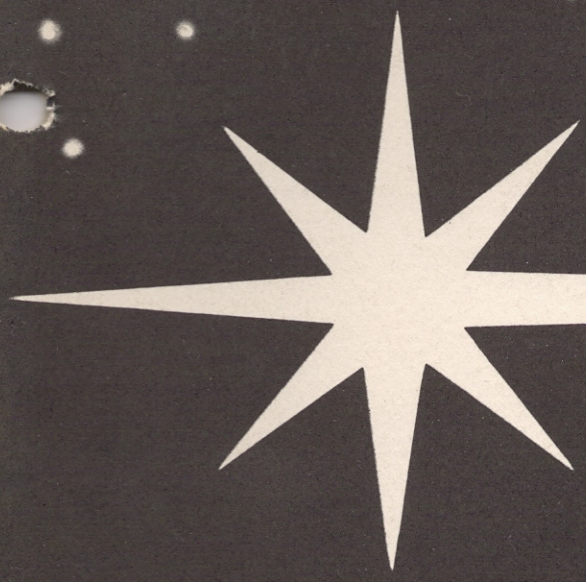


Starline

CATV EQUIPMENT

JERROLD ELECTRONICS CORPORATION

CATV SYSTEMS DIVISION

INSTRUCTION MANUAL 435-533

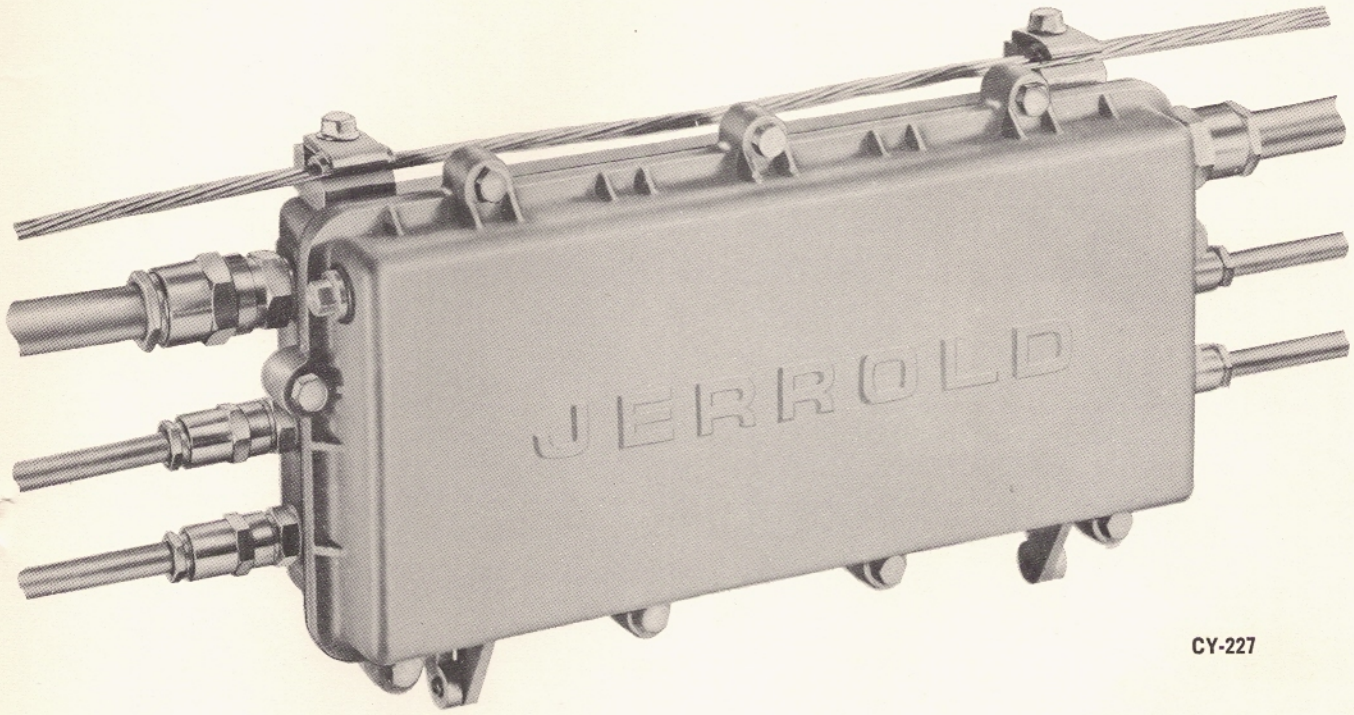
JERROLD®

INSTRUCTION MANUAL

435-533

STARLINE CATV EQUIPMENT

(Patent Pending)



CY-227

JERROLD ELECTRONICS CORPORATION

CATV SYSTEMS DIVISION

PHILADELPHIA, PA. 19132

KM, OCTOBER 1965

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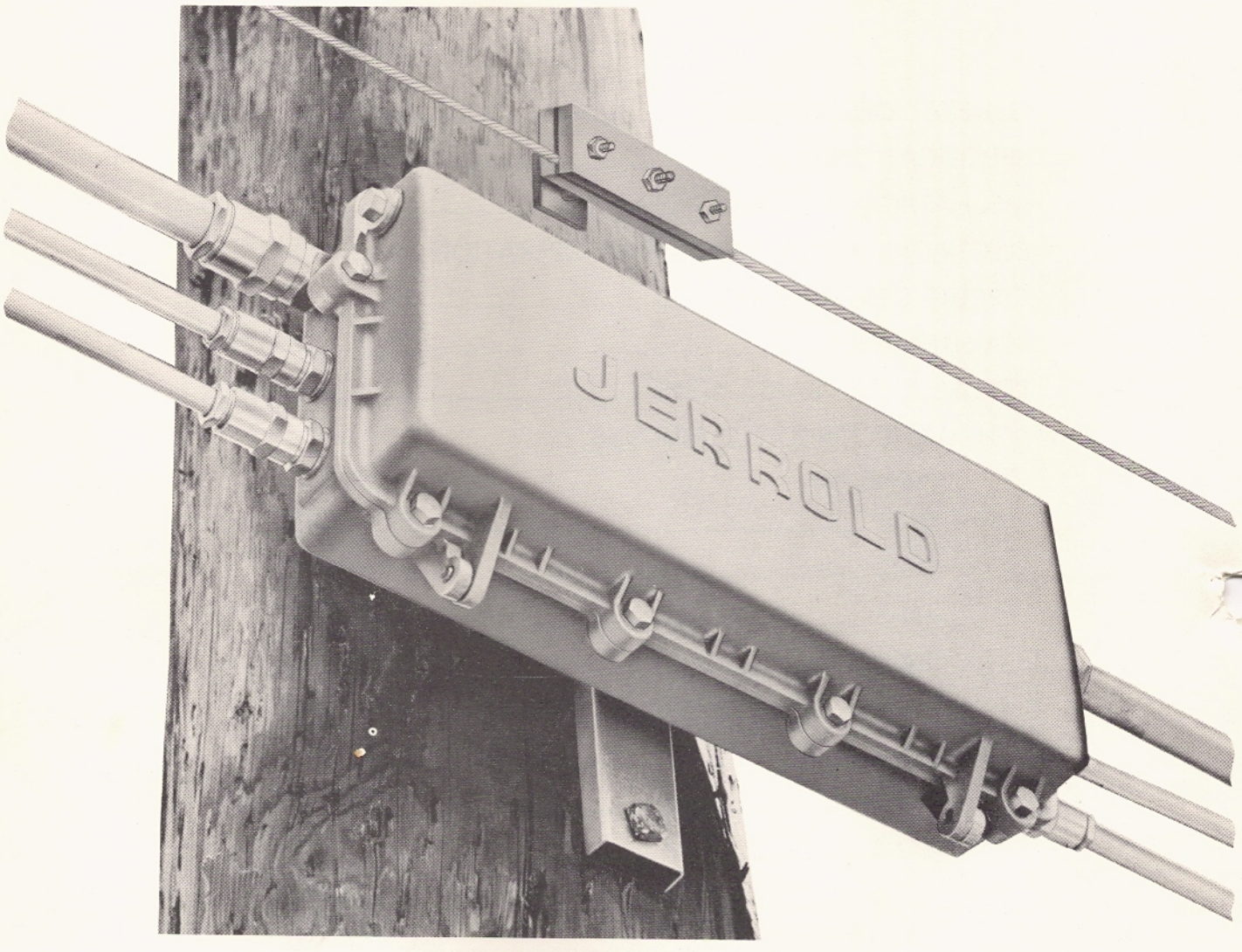
SCHEMATIC CIRCUIT DIAGRAMS

MODEL NO.	DWG. NO.
SA-1	E 861-838
SA-2	E 861-830
SA-3	E 861-842
SA-4	E 861-840
SA-5	E 861-828
SO-1	A 861-773
SO-2	B 861-769
SO-3	B 861-770
SO-4	C 861-771
SPS-12	C 861-780
SPJ-2	B 861-827
SDC-8, 12, 16	C 861-777
STE	C 861-782
SX-1	E 861-856
SHS-2	C 861-776



CY-228

Fig. 1. Main Trunk Station, Pole-Mounted

STARLINE EQUIPMENT

DESCRIPTION

GENERAL

The STARLINE series of Jerrold CATV distribution equipment is a group of compact, cable-powered, solid-state amplifiers and auxiliary units. The group comprises:

1. Five main trunk station types, Models SA-1, SA-2, SA-3, SA-4, and SA-5.
2. Line splitters, Models SO-1, SO-2, SO-3, and SO-4,
3. Line extension amplifier, Model SX-1.
4. Hybrid splitter/mixer, Model SHS-2.
5. Directional couplers, Models SDC-8, SDC-12, and SDC-16.
6. Thermal equalizer, Model STE.
7. A.C. power supply, Model SPS-12.
8. A.C./R-F combiner, Model SPJ-2.
9. Test accessories.
10. Surface (pole or cross-arm) mounting brackets (optional) substituting for messenger clamps; auxiliary hanger brackets (optional) for messenger mounting where multiple cable installations make direct mounting inconvenient or impossible.

