal voltage of 115 volts line-to-line.
Decade Dials	Number Depends on model	Selects the angle that the synchro or resolver signal will define. Number of dials depends on model A1202-S/R: 1 = 3 dials .1 = 4 dials .01 = 5 dials .001 = 6 dials .0001 = 7 dials
F1-1.5A	------	Provides overload protection.
Chassis Ground	------	Provides a chassis ground connection.
EXCITATION	------	Three terminals are provided for input excitation 26V-COM-115V. Above these terminals are the rotor designations associated with RES (resolver) and SYN (synchro). Note that for RES, R3 is common and R1 is reconnected to 26V or 115V depending on excitation supplied to the standard. For SYN, R2 is common and R1 is the lead that is reconnected.
SYNCHRO Terminals	S1, S2, S3	These are the terminals at which the 3-wire synchro signal is obtained in synchro mode.
RESOLVER	S1-S3	These are the terminals at which the cosine resolver signal is obtained in resolver mode.
	S2-S4	These are the terminals at which the sine resolver signal is obtained in resolver mode.

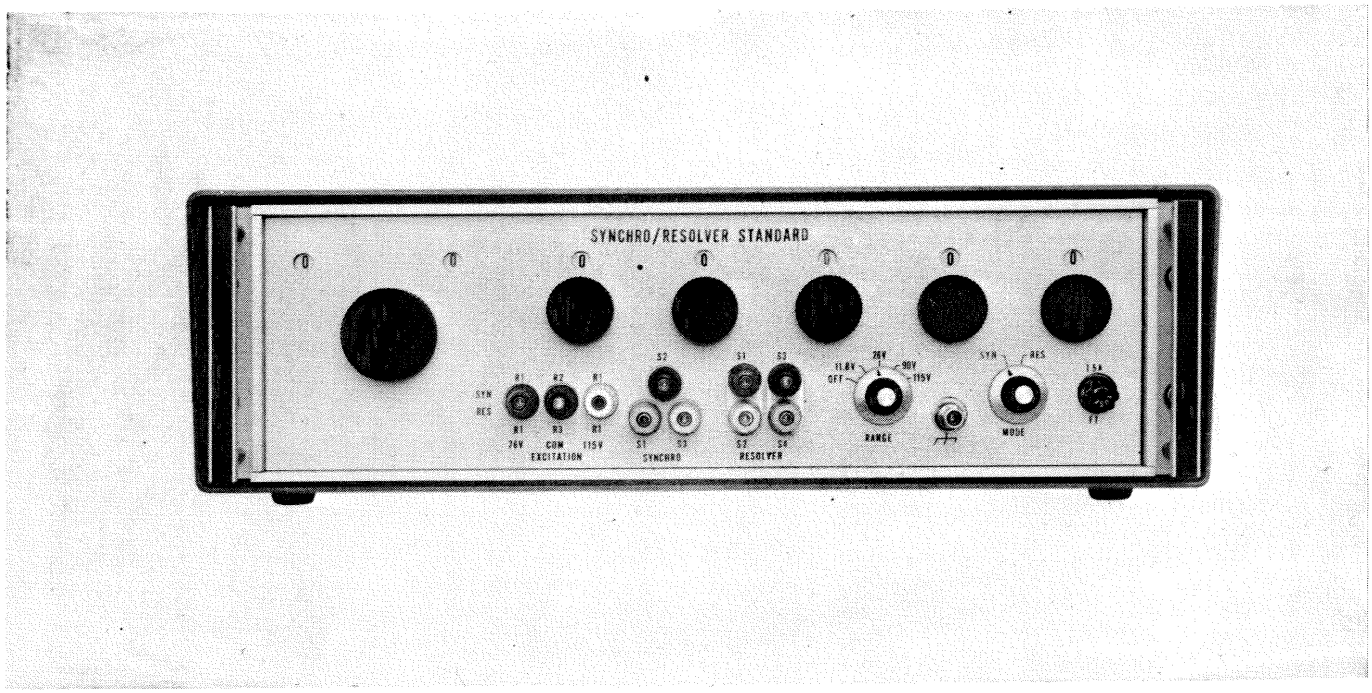

Figure 4-1. Synchro/Resolver Standard, Front View

SECTION V

MAINTENANCE INSTRUCTIONS

5-1. GENERAL

5-2. Maintenance for the standard includes routine inspection and cleaning, general repair procedures and test to insure satisfactory performance. Refer to Section 6 for all required reference assembly and schematic diagrams.

5-3. INSPECTION AND CLEANING

5-4. Before inspecting or cleaning the unit make sure all power has been removed from the unit. Inspect the exterior of the unit for evidence of damage or wear. Inspect for obvious defects that could interfere with operation of the front panel control. Check for defects in rear connectors such as loose pins. Check that fuse F1, is not "blown" and is secure. Check insulation for discolorations that could indicate shorts; broken leads, and cold solder points and other such items should be carefully checked.

5-5. Remove the cover assembly from the chassis and inspect the interior of the unit for damage to the transformer terminals and cracked or frayed insulation, and loose connections. Check switches for bent, broken or dirty contacts. Clean switch contacts with any commercial or military approved contact cleaner, for example, "GC ELECTRONICS WALSCO DE-OX-ID Electronic Contact cleaner, GC No. 19-16, WALSCO 100-116".

5-6. Use a brush to remove dust or dirt from areas not easily accessible. Use a small hand vacuum cleaner if necessary, but direct the hoze nozzle away from critical components. Wipe all accessible surfaces with a clean, dry cloth.

5-7. REPAIR

5-8. All sections and components can be reached easily for repair or replacement purposes without the need for special procedures. All transformers are mounted to the chassis with pan head screws and washers. In some instances, such as transformers or switch removal, disconnection of numerous wires is required. Wherever feasible, carefully tag each wire on removal from its terminal to avoid a misconnection when the component is replaced.

CAUTION

Use a pencil-type soldering iron with a 40 watt maximum capacity for soldering or unsoldering circuit components. Use a heat sink between the component and the joint.

5-9. CALIBRATION

5-10. The Standard should be calibrated periodically to ensure it is in proper operating order well within design specifications and not marginal. This is accomplished by checking the accuracy of the voltages ratios generated by the unit.

5-11. These tests should be performed by personnel who are equipped, by training and experience, to work at levels of precision of a few parts per million, and at signal levels of the order of microvolts. If the results obtained are not within specification, and particularly if they are not consistent, we recommend communicating with our field engineering representatives or our engineering department, to discuss possible test anomalies, before further action is taken.

TABLE 5-1. TEST EQUIPMENT REQUIRED

EQUIPMENT	MANUFACTURER AND MODEL
Decade Ratio Transformer	Astrosystems, Model A404-9
Bridging Transformer	Astrosystems, Model T104B
Oscilloscope	Tektronix, Model 546

5-12. TEST EQUIPMENT REQUIRED. The test equipment or their equivalent required to perform the calibration test is listed in table 5-1.

5-13. CALIBRATION TEST PROCEDURE. The calibration test procedure for the Synchro/ Resolver Standard is divided in two parts, one for resolver mode and one for synchro mode. Each of these tests are prescribed for the 90-volt 400Hz range with a reference input of 115-volts rms at 400Hz. The performance of additional tests using all positions of the RANGE switch with excitations of both 26-volts and 115-volts over the frequency range of 200 to 800 Hz is a matter that is left up to the discretion of test personnel. The same test procedure and test-result datum are applicable.

5-14. Test connections for performing the calibration test are changed at 45-degree intervals for resolver tests and 60-degree intervals for synchro tests. These interconnections are required to maintain test voltage ratios at less than unity. The interconnections are given in tables in the test setup diagrams, figures 5-1 and 5-2, respectively.

5-15. It is recommended that all calibration test results be recorded and filed for future use in detecting causes of marginal operation and also as aid to factory trained personnel in fault isolation and repair of a defective unit.