MAIN TRUNK STATIONS

Main trunk stations differ in circuitry and operating facilities according to functions required. Each station consists of a STARLINE housing with built-in connector chassis and a plug-in amplifier module with d.c. power supply sub-chassis; one type connector chassis is common to Models SA-1, SA-2 and SA-5, a second type is common to Models SA-3 and SA-4. The sub-chassis with d.c. power supply is common to all five models.

MODEL SA-1

This is a completely equipped trunk line and bridging amplifier station for vhf tv all-band amplification with automatic and manual gain control circuitry. It is usually required at every third trunk line station where one to four feeder lines are to be connected and where automatic gain control circuitry is necessary for maintaining the amplifier output constant. The feeder lines are established through plug-in splitter Models SO-1, SO-2, SO-3, or SO-4 respectively.

The amplifier circuit stages are made up of solid-state components on printed circuit boards built into shielded chassis compartments. A switchable attenuator, a switchable cable equalizer, and gain and tilt controls for both trunk output and bridging output, permit adjusting the amplifier to attain specified system operating parameters. Test fittings are provided for checking trunk input, trunk output and bridging output signal levels. Tip jacks permit testing a.c., B+ and B— voltages. The full-wave power supply built onto the amplifier plug-in module has the rectifier, filter, and regulating networks necessary for transforming the a.c. input into the d.c. output required for powering the amplifier stages. The entire amplifier module plugs into the connector chassis of the STARLINE housing.

The connector chassis has screw and crown washer terminal assemblies for trunk input, trunk output, and four feeder lines. Four fuse holders serve for fusing each feeder line individually. The fuses are supplied separately with the SO-type splitters. A plug-type switch permits establishing a.c. input and bypass conditions planned for the particular main trunk station. A.C. can be applied to the station either through the input or through the output terminal; the bypass circuit permits driving other equipment ahead of or past the SA-1 station. Five chassis fittings on the connector chassis accept any one of the plug-in splitter models.

The housing itself has six threaded apertures accepting VSF-type fittings for direct introduction of aluminum-sheathed or polyethylene-jacketed cables. Three additional apertures, sealed by wire-secured plugs, give access to the test fittings while the housing is closed and the station is operating.

Heavily galvanized steel clamps and bolts, which can be installed either on top or on the rear wall of the housing, permit messenger mounting in various positions, independent of pole locations. Two special gaskets between its hinged lid and body make the STARLINE housing air-tight and r-f radiationproof. A maintenance chart is available inside the lid for the convenience of operating personnel.

MODEL SA-2

This is the same as Model SA-1 but without automatic gain control circuitry. It is used in trunk line sections where feeder lines are required, but where automatic gain control circuitry is not needed.

MODEL SA-3

This unit is the same as Model SA-1 but without bridging amplifier circuitry. It is used at main trunk stations where automatic gain control is necessary but where feeder lines are not required.

MODEL SA-4

This model is the same as Model SA-3 but without automatic gain control circuitry. It is used as a main trunk line cascader (e.g. in mountain runs).

MODEL SA-5

This unit is an intermediate bridging amplifier used at trunk line points where trunk line signal amplification is not required but where one to four feeder lines are to be created.

PLUG-IN SPLITTERS

Models SO-1, SO-2, SO-3 and SO-4 serve to establish one, two, three, or four feeder lines respectively. The networks are contained in a housing equipped with plug-in fittings which mate with the fittings mounted on the connector chassis of SA-1, SA-2 or SA-5 type stations. The splitters are supplied separately according to system requirements and are shipped with the appropriate number of fuses, and with plugs for sealing unused feeder line exits where necessary.

AUXILIARY EQUIPMENT

GENERAL

Except for the power supply Model SPS-12, all auxiliary units are built into a STARLINE utility housing. Like the main trunk station housing, the utility housing has threaded apertures accepting VSF-type fittings and is equipped with a clamp and bolt assembly for messenger mounting. Two special gaskets between the lid and body make the utility housing air-tight and r-f radiationproof. The utility housing of Model SX-1, however, has factory-mounted adapters which in turn will accept VSF-type fittings.

MODEL SHS-2

This is a hybrid splitting network built into a STARLINE utility housing, and used where signal energy is to be equally divided and passed to two trunk line branches. A.C. bypass circuitry permits driving other equipment past the splitter location.

MODELS SDC-8, SDC-12 and SDC-16

These are directional coupling networks built into STARLINE utility housings. They are used where a nominal 8, 12 or 16 db of attenuation are required for diverting a minor portion of the signal energy to a secondary line, while the major portion of the signal energy is passed to the main trunk line. All couplers have a.c. bypass circuitry.

MODEL STE

Equalizer Model STE is a thermistor-regulated network built into a STARLINE utility housing. It compensates for varying cable tilt due to temperature fluctuations and for the differences in attenuation vs. frequency characteristics between channels 2 and 13. Model STE has a.c. bypass circuitry. The unit is used at every third main trunk station, preferably at stations without AGC circuitry in order to approximate as much as possible symmetrical spacing between stations.

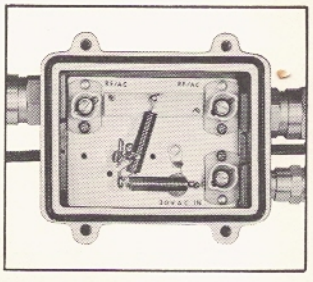


Fig. 7. Power Combiner
Model SPJ-2

MODEL SPS-12

STARLINE Power Supply Model SPS-12 consists of: a line voltage regulating power transformer and filter module with a 30 vac output test jack and a 115 vac convenience outlet; a 15 amp. circuit breaker; and a dual output r-f/a.c. bridging network, all mounted in a weatherproof housing equipped with brackets which permit mounting on a utility pole or on cross-arms.

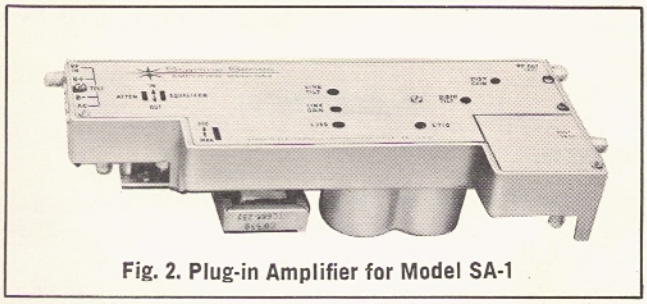


Fig. 2. Plug-in Amplifier for Model SA-1

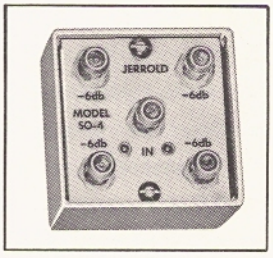


Fig. 3. 4-Way Plug-in Splitter
Model SO-4

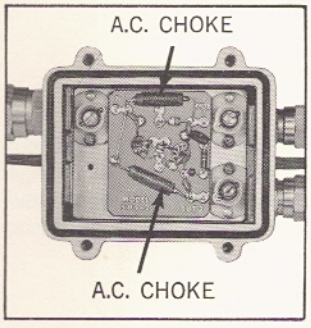


Fig. 4. Hybrid Splitter
Model SHS-2

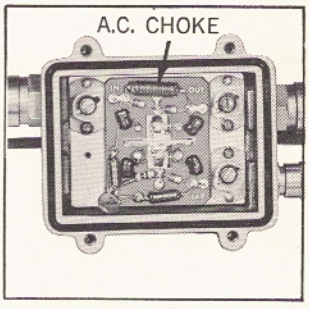


Fig. 5. Directional Coupler
Model SDC-*

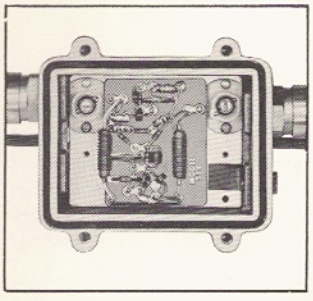


Fig. 6. Thermal Equalizer
Model STE

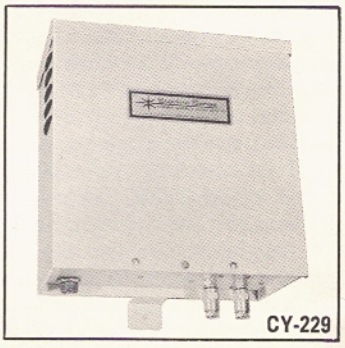


Fig. 8. Power Supply
Model SPS-12

Output is 30 vac 12 amp. Fig. 12 illustrates a typical main trunk section powered by the same SPS-12.

MODEL SPJ-2

This is a 30-volt a.c. and r-f bridging network mounted in a utility housing. It is used where an SPS-12 cannot conveniently be mounted near the main trunk cable or where for other reasons it is desired to establish a single cable line between an SPS-12 and the point where a.c. is to be injected into the main trunk cable.

MODEL SX-1

Line extension Amplifier Model SX-1 is built into a STARLINE utility housing equipped with special VSF adapters. It is used in feeder lines connected to STARLINE main trunk stations SA-1, or SA-2, or SA-5. Model SX-1 is cable-powered and has a.c. bypass circuitry. It is recommended that no more than two SX-1 amplifiers be placed in any single feeder line.

The unit is equipped with gain control, tilt control, and a switch for establishing a.c. stop or bypass condition. A 0-dB attenuation pad is shipped with the unit, plugged into the circuit board. A 6-dB pad is available on order. The r-f signal, attenuated by 30 dB, can be measured on a test fitting on the circuit board.