5-16. RESOLVER MODE TEST PROCEDURE. Perform the resolver mode test procedure as follows:

1. Set RANGE switch on standard at OFF.
2. Connect standard and test equipment as shown in figure 5-1.
3. On standard, set MODE switch at RESOLVER and decade dials for zero degree.
4. Set RANGE switch on standard at 90V and energize test circuit.
5. Adjust decade ratio transformer (DRT) for best null on oscilloscope. DRT shall indicate the ratio plus or minus the allowable parts per million (PPM) tolerance specified in table 5-2 for the model of standard undergoing calibration. Record and check results.
6. Set the standard for each of the test angles listed in table 5-2. For each setting of the standard repeat the procedure of step 5. Record and check results.

5-17. SYNCHRO MODE TEST PROCEDURE. Perform the synchro mode test procedure as follows:

1. Set RANGE switch on standard at OFF.
2. Connect standard and test equipment as shown in figure 5-2.
3. On standard, set MODE switch at RESOLVER and decade dials for zero degree.
4. Set RANGE switch on standard at 90V and energize test circuit.

ANGLE RANGE	S1	S3	S2	S4
0–45	HI	LO	ARM	LO
45–90	ARM	LO	HI	LO
90–135	LO	ARM	HI	LO
135–180	HI	LO	LO	ARM
180–225	LO	HI	LO	ARM
225–270	LO	ARM	LO	HI
270–315	ARM	LO	LO	HI
315–360	LO	HI	ARM	LO

TABLE OF
TEST CONNECTIONS

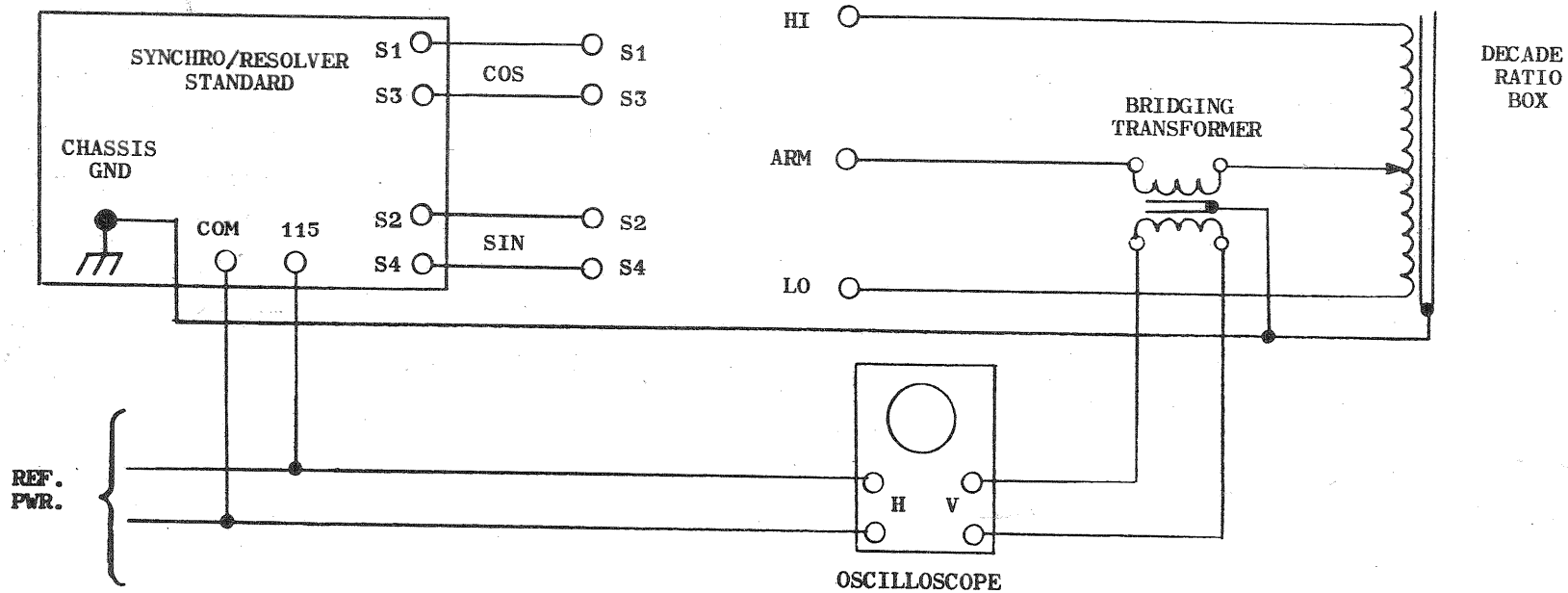

Figure 5-1. Resolver Mode Test Setup

TABLE 5-2. RESOLVER MODE TEST ANGLE DRT RATIOS FOR ALL MODELS OF S/R STANDARDS

TEST ANGLE NO.	TEST ANGLE IN DEGREES SET ON DECADE DIALS (SEE NOTE)	CALCULATED DRT RATIOS X 10^{-6} FOR SYNCHRO/RESOLVER STANDARDS A1202-S/R HAVING RESOLUTIONS OF:					TOL. ±PPM	ACTUAL DRT RATIO MEASURED	ERROR ±PPM
		1^{o}	$.1^{o}$	$.01^{o}$	$.001^{o}$	$.0001^{o}$			
1	000.000	000000.0	000000.0	000000.0	000000.0	000000.0	10	_____	_____
2	003.1861	052407.9	054158.2	055558.7	055663.7	055665.4	10	_____	_____
3	014.2972	249328.2	253039.1	254711.2	254841.3	254845.0	10	_____	_____
4	025.3183	466307.8	472697.9	472911.5	473082.3	473088.8	12	_____	_____
5	036.4294	726542.5	737263.6	737802.5	738045.1	738055.9	14	_____	_____
6	047.5315	932515.1	916331.2	915368.4	915336.3	915320.3	18	_____	_____
7	058.6426	624869.4	610402.7	609444.8	609397.0	609382.6	12	_____	_____
8	069.7537	383864.2	369911.4	368919.7	368860.2	368846.3	10	_____	_____
9	071.8648	344327.8	328783.5	327623.5	327546.2	327530.7	10	_____	_____
10	082.9759	140541.1	124556.8	123316.3	123227.7	123211.8	10	_____	_____
11	154.6817	487732.7	474835.1	473125.1	473103.8	473088.8	12	_____	_____
12	277.0241	122784.7	122784.7	123139.0	123209.9	123211.7	10	_____	_____
13	334.6187	487732.8	474835.1	474621.3	474450.2	474435.2	10	_____	_____

NOTE: RESOLUTION OF TEST ANGLE IS DEPENDENT ON MODEL, SET TEST ANGLE ON DECADE DIALS ACCORDINGLY. DO NOT ROUND OFF OTHERWISE DRT RATIO WILL NOT APPLY.

MODEL NO. _____

SERIAL NO. _____

TESTED BY: _____ DATE: _____

ANGLE RANGE	S1	S2	S3
0-60	LO	HI	ARM
60-120	LO	ARM	HI
120-180	ARM	LO	HI
180-240	HI	LO	ARM
240-300	HI	ARM	LO
300-360	ARM	HI	LO