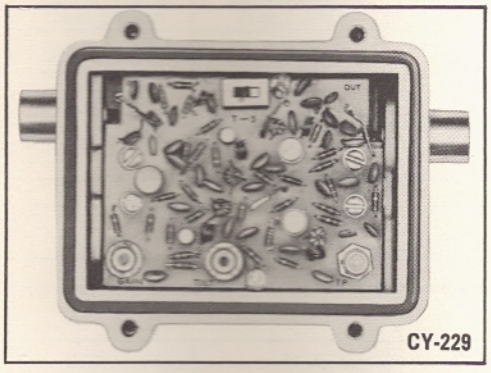


Fig. 9. Line Extender Model SX-1

AUXILIARY MOUNTING BRACKETS

Where system requirements call for surface or pole-mounting of STARLINE equipment, special brackets can be ordered which replace the factory-installed messenger clamps.

For situations where a group of cables does not permit mounting of STARLINE equipment directly to the messenger wire, auxiliary hanger brackets are available. Messenger clamp assemblies are simply transferred from the housing body to the auxiliary hanger brackets.

Both groups of brackets are fastened to a housing body with slotted round head screws supplied with the brackets.

MODEL SPB-1 is a pole-mounting bracket for STARLINE amplifier housings.

MODEL SPB-2 is a pole-mounting bracket for STARLINE utility housings.

MODEL AHB-3 consists of two auxiliary hanger brackets for STARLINE amplifier housings.

MODEL AHB-2 is an auxiliary hanger bracket for STARLINE utility housings.

TEST ACCESSORIES

MODEL SPD-30. This unit is a test probe with 30 dB of attenuation. It is used for connecting a field strength meter to the test fittings on the SA-series STARLINE amplifiers. The probe has a high input impedance and will thus have a negligible effect upon amplifier response. Output impedance is 75 ohms.

The network is housed in a barrel equipped on one end with a PG-type push-on connector (which mates with the test fittings on the amplifiers) and on the other end with an F-61A fitting (accepting an F-59A connector).

MODEL PGF. This is an adapter similar to Model SPD-30 except that it has no attenuation network and thus has a shorter barrel. The unit is used where no attenuation is required in connection of test instruments to STARLINE equipment, e.g. when bench-testing plug-in modules.

MODEL GFA. This adapter is similar to Model PGF but has a female G-type connector at one end which mates with the male G-type fittings on the connector chassis of the STARLINE housing.

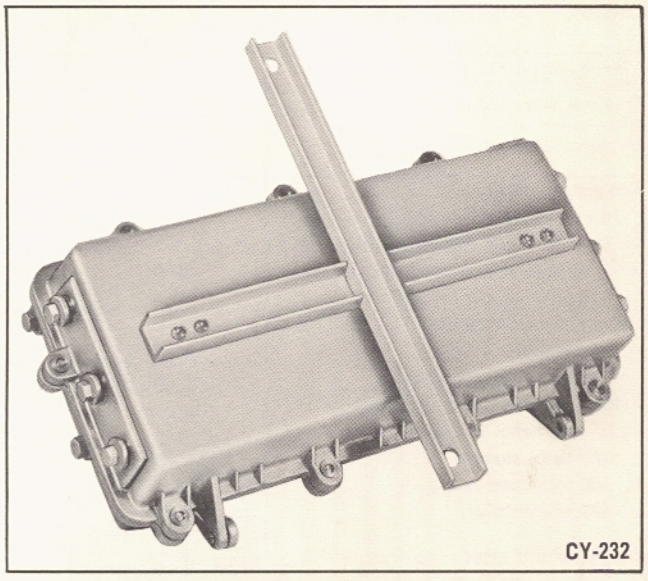


Fig. 10. Main Trunk Station Showing Pole-Mounting Bracket Model SPB-1

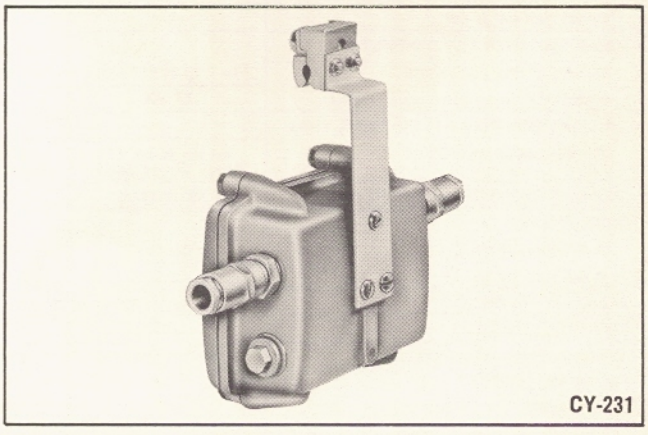


Fig. 11. Starline Utility Housing with Auxiliary Hanger Bracket Model AHB-2

SPECIFICATIONS—MAIN TRUNK STATIONS

	SA-1	SA-2	SA-3	SA-4	SA-5
UNITIZED STATION FUNCTION	TRUNK AMP. BR. AMP. AGC	TRUNK AMP. BR. AMP. —	TRUNK AMP. — AGC	TRUNK AMP. — —	INTERMEDIATE BR. AMP.
MAXIMUM OUTPUT CAPABILITY (for all Starline amplifiers located on the main trunk)	This specification is quoted for —57 dB cross-modulation and where 5 dB block-tilt technique is used, i.e. low channels are operated 5 dB below high channels in 9 or 12-channel operation.				
Trunk Amplifier					
per ch. for 2 channels (in dBmV)	55*	55*	55	55	—
per ch. for 9 channels (in dBmV)	49*	49*	49	49	—
per ch. for 12 channels (in dBmV)	48*	48*	48	48	—
Bridging Amplifier					
per ch. for 2 channels (in dBmV)	55	55	—	—	55
per ch. for 9 channels (in dBmV)	49	49	—	—	49
per ch. for 12 channels (in dBmV)	48	48	—	—	48
TYPICAL OPERATING LEVELS	IN / OUT	IN / OUT	IN / OUT	IN / OUT	—
Trunk Amplifiers (12-channel operation)					
41 to 50 amps in cascade (in dBmV)	9 / 31*	9 / 31*	9 / 31	9 / 31	—
2 to 40 amps in cascade (in dBmV)	8 / 32*	8 / 32*	8 / 32	8 / 32	—
FREQ. RANGE (all amplifiers) in Mc/s	54 to 216	54 to 216	54 to 216	54 to 216	54 to 216
RESPONSE FLATNESS (trunk amps)	±0.25 dB	±0.25 dB	±0.25 dB	±0.25 dB	—
(br. amps)	±0.5 dB	±0.5 dB	—	—	±0.5 dB
INPUT AND OUTPUT MATCH (for all unitized stations)					
Trunk in and out	16 dB return loss (VSWR 1.38:1)	16 dB return loss (VSWR 1.38:1)	16 dB return loss (VSWR 1.38:1)	16 dB return loss (VSWR 1.38:1)	18 dB return loss (VSWR 1.29:1)
Distribution out	16 dB return loss (VSWR 1.38:1)	16 dB return loss (VSWR 1.38:1)	—	—	16 dB return loss (VSWR 1:38:1)
TRUNK AMPLIFIER GAIN					
Min. full gain	26 dB*	26 dB*	26 dB	26 dB	—
Operational gain (12 channels)					
41 to 50 amps in cascade	22 dB	22 dB	22 dB	22 dB	—
2 to 40 amps in cascade	22 dB	24 dB	22 dB	24 dB	—
BRIDGING AMPLIFIER GAIN					
Min. full gain	18 dB	18 dB	—	—	33 dB
Operational gain (12 channels)	17 dB	17 dB	—	—	24 to 32 dB
TRUNK AMPLIFIER GAIN CONTROLS (Carrier at 73.5 Mc/s)					
AGC signal strength	17 dBmV	—	17 dBmV	—	—
AGC operational gain	22 dB	—	22 dB	—	—
AGC compensation	±4 dB input = ± 0.5 dB output	—	±4 dB input = ±0.5 dB output	—	—
Manual gain range	0 to 7 dB	0 to 7 dB	0 to 7 dB	0 to 7 dB	—
Switch pad (in or out)	0 or 6 dB	0 or 6 dB	0 or 6 dB	0 or 6 dB	—
BRIDGING AMPLIFIER GAIN CONTROLS					
Manual gain range	0 to 5 dB	to 5 dB	—	—	0 to 7 dB
Switch pad (in or out)	—	—	—	—	0 or 6 dB
TRUNK AMPLIFIER TILT CONTROLS					
Variable (cable equivalent)	0 to 7 dB at 216 Mc/s	0 to 7 dB at 216 Mc/s	0 to 7 dB at 216 Mc/s	0 to 7 dB at 216 Mc/s	—
Switchable (in or our) (cable equiv.)	17 dB	17 dB	17 dB	17 dB	—
BRIDGING AMPLIFIER TILT CONTROLS, Fixed	—	—	—	—	11 dB
Variable (cable equivalent)	±4 dB at ch. 13 linear across band	±4 dB at ch. 13 linear across band	—	—	±4 dB at ch. 13 linear across band
BRIDGING AMPLIFIER INSERTION LOSS	1 dB nominal	1 dB nominal	—	—	1.25 dB nominal
NOISE FIGURE					
at full gain at ch. 2	8 dB max.	8 dB max.	8 dB max.	8 dB max	26 dB max.
at full gain at ch. 13	11 dB max.	11 dB max.	11 dB max.	11 dB max.	22 dB max.
RADIATION SUPPRESSION	Equipment housing suppresses radiation as well as or better than aluminum-sheathed cable.				
HUM MODULATION	—60 dB	—60 dB	—60 dB	—60 dB	—60 dB
AMBIENT TEMPERATURE RANGE	—40°F to +140°F	—40°F to +140°F	—40°F to +140°F	—40°F to +14J°F	—40°F to + 140°F
POWER REQUIRED rms voltage and current	22 to 30 v 1 amp. max.	21 to 30 v 0.9 amp. max.	21 to 30 v 0.75 amp. max.	20 to 30 v 0.6 amp. max.	20 to 30 v 0.6 amp. max.

*Subtract 1 dB for bridging amplifier insertion loss.