TABLE OF TEST CONNECTIONS

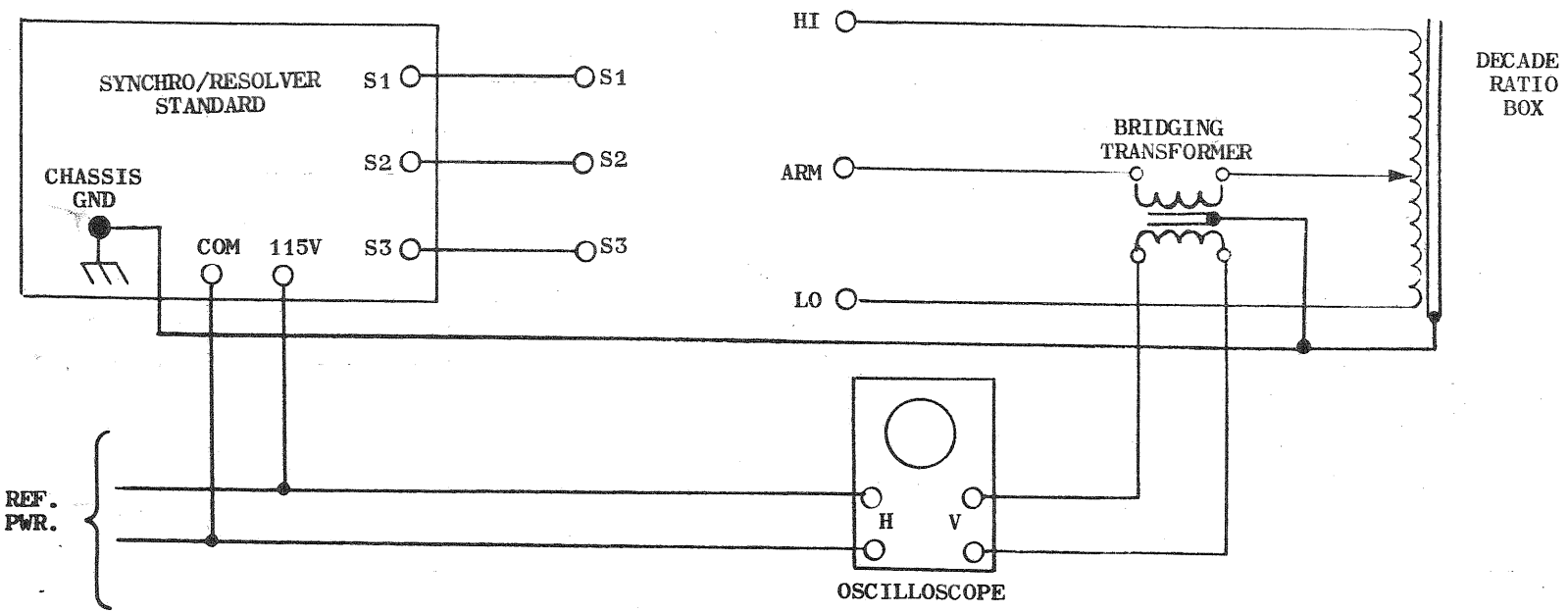

Figure 5-2. Synchro Mode Test Setup

TABLE 5-3. SYNCHRO MODE TEST ANGLE DRT RATIOS FOR ALL MODELS OF S/R STANDARDS

TEST ANGLE NO.	TEST ANGLE IN DEGREES SET ON DECADE DIALS (SEE NOTE)	CALCULATED DRT RATIOS X 10^{-6} FOR SYNCHRO/RESOLVER STANDARDS A1202-S/R HAVING RESOLUTIONS OF:					TOL. ±PPM	ACTUAL DRT RATIO MEASURED	ERROR ±PPM
		1^{o}	$.1^{o}$	$.01^{o}$	$.001^{o}$	$.0001^{o}$			
1	000.0000	000000.0	000000.0	000000.0	000000.0	000000.0	12		
2	003.1861	058738.0	060640.2	062159.6	062273.4	062275.3	10		
3	014.2972	251671.4	254939.7	256408.3	256522.5	256525.8	10		
4	025.3183	424233.7	428800.9	428953.0	429074.8	429079.3	8		
5	036.4294	591024.3	597141.7	597447.8	597585.5	597591.7	8		
6	047.5315	764771.1	773057.3	773555.9	773572.5	773580.8	10		
7	058.6426	960473.9	972172.4	972957.0	972996.2	973008.0	12		
8	069.7537	832436.3	820352.6	819493.6	819442.0	819430.5	10		
9	071.8648	798196.9	784735.1	783730.6	783663.6	783650.2	10		
10	082.9759	621713.1	607870.4	606796.2	606719.4	606705.6	8		
11	154.6817	560560.0	569680.3	570897.4	570912.6	570923.3	8		
12	277.0241	606335.8	606335.8	606642.7	606704.1	606705.6	8		
13	334.6187	439442.8	430322.4	430170.3	430048.5	430037.9	8		