SPECIFICATIONS—AUXILIARY EQUIPMENT

LINE SPLITTERS MODELS SO-1, 2, 3 and 4

MODEL	SO-1	SO-2	SO-3	SO-4
MATCH (return loss in dB)	30	23	23	18
NOM. INSERTION LOSS in dB	0.2	3.5	3.5 for 3 dB terms. 6.5 for 6 dB terms.	6.5
ISOLATION, in dB	—	20	20	18

SPLITTERS AND DIRECTIONAL COUPLERS, MODELS SHS-2, SDC-8, 12, 16

MODEL	SHS-2	SDC-8	SDC-12	SDC-16
MATCH (return loss in dB)	20	18	21	24
NOM. INSERTION LOSS in dB				
LINE	3.5	2	0.8	0.5
TAP	—	8.25	12.25	16.25
ISOLATION in dB (min.)	20*	26**	26**	26**
CURRENT CAPACITY (each leg)	5 amp.	5 amp.	5 amp.	5 amp.

*Between outputs
**Between output and tap

POWER COMBINER MODEL SPJ-2

FREQ. RANGE	54-216 Mc/s
MATCH (return loss in dB)	
5 to 48 Mc/s	19
50 to 216 Mc/s	26
INSERTION LOSS in dB	0.25 max.
CURRENT CAPACITY	12 amp. max.

THERMAL EQUALIZER MODEL STE

MATCH (return loss in dB)	18
FREQ. RANGE	54-216 Mc/s
INSERTION LOSS at ch. 13, 70°F	2.3 dB ±0.5 dB
CABLE COMPENSATION	17 dB of cable at 70°F at 216 Mc/s
THERMAL COMPENSATION	58 dB of cable from —40°F to +120°F
CURRENT CAPACITY	5 amp.

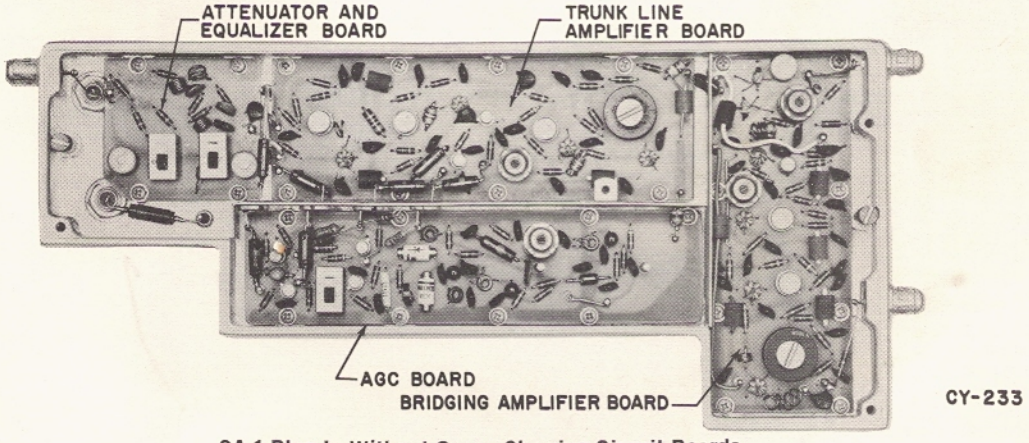
POWER SUPPLY MODEL SPS-12

VOLTAGE OUTPUT	30 vac ±1% for line voltage between 95 and 130 vac and held within 2% for load variations between 4 and 12 amp.
MAXIMUM LOAD	12 amperes

MODEL SX-1 LINE EXTENDER

MAX. OUTPUT CAPABILITY @ — 57 dB cross-mod	
for 2 channels	49 dBmV
for 9 channels*	43 dBmV
for 12 channels*	42 dBmV
FREQ. RANGE	54-216 Mc/s
GAIN (min. full)	24 dB at ch. 13
RESPONSE FLATNESS	±1 dB
GAIN CONTROL RANGE	0 to 6 dB manual
GAIN CONTROL (fixed pad)	SXP-0, or SXP-6 (6 dB)
TILT CONTROL RANGE	compensates for-from 16 to 24 dB of cable
POWER REQUIRED rms voltage and current	20 to 30 v, 0.3 amp. max.

*assumes operation with 5 dB block tilt



SA-1 Plug-In Without Cover, Showing Circuit Boards

COMBINED SYSTEM USING SUB-CHANNEL TRANSPORTATION

For very long initial trunk lines, where cascades of STARLINE amplifiers would have to exceed the 50 units specified and where high-channel frequencies would become excessively attenuated, a combination of systems is recommended.

The long-haul system would call for high-to-sub channel conversion at the head-end, sub-and-low channel cascaders with AGC units and appropriate power supplies along the trunk, and sub-to-high channel conversion at the end of the trunk. After reconversion the system would be continued with STARLINE equipment. For details on sub-and-low channel cascaders Model TLSA-510 and associated equipment see Jerrold instruction sheet 435-489.

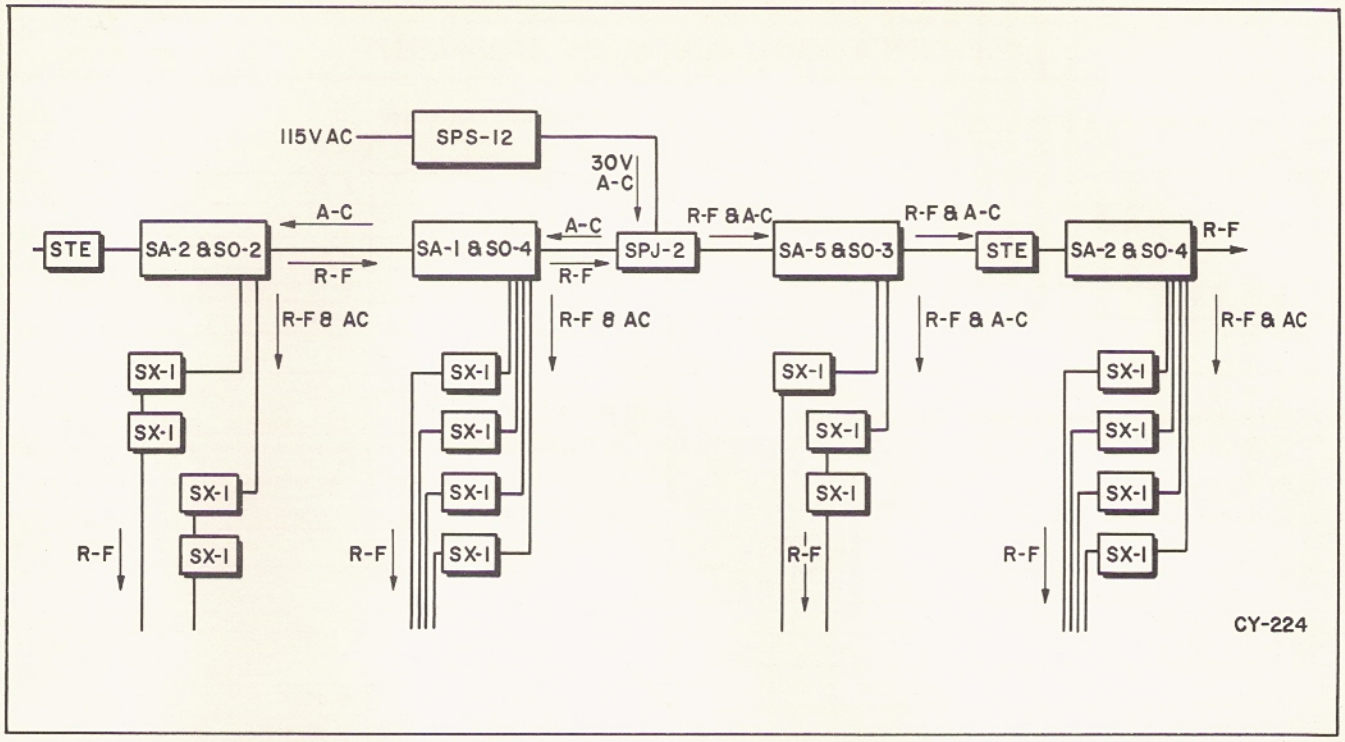


Fig. 12. Typical Starline Main Trunk Section, Block Diagram

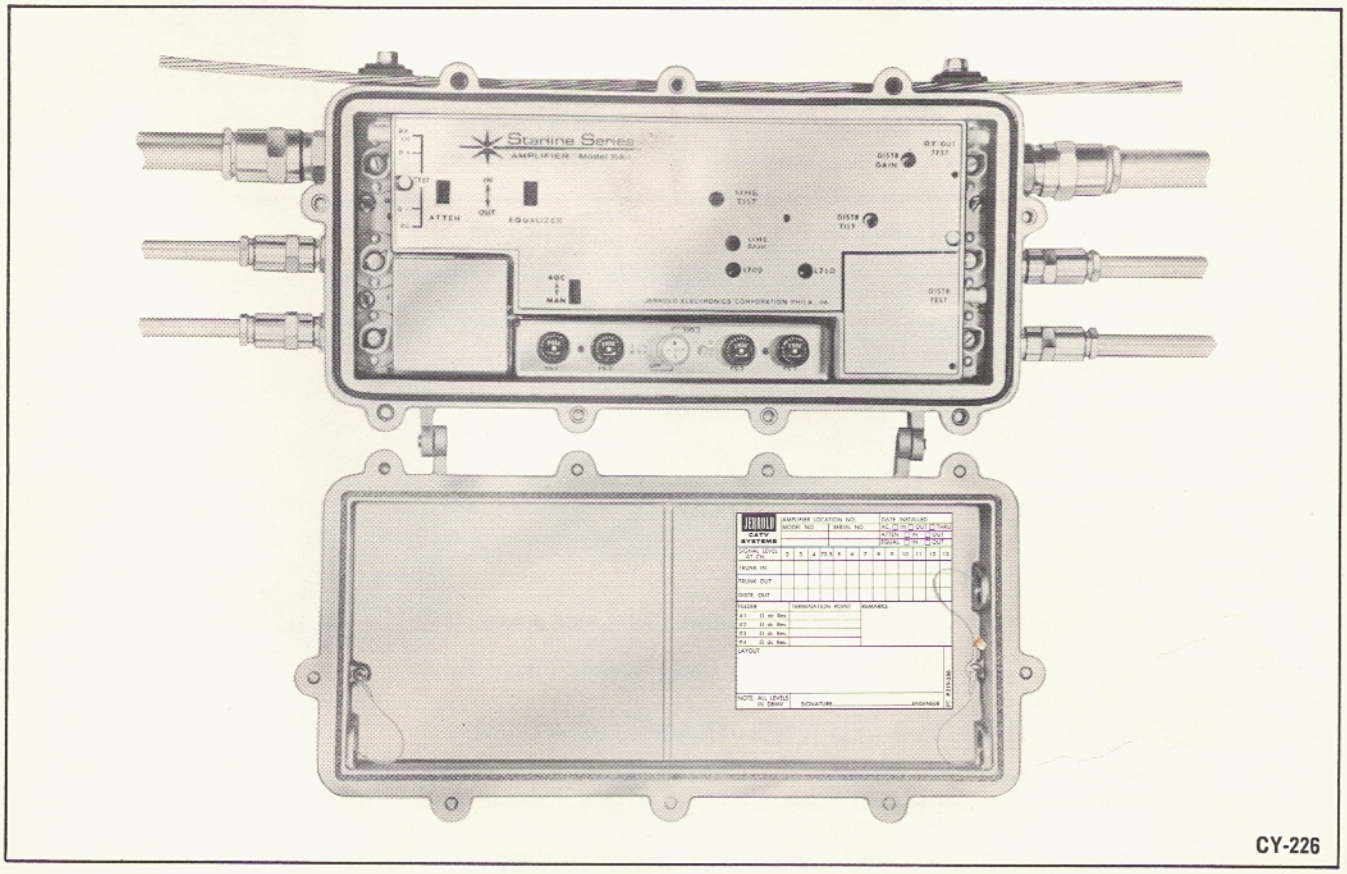


Fig. 13. Typical Main Trunk Station, Messenger Mounted, Housing Open.

INSTALLATION

A. MECHANICAL INSTALLATION

1.0 GENERAL

1.1 Main trunk stations are shipped with the amplifier module plugged into the connector chassis in the housing; messenger clamp and bolt assemblies are mounted on top of the housing for vertical installation of the unit below a messenger wire. Where a different mode of installation has been planned, the clamp and bolt assemblies may have to be relocated to the rear of the housing or, where surface or pole mounting is required, they will have to be replaced by an auxiliary bracket.

All housing apertures where VSF fittings are to be installed are guarded by factory-mounted plastic cap plugs. Threaded metal plugs for unused feeder line apertures are shipped with the appropriate splitter (e.g. one plug is shipped with a Model SO-3); only Models SA-3 and SA-4 have factory-mounted plugs.

1.2 It is assumed:

a. the mounting location has been determined by system lay-out;

b. messenger wire and coaxial cables have been strung;

c. the appropriate type and number of VSF fittings and, where necessary for certain types of cable, weatherboots have been procured.

2.0 PREPARATION OF CABLES

2.1 Cut the coaxial cables at the point where the station is to be mounted; remove sufficient lengths of any lashing wires to permit forming of expansion loops; fasten the ends of the lashing wires with clamps (regular hardware type) to the messenger wire.

2.2 Prepare the coaxial cable ends as described in Jerrold Instruction Book 435-345, for the type of VSF fittings to be used with the station. Where necessary, slide an appropriate weatherboot over each cable end.

3.0 PREPARATION OF STATION

3.1 Remove the plastic cap plugs from all cable apertures in the housing, then install the appropriate VSF fitting in each aperture; hand-tighten, then wrench-tighten on each fitting the hex nut adjacent to the aperture. Where a feeder line exit is not used, insert the plug supplied with the relevant splitter, then wrench-tighten the plug.

3.2 Loosen the hex head bolts on the messenger clamps 3/16 of an inch.

4.0 MOUNTING THE STATION

4.1 System planning should have made sure that with an open housing (the lid hanging down freely) there will be sufficient clearance to a telephone or other utility line strung below the unit.

4.2 Hold the closed housing so that you face "JERROLD" cast into the lid, then face the trunk line so that r-f signal flow is from left to right.

4.3 Loosely engage the messenger wire in the clamp assemblies; the clamps will pop open when forced onto the messenger. The hex head bolts on the clamps should be closed only so far as to permit moving the station freely for proper positioning on the messenger; one turn of the bolts is sufficient.

4.4 Loosen all nine hex head bolts holding the lid to the housing body; open the housing and let the lid hang down freely.

4.5 Make sure that the hex head machine screws in the terminal assemblies are loosened so that center conductors will not be bent when feeding cable ends into the terminal assemblies.

4.6 Coat the exposed center conductors at the cable ends with silicone grease; on aluminum-sheathed cables also coat 1 inch of the sheath.

4.7 Each cable end should be connected completely before the next cable end is connected; all cable ends on one side of the station should be connected first before connecting the cable ends on the other side of the station.

4.8 Feed the cable end all the way through its associated fitting until the bare center conductor is visible beyond the crown washer in the terminal assembly.

4.9 Use a spin-tight or a screwdriver for firm tightening of the slotted hex head machine screw in the terminal assembly.

4.10 Hand-tighten, then wrench-tighten first the clamp nut then the gland nut (where cable enters) on the VSF fitting. Recommended torque on all VSF-type fittings is 10 to 15 ft. lbs.

Where a weatherboot is used, fill the boot with silicone grease; then slide the boot all the way up to the wall of the station housing until it snaps into the retaining groove on the fitting.

4.11 The housing should now be closed until electrical adjustments are to be made on the amplifier module itself. Before closing the lid, make sure the sealing and r-f gaskets are properly positioned in their grooves. Hand-tighten every other bolt until all nine bolts holding the lid are tightened; then wrench-tighten all bolts in the same manner. Recommended torque on these bolts is 5 to 8 ft. lbs.

4.12 Position the housing on the messenger wire so that expansion loops of symmetrical shape can be formed on the cables; hand-tighten, then wrench-tighten the two hex head bolts on the messenger clamps.

4.13 Lash all cables to the messenger wire at the point where they approach the wire.

4.14 Make sure that the cap plugs on the three test apertures in the lid of the housing are firmly seated.

5.0 MOUNTING A STATION ON A UTILITY POLE

5.1 For mounting a main trunk station on a utility pole, auxiliary bracket Model SPB-1 is required.

5.2 Remove the hex head bolts and the loose clamp jaws from the messenger clamp assemblies on the Starline housing.

5.3 Using an Allen wrench, remove the two socket head cap screws from each clamp jaw on the housing body.

5.4 Use these cap screws for mounting the bracket at the threaded apertures provided at the rear wall of the housing; the long arm of the cruciform bracket should extend above the housing.

5.5 Firmly wrench-tighten the cap screws.

5.6 Mount the closed housing on the pole so that when facing the trunk line, r-f signal flow will be from left to right. Commercial galvanized ⅜" lag bolts can be used through the two holes in the vertical arm of the bracket.

5.7 From here on, proceed as in steps 4.4 to 4.11 and 4.13 to 4.14.

6.0 MOUNTING A STATION WITH AUXILIARY HANGER BRACKETS ON MESSENGER WIRE

6.1 For mounting a main trunk station below a messenger wire carrying a multiple cable line, auxiliary hanger bracket Model AHB-3 is required.

6.2 Remove the entire messenger clamp assemblies from the housing of the station by removing first the hex head cap screws and clamp jaws from the housing body.

6.3 In place of the messenger clamp assemblies, install the two brackets with the four slotted round head screws supplied.

6.4 Install the messenger clamp assemblies on the brackets.

6.5 From here on, mounting on the messenger wire is done in the same manner as under steps 4.2-4.14.

7.0 MOUNTING OF UTILITY HOUSINGS

7.1 Preparation of cables, installation of VSF-type fittings, and mounting on messenger wire of all models contained in a utility housing is done in a similar manner as for a main trunk station, except that only one messenger clamp assembly is involved. R-F signal flow should be from left to right when facing the trunk line. Installation of an SX-1 is described separately in section 9.0.

7.2 Where pole-mounting is required, auxiliary bracket Model SPB-2 is installed on the utility housing in place of the messenger clamp assembly. Commercial galvanized ¼" lag bolts are used for mounting the unit on the pole.

7.3 Where clearance for a multiple cable installation is required, auxiliary hanger bracket Model AHB-2 is installed on the housing in place of the messenger clamp assembly and the latter is transferred to the hanger bracket.

7.4 Models SHS-2, SDC-8, SDC-12, SDC-16, STE, and SPJ-2 are passive networks and require no further operational settings after mounting and cable connections have been made at the locations determined by system lay-out.

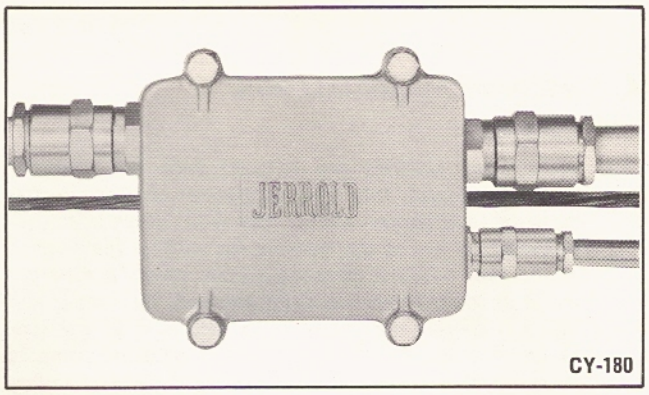


Fig. 14. Utility Housing, Messenger—Mounted Front View

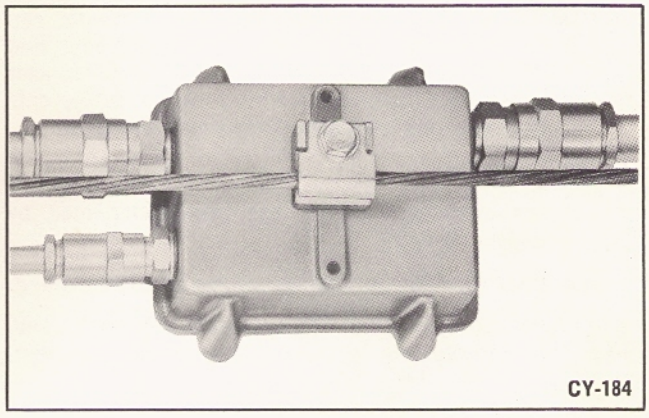


Fig. 15. Utility Housing, Messenger—Mounted Rear View

7.5 When replacing the lid on a utility housing, make sure the sealing gasket is properly positioned in its groove; hand-tighten, then wrench-tighten the hex-head bolts alternately in opposite corners. Recommended torque on these bolts is 5 to 8 ft. lbs.