NOTE: RESOLUTION OF TEST ANGLE IS DEPENDENT ON MODEL, SET TEST ANGLE ACCORDINGLY. DO NOT ROUND OFF OTHERWISE RATIO WILL NOT APPLY.

MODEL NO. _____

SERIAL NO. _____

TESTED BY: _____ DATE: _____

5. Adjust decade ratio transformer for best null on oscilloscope. DRT shall indicate the ratio plus or minus the PPM tolerance specified in table 5-3 for the model of standard undergoing calibration. Record and check results.

6. Set the standard for each of the test angles listed in table 5-3. For each setting of the standard repeat the procedure of step 5. Record and check results.

SECTION VI

MAINTENANCE PARTS LIST AND REFERENCE DRAWINGS

6-1. This section contains the assembly and schematic drawings for the Synchro/Resolver Standard. The parts list for all models of the standard is listed on the assembly drawing. The difference between models in terms of the parts list is the quantity of certain components, for example, front panel switches. These differences are indicated on the parts list by use of dash numbers. The following list identifies the dash number in the left hand columns of the parts list to use for the models of standard.

Model	Assembly No. 100-4883
A1202-S/R-1	-5
-.1	-4
-.01	-3
-.001	-2
-.0001	-1

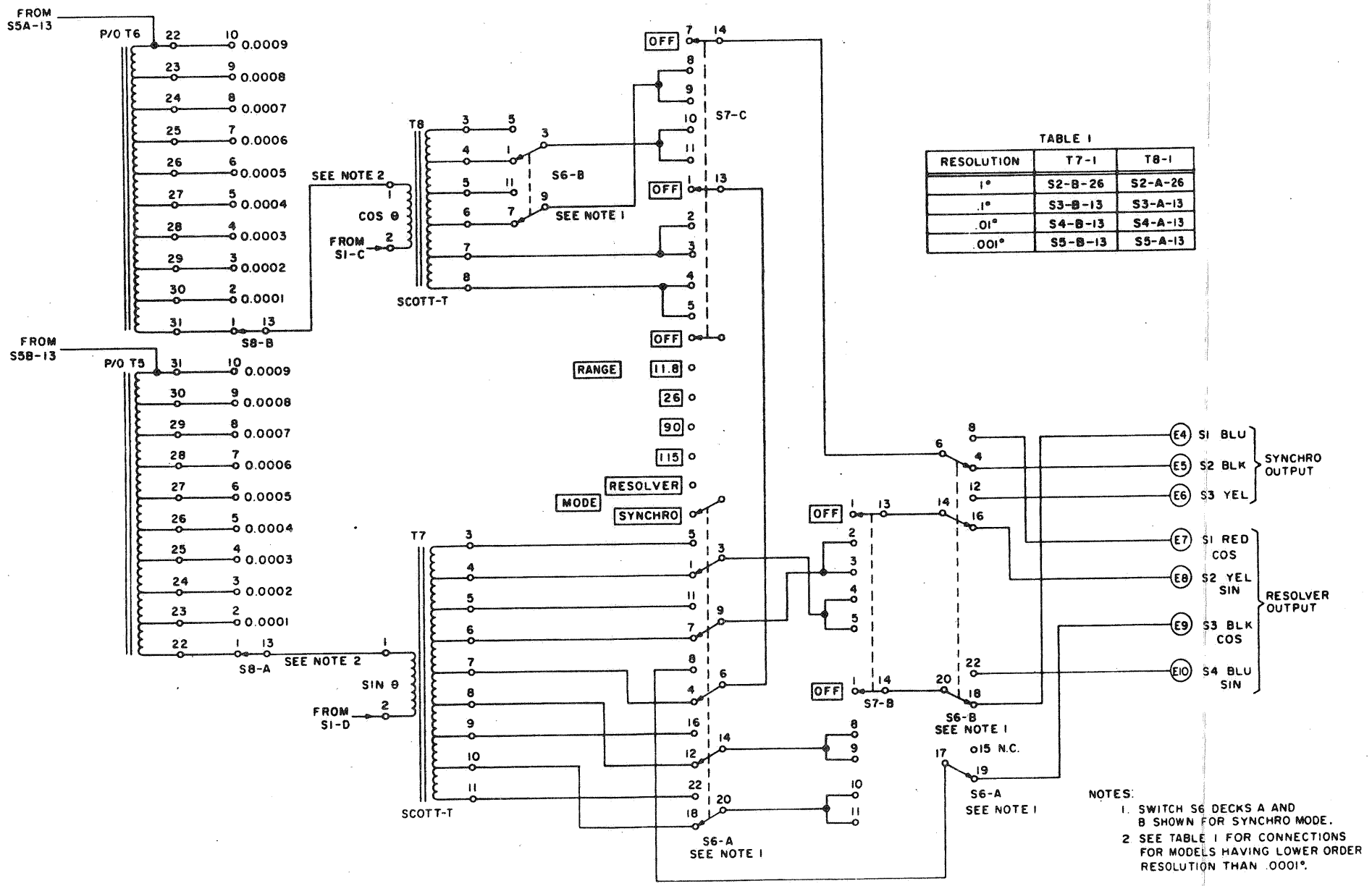

TABLE I

RESOLUTION	T7-1	T8-1
1°	S2-B-26	S2-A-26
.1°	S3-B-13	S3-A-13
.01°	S4-B-13	S4-A-13
.001°	S5-B-13	S5-A-13

Figure 6-1. Synchro/Resolver Standard, Schematic Diagram (Sheet 1 of 2)