7.6 Where it is necessary to prevent a.c. power at the mounting location of an SHS-2, an SDC-8, an SDC-12, or an SDC-16 from being passed to an outgoing cable, because there is no facility for separating the r-f from the a.c. input at a device down the line, cut out completely the power-passing choke in the relevant leg of the circuit (see illustrations).

8.0 MOUNTING A POWER SUPPLY MODEL SPS-12

8.1 It is assumed:

a. the mounting location has been determined by system lay-out;

b. a utility pole is available at the location;

c. a 115 vac source is available at the pole.

d. hardware required:
⅝" x 14" galvanized steel bolt, 2 washers, 1 nut;
⅜" x 3½" commercial type galvanized lag bolt;
one or two VSF-type fittings, depending on whether or not a power combiner Model SPJ-2 is used.

8.2 Drill a ⅝" hole all the way through the utility pole at the height required for mounting the power supply.

8.3 Remove the two nuts and washers and the loose section of the upper mounting bracket of the power supply.

8.4 Mount this section of the bracket on the utility pole by forcing the steel bolt through the hole, having placed one washer under the head of the bolt; then place the other washer over the protruding part of the bolt and secure it with the nut; wrench-tighten the nut.

8.5 The SPS-12 is shipped with both R-F/A.C. apertures, giving access to the two crown washer and screw terminals in the bridging network, covered by knock-out discs. Where Model SPJ-2 is used, remove one knock-out disc; where it is not used, remove both knock-out discs.

8.6 Loosen the two turn-lock fasteners at the bottom of the power supply cover and remove the cover. Then install one or two VSF-type fittings, as required, at the R-F/A.C. apertures with the two nuts and washers (shipped with the SPS-12) holding the fittings captive inside the housing; wrench-tighten the nuts.

8.7 At some communities local regulations may require the use of a lightning arrester with the power supply; such lightning arresters and appropriate condulets are available from Jerrold on special order. They should be installed at this stage before mounting the power supply on the pole.

8.8 Mount the power supply on the pole-mounted bracket by inserting the two studs protruding from the rear of the housing through the corresponding holes in the pole-mounted bracket, placing the two washers over the studs and threading on the two nuts; then wrench-tighten the two nuts.

8.9 Fasten the lower mounting bracket to the pole with the ⅜" lag bolt.

8.10 Remove the cover from the bridging network sub-chassis and make sure that the screw and crown washer terminals are sufficiently loose to permit unimpeded introduction of center conductors of cables.

8.11 It is assumed that sufficient cable has been looped off at the location to permit forming of expansion loops and connection to the power supply. Prepare the cable ends as required for the type of VSF fittings used on the power supply; for flexible types of cable, weather-boots should be used.

8.12 Feed the cable ends all the way through the fittings until the bare center conductors are visible beyond the crown washers in the terminal assemblies inside the bridging network chassis. Then tighten the clamp nut and the gland nut on the fittings. Finally tighten the screws in the terminal assemblies of the bridging network, then replace its cover. Form expansion loop or loops on the trunk line cable and lash the cable to the messenger wire.

8.13 Remove the cover from the circuit breaker housing, then feed the 115 vac cable through the bushing in the bottom of the power supply housing into the circuit breaker housing. Connect the positive conductor to the positive (top) terminal on the circuit breaker, connect the neutral conductor to one of the terminals in the four-terminal bank to the left of the switch. Where a ground wire and rod are used, connect the ground wire to the lug inside the power supply housing.

8.14 Replace the cover on the circuit breaker housing; make sure that the 115V plug is properly seated in the socket on the transformer chassis.

8.15 Where system planning so provides, the circuit breaker switch can now be thrown to ON position at this stage and connecting the other end of the power cable to the 115 vac source will energize the entire trunk line section fed by this power supply.

8.16 Replace the cover on the SPS-12 housing and secure it with the turn-lock fasteners.

8.17 Where a power combiner Model SPJ-2 is used, only one cable connection is required between the power supply and the power combiner. For this cable, safe current-carrying capacity requires the use of one of the following types: JT-408, JT-412, JT-1500, JT-1750, or their equivalent. The solid aluminum-sheathed types are preferred.

NOTE: Where system planning requires cross-arm mounting of Model SPS-12, regular spacing of 7½" between cross-arms will permit mounting the power supply in the same manner as on a pole; a shorter ⅝" diameter steel bolt may suffice in this case.

8.18 A 30 V test jack on the transformer chassis permits checking the a.c. output voltage of the power supply.

8.19 The convenience 115 V socket permits connecting a measuring instrument, soldering iron, etc.

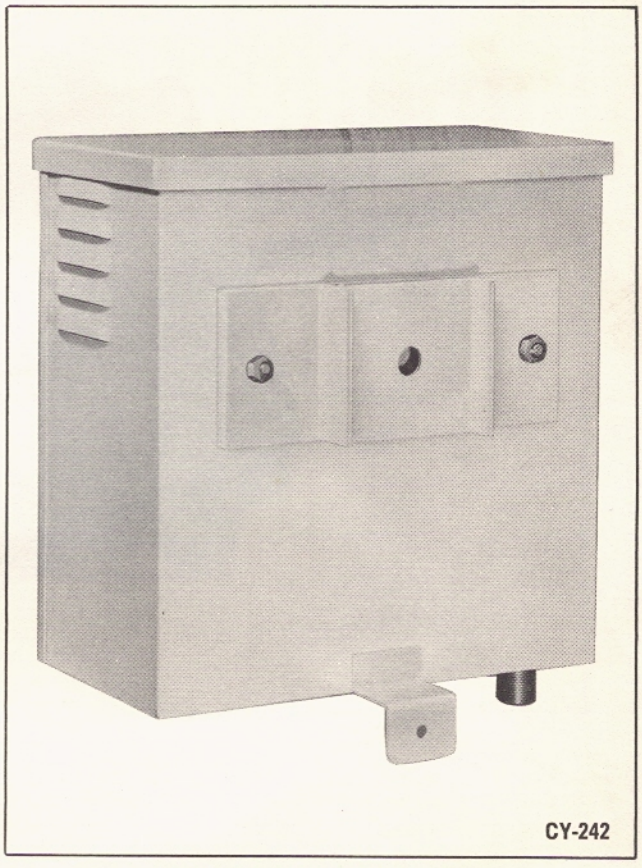


Fig. 16. Model SPS-12, Rear View

9.0 INSTALLATION OF MODEL SX-1

9.1 The housing of Model SX-1 comes factory-equipped with two firmly installed VSF-type adapters, internally wired to the amplifier input and output respectively.

9.2 The adapters accept VSF-type cable fittings (ordinarily either VSF-412 or VSF-500) to be procured according to the cable type used in the feeder line.

9.3 Unless signal level tests and operational settings are to be made at the time the amplifier is mounted and connected to the cable, the housing need not be opened.

9.4 Install the two VSF fittings in the adapters on the housing; wrench-tighten on the fittings the hex nuts adjacent to the adapters.

NOTE: Where weatherboots are to be used with certain types of cable, first slide the boot retaining rings onto the knurled section of the adapters snug up against the wall of the SX-1 housing, before installing the VSF fittings.

9.5 Cut the feeder cable at the point where the SX-1 is to be mounted and remove as much of any lashing wire as is necessary to permit forming of expansion loops. Then prepare the cable ends in accordance with instructions in Jerrold publication 435-345 for the specific type of cable used, except that here for the VSF adapters the length of the exposed center conductor must be 1½".

9.6 The SX-1 should be mounted so that, with the lid towards the installer facing the feeder line, r-f input will be at the left.

9.7 Loosen the hex head bolt on the messenger clamp assembly of the SX-1 housing and loosely engage the messenger wire in the clamp jaws.

9.8 Grease the exposed center conductors and introduce the cable ends all the way (ca. 2") into the VSF fittings; DO NOT BEND THE CENTER CONDUCTORS IN THIS PROCESS! Hand-tighten, then wrench-tighten first the clamp nut then the gland nut on the fittings.

NOTE: Where weatherboots are used, slide the boots all the way up to the wall of the SX-1 housing and over the boot retaining rings.

9.9 Position the SX-1 on the messenger so that expansion loops of symmetrical shape can be formed; then wrench-tighten the hex-head bolt on the messenger clamp.

9.10 Mounting of an SX-1 on a utility pole with an auxiliary bracket Model SPB-2, or on messenger with an auxiliary hanger bracket Model AHB-2, is done in the same manner as described in section 7.0.

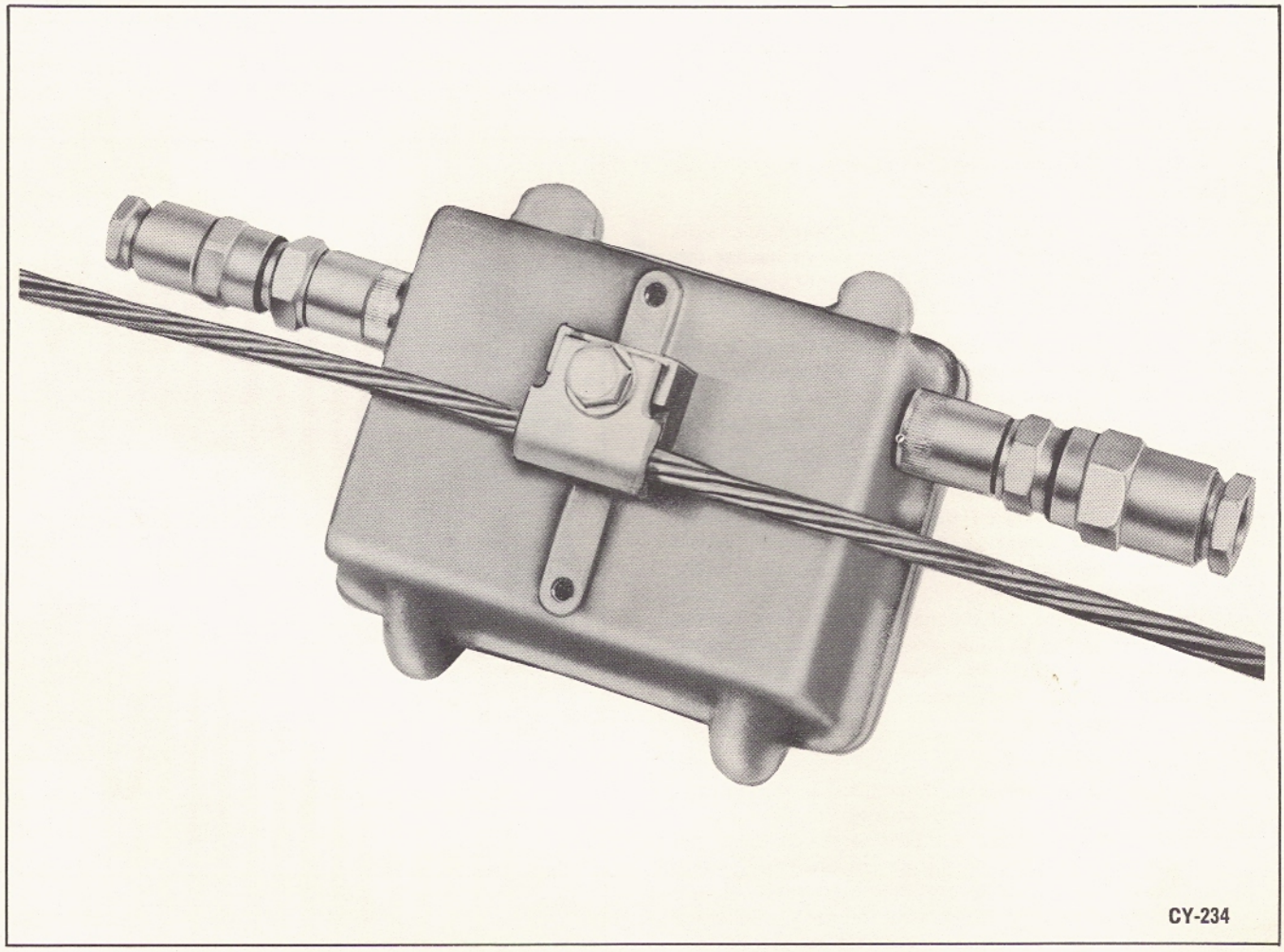


Fig. 17. Model SX-1, Messenger—Mounted

B. ELECTRICAL ADJUSTMENTS AND OPERATION

1.0 GENERAL

1.1 It is assumed:

a. All amplifier stations are installed and spaced according to system lay-out.

b. All power supplies are installed and operating, supplying a.c. power to their respective trunk line sections.

c. All auxiliary units such as thermal equalizers, power combiners, etc., are installed.

d. A field strength meter, a Model SPD-30, and a tube or transistorized volt-ohm-ampere meter are available. Battery-powered instruments are preferred.

2.0 CHART OF CONTROLS AND CONNECTIONS—MAIN TRUNK STATIONS

PLUG-IN MODULES				
NAME OF CONTROL	CIRCUIT DESIGNATION AND TYPE	POSITION	FUNCTION	AVAILABLE ON MODELS
RF IN TEST	TP101 Chassis Fitting	—	Checking for presence of R-F at trunk input terminal	SA-1, SA-2, SA-3, SA-4.
RF OUT TEST	TP102 Chassis Fitting	—	For checking trunk line amplifier output levels** prior to splitter input	SA-1, SA-2, SA-3, SA-4, SA-5.
DIST TEST	TP103 Chassis Fitting	—	For checking bridging amplifier output levels	SA-1, SA-2, SA-5.
ATTEN	S201 Slide Switch	IN OUT	Attenuates level of incoming signal by 6 dB Bypasses attenuator	SA-1, SA-2, SA-3, SA-4, SA-5.*
EQUALIZER	S202 Slide Switch	IN OUT	Compensates for tilt in trunk line cable of a length equivalent to 17 dB @ 216 Mc/s Bypasses equalizer	SA-1, SA-2, SA-3, SA-4.
LINE TILT	R313 Potentiometer	—	Permits increase in equalization continuously from 17 to 24 dB	SA-1, SA-2, SA-3, SA-4.
DIST TILT	R414 Potentiometer	—	Permits varying tilt of bridging amplifier output	SA-1, SA-2.
TILT	R615 Potentiometer	—	Permits varying tilt of intermediate bridging amplifier output	SA-5
AGC-MAN	S701 Slide Switch	AGC MAN	AGC circuit operative; manual gain control circuit inoperative Manual gain control circuit operative; AGC circuit inoperative	SA-1, SA-3.
LINE GAIN	R326 (SA-2, SA-4) R718 (SA-1, SA-3) Potentiometer	—	Permits manual adjustment of trunk line amplifier gain	SA-1, SA-2, SA-3, SA-4.
DIST GAIN	R403 Potentiometer	—	Permits manual adjustment of bridging amplifier gain	SA-1, SA-2.
GAIN	R613 Potentiometer	—	Permits manual adjustment of intermediate bridging amplifier gain	SA-5.
AC TEST	TP106 Tip Jack	—	Permits checking A.C. input voltage	SA-1, SA-2, SA-3, SA-4, SA-5.
B+ TEST	TP104 Tip Jack	—	Permits checking B+ voltage	SA-1, SA-2, SA-3, SA-4, SA-5.
B— TEST	TP105 Tip Jack	—	Permits checking B— voltage	SA-1, SA-2, SA-3, SA-4, SA-5.

*At Models SA-1, SA-2, SA-3 and SA-4 the trunk line signal itself is attenuated; in Model SA-5 the portion of the trunk line signal diverted to the intermediate bridging amplifier input is affected.

**In Model SA-5, the output level of the trunk line signal.

CONNECTOR CHASSIS				
NAME OF CONTROL	CIRCUIT DESIGNATION AND TYPE	POSITION	FUNCTION	AVAILABLE ON MODELS
POWER	J1, P1 4-Pin Socket 3-Pin Plug	IN	Station powered thru input terminal; power not passed on	SA-1, SA-2, SA-3, SA-4, SA-5.
		OUT	Station powered thru output terminal; power not passed on	
		THRU	Station powered thru input or output terminal; passing power	
		OFF	Station itself not powered but passing power on	
LINE IN	Terminal Ass.	—	Trunk line input terminal	SA-1, SA-2, SA-3, SA-4, SA-5.
LINE OUT	Terminal Ass.	—	Trunk line output terminal	SA-1, SA-2, SA-3, SA-4, SA-5.
DIST IN	P103 Chassis Fitting	—	Accepts bridging amplifier output terminal	SA-1, SA-2, SA-5.
DIST OUT	Chassis Fitting	—	Feeds bridging amplifier output into SO-type splitters	SA-1, SA-2, SA-5.
FS1, FS2, FS3, FS4.	FS1, FS2, FS3, FS4. Fuse Holders	—	Individual fusing of feeder lines	SA-1, SA-2, SA-5.
E1, E2, E3, E4	Screw and Crown Washer Terminals	—	Connections for feeder line cables	SA-1, SA-2, SA-5.
1, 2, 3, 4.	Chassis Fittings	—	Feeder line outputs from splitter	SA-1, SA-2, SA-5.
AC	J104 Chassis Fittings	—	A.C. input terminal to plug-in module	SA-1, SA-2, SA-3, SA-4, SA-5.
LINE	J101, J102 Chassis Fittings	—	Trunk line RF-input to and output from plug-in module	SA-1, SA-2, SA-3, SA-4, SA-5.

3.0 VOLTAGE TESTS (ALL SA-MODELS)

3.1 Open the housing by loosening the nine hex head bolts holding the lid; let the lid hang down freely.

3.2 Check whether the power switch plug is in the correct position as planned for this amplifier location; if necessary withdraw the plug and re-insert it as required for correct a.c. input and bypass condition. Check off the appropriate square on the chart in the lid of the housing.

3.3 Connect the a.c. voltmeter to the AC TEST tip jack and log the reading for future reference; minimum a.c. input voltage should be as specified in the chart of SPECIFICATIONS for the relevant type of plug-in.

NOTE: Since the waveform approaches that of a clipped sine-wave, a dynameter or iron vane type meter should be used to obtain accurate a.c. readings.

3.4 Connect the volt-ohm meter to the B+ TEST tip jack and log the reading; the reading should be +15 ±1.5 vdc for all SA-models.

3.5 Connect the volt-ohm meter to the B— TEST tip jack and log the reading; the reading should be —15 ±1.5 vdc for all SA-models.

4.0 ADJUSTMENT OF CONTROLS ON MODEL SA-4 (TRUNK LINE CASCADER)

4.1 Set the EQUALIZER switch to the position required by system lay-out; check off the appropriate square on the chart in the lid of the housing and enter the information in the log book.

4.2 Connect a field strength meter through an SPD-30 to the RF OUT TEST fitting and check the levels of all channels carried on the system including that of the pilot carrier (73.5 mc).