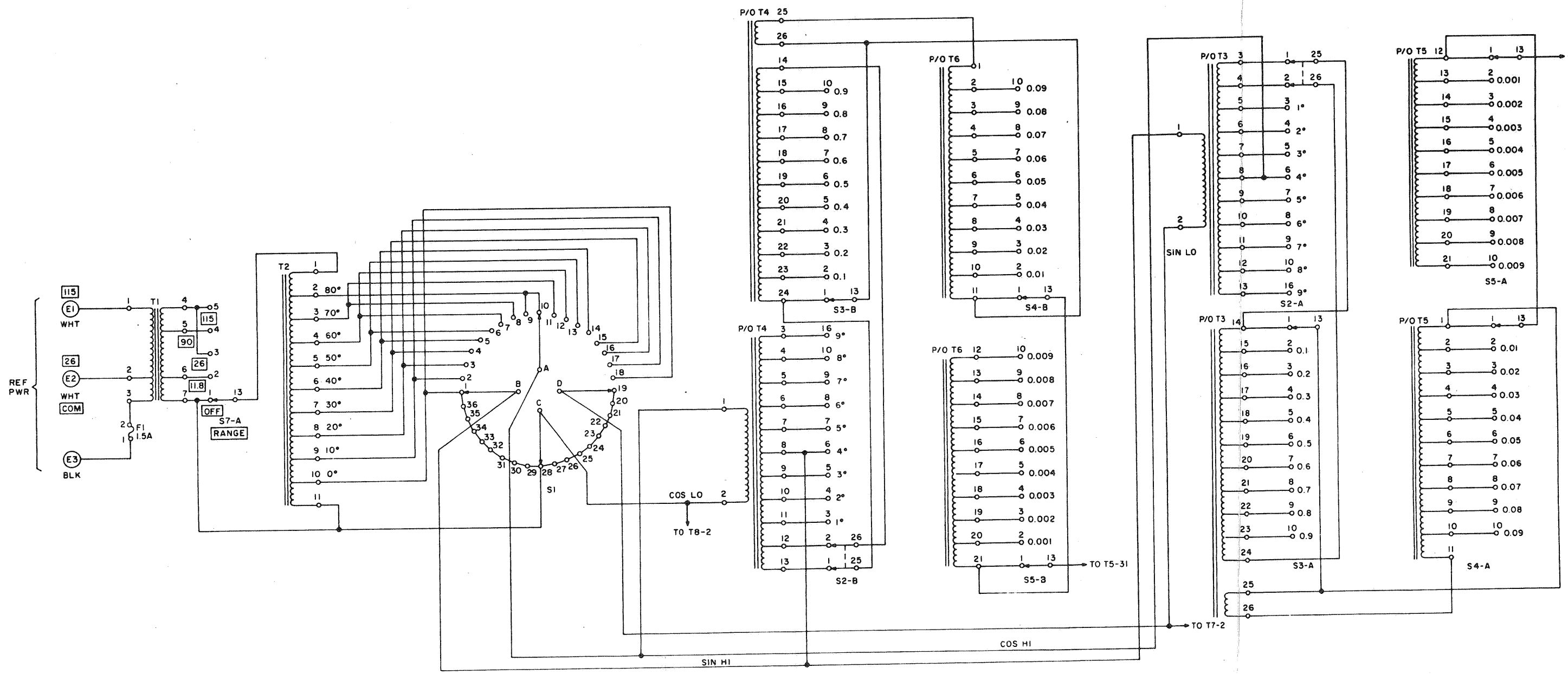

Figure 6-1. Synchro/Resolver Standard, Schematic Diagram (Sheet 2 of 2)

Figure 6-2 Item No.	Reference Designator	Type of Part or MFG Name FCSM	Part Number	Qty per Assy				
				1°	.1°	.01°	.001°	.0001°
1		---						
2		---						
3		HOUSING, 12868	101-2452	1	1	1	1	1
4		CHASSIS, 12868	101-2453	1	1	1	1	1
5		FRONT PANEL, 12868	100-4818	1	1	1	1	1
6		GUSSET, 12868	100-2320-1	1	1	1	1	1
7		GUSSET, 12868	100-2320-2	1	1	1	1	1
8		---						
9	XF1	FUSE HOLDER, 75915	342004	1	1	1	1	1
10	F1	FUSE, 81349	F02A250V1.5A	1	1	1	1	1
11		---						
12		DIAL ASSY, SMALL, 12868	100-2343-1	1	2	3	4	5
13		DIAL ASSY, LARGE, 12868	100-2344-1	1	1	1	1	1
14		---						
15		DUMMY PANEL, 12868	100-4882-1	-	-	-	-	1
		DUMMY PANEL, 12868	100-4882-2	-	-	-	1	-
		DUMMY PANEL, 12868	100-4882-3	-	-	1	-	-
		DUMMY PANEL, 12868	100-4882-4	-	1	-	-	-
		DUMMY PANEL, 12868	100-4882-5	1	-	-	-	-
16		---						
17		---						
18		---						
19	T2	XFMR, MAIN DATA, 12868	101-4075	1	1	1	1	1
20	T1	XFMR, EXCITATION, 12868	101-4130	1	1	1	1	1
21	*T7,T8	XFMR, SCOTT "T", 12868	101-4079	1	1	1	1	1
22	T3,T4	XFMR, TANGENT, 12868	101-4076	1	2	2	2	2
23	T5,T6	XFMR, INTERPOLATION, 12868	101-4078	-	-	2	2	2
24	S3,S4,S5,S8**	ROTARY SWITCH, 12868	100-4817	1	1	2	3	4
25	S2	ROTARY SWITCH, 17870	221DB-12A	1	1	1	1	1

*Transformers T7 and T8 are a matched pair.
**Reference Designator order 0.1 through 0.0001.