4.3 Where the level of the highest channel carried is found to be higher by more than 6 dB over that recommended in the SPECIFICATIONS, set the ATTEN switch to IN position; check off the appropriate square on the chart in the housing and make entry in the log book. Then reduce the amplifier gain by setting the LINE GAIN control for proper output level reading.

4.4 Where the level of the highest channel carried on the system is found to be higher by less than 6 dB over that recommended, leave the ATTEN switch in the OUT position, but set the LINE GAIN as in step 4.3.

4.5 It is assumed that the head-end output is operated with recommended block-tilt of 5 dB; i.e. low-band channel levels are 5 dB below those of the high-band channels. From here on, "tilted output" assumes block tilt is used. Adjust the LINE TILT control to obtain a "tilted output" across the frequency range of all channels carried on the system. Record the readings on the chart and in the log book.

5.0 ADJUSTMENT OF CONTROLS ON MODEL SA-3 (TRUNK LINE AMPLIFIER WITH AGC)

5.1 Setting of EQUALIZER switch is done as in para. 4.1.

5.2 Set the AGC-MAN switch to MAN position, set LINE GAIN control to maximum (fully clockwise) position and check the output levels as in para. 4.2.

5.3 If necessary set the ATTEN switch as in para. 4.3.

5.4 Set the LINE TILT control to obtain a "tilted output" across the frequency range of all channels carried.

5.5 Reset the AGC-MAN switch to AGC position, check all output levels and reduce LINE GAIN to obtain proper levels. Record the readings on the chart and in the log book.

6.0 ADJUSTMENT OF CONTROLS ON MODEL SA-2 (TRUNK LINE AMPLIFIER WITHOUT AGC, AND BRIDGING AMPLIFIER)

6.1 The trunk line amplifier controls on Model SA-2 are set in the same manner as for a Model SA-3; taking into consideration a bridging amplifier insertion loss of 1 dB, adjustment of controls on the bridging amplifier section is done as follows:

6.2 First determine from system lay-out the type of SO-splitter required for this location; plug the splitter into the connector chassis so as to derive the proper feeder line inputs planned for the cables connected through the relevant VSF fittings. The fitting with the highest attenuation on the splitter should be connected to the fitting feeding the shortest feeder line.

6.3 Connect a field strength meter through an SPD-30 to the DIST TEST fitting and check the levels of all channels; i.e. levels prior to the signals going through the SO-4 type splitter.

6.4 Where the level of the highest channel exceeds specifications, reduce the bridging amplifier gain by setting the DIST GAIN control until a proper reading is obtained.

6.5 The DIST TILT control is factory-set to yield a flat response; this will yield a 5 dB block tilt at the bridging amplifier output where the system is operated with 5 dB block tilt. Only where system planning requires a bridging amplifier output deviating from block-tilt of 5 dB will it be necessary to reset the DIST TILT control.

6.6 Record the bridging amplifier output levels under DISTR. OUT on the chart in the housing and in the log book.

7.0 ADJUSTMENT OF CONTROLS ON MODEL SA-1 (TRUNK LINE AMPLIFIER WITH AGC AND BRIDGING AMPLIFIER)

7.1 Adjustment of controls on the trunk line amplifier section is done as for a Model SA-3.

7.2 Insertion of SO-type splitter and adjustment of controls on bridging amplifier section is done as for Model SA-2 (paras. 6.2 to 6.6).

8.0 ADJUSTMENT OF CONTROLS ON MODEL SA-5 (INTERMEDIATE BRIDGING AMPLIFIER)

8.1 As trunk line signals are "fed thru," trunk line output level measurements are done only if considered necessary as an assurance test.

8.2 Insertion of SO-type splitter and adjustment of controls is done as for the bridging amplifier section in Model SA-2, except that the bridging amplifier gain and tilt controls here are named GAIN and TILT (see CHART OF CONTROLS AND CONNECTIONS).

9.0 CLOSING THE HOUSING

9.1 Close the housing, observing all precautions detailed in the mechanical installation procedure.

10.0 ADJUSTMENTS ON MODEL SX-1

10.1 Remove the two hex-head bolts on top of the unit and one of the two hex-head bolts on the bottom; slightly loosen the fourth bolt so that the lid can be pivoted out of the way, giving access to the amplifier.

10.2 Set the power switch to either T (thru) or S (stop) position as required by system lay-out (depending on whether or not other units down the feeder line have to be powered).

10.3 Connect a field strength meter thru adapter Model PGF to the TP test fitting on the SX-1 board; tune the meter to the highest channel carried on the system and measure the output level.

10.4 Adjust the GAIN control for the desired output; if further gain reduction is necessary, replace the plug-in Model SXP-0 by Model SXP-6, then re-adjust the gain control.

10.5 Tune the meter to the lowest channel carried on the system and measure the output level; if necessary adjust the TILT control for the desired output. As in some cases GAIN and TILT control adjustments may somewhat interact, a readjustment of the GAIN control may be necessary after TILT control adjustment; in that case repeat steps 10.3 and 10.4.

10.6 Replace the lid and the hex-head bolts; then wrench-tighten all four bolts as described in the mechanical installation procedure.

CIRCUIT DESCRIPTIONS

A. MAIN TRUNK STATIONS

1.0 D.C. POWER SUPPLY

1.1 The regulated d.c. power supply is common to all five main trunk station types. Its circuit description given here is not repeated in the description of the trunk line and bridging amplifier circuits.

1.2 The d.c. power supply receives the a.c. from the trunk line and converts it into the B+ and B— voltages (+15 vdc and —15 vdc) required for the r-f amplifiers.

1.3 A.C. enters the plug-in module at J104 which mates with P104 on the connector chassis of the Starline housing. From J104 a pin jack TP106 is brought out as AC TEST point on the plug-in chassis. R-F is blocked by L102 mounted in the plug-in chassis.

1.4 From L102 the a.c. voltage is applied through filter choke L101 to a voltage doubler rectifier consisting of diodes CR101 and CR107.

1.5 The positive d.c. voltage is filtered by C102 and C103 and then applied to a series regulator and filter network consisting of R101, R102, C104, Q101 and CR105. Transistor Q101 is protected against overloads by a current-limiting circuit consisting of R105, CR102, CR103 and CR104. From the junction of R105 and CR104 the B+ voltage is passed via a feed-thru capacitor C110 over one path into the amplifier circuit, over a second path it is brought out to pin jack TP104 as B+ TEST point on the plug-in chassis.

1.6 The B—voltage is processed in a similar manner in filter capacitors C106 and C107 and in series regulator network R103, R104, C108, Q102 and CR106. Regulator Q102 is protected by CR103, CR109 and R106. From the junction of R106 and CR109 the B— voltage is fed through C112 and then connected on one side into the amplifier circuit, on the other side it is brought out to pin jack TP105 as B—TEST point on the plug-in chassis.

1.7 In Models SA-1 and SA-2 additional positive and negative voltage paths are provided through C111 and C113 respectively for the bridging amplifier circuit board.

2.0 TRUNK LINE AMPLIFIER

2.1 The trunk line amplifier is common to Models SA-1, SA-2, SA-3 and SA-4.

2.2 The circuitry occupies an etched board for the amplifier itself, an etched board accommodating the cable equalizer and signal attenuator networks, and a separately mounted manual gain control circuit.

2.3 The r-f signal enters the plug-in chassis at terminal J101 and is applied to the ATTEN switch S201 and the EQUALIZER switch S202. With both switches in OUT position, the signal is passed straight on to the input stage Q301 of the r-f amplifier. This and all other amplifier stages are operated in a common emitter circuit configuration.

2.4 From the junction of J101 and S101 an input signal test point TP101 is brought out in form of a push-on fitting RF TEST IN mounted on the plug-in chassis. C201 adjusts impedance match for the input terminal.

2.5 The incoming signal is coupled through C301 to the base of Q301. Base current is provided through bias resistors R303 and R304 with the latter providing bias stabilization. The output of Q301 is coupled through C303 to the base of the second stage Q302. Transformer T301 provides impedance match between the collector of Q301 and the base of Q302. Base bias for Q302 is furnished by R306, R307 and R308. R306 acts as bias stabilizer.

2.6 The collector output of Q302 is passed through a tunable network L302, C323 and coupled through C306 to Q303.

2.7 Q303 and Q304 are arranged in a "bridged T" attenuation network acting as a gain reduction circuit which can be manually controlled by LINE GAIN potentiometer R326 (Models SA-2 and SA-4); R718 (Models SA-1 and SA-3).

2.8 In addition to this variable gain reduction, a fixed 6 dB gain reduction network is available at the input stage. The network consists of R201, R202 and R203. With ATTEN switch set to IN position, this network is connected into the input circuit.

2.9 The output of Q303 is coupled through C310 to the base of the next stage Q305. A portion of the output of Q305 is fed back through transformer T303 and a parallel network L304, C322 resonating at 216 Mc/s and then through R316 to the LINE TILT control R313.

2.10 This control permits 0 to 7 dB equalization for variations in cable tilt, apart from that available from the fixed 17 dB equalizer network in the input stage. The 17 dB equalizer network consists of L202, C202, R204, C203, R205, R206, L201, C204, L203 and R207. With EQUALIZER switch S202 set to IN position, this network is connected into the input circuit.

2.11 The collector output of Q306 is passed through an impedance matching transformer T304 and coupled through C314 to the plug-in terminal J102 which mates with an appropriate fitting P102 on the connector chassis in the station housing.

2.12 From the internal tiepoint of J102 an output signal test point TP102 is brought out in form of a push-on fitting RF TEST OUT on the plug-in chassis.

2.13 In Models SA-3 and SA-4 a trimmer C10 adjusts the impedance at the output terminal; in Models SA-1 and SA-2 a similar trimmer C401 is incorporated on the bridging amplifier circuit board.

2.14 On Models SA-1 and SA-2 the tap of the directional coupling network T305, C321 and R323 connects to the AGC circuit; the line output of the coupler serves to branch a portion of the signal into the bridging amplifier. In Models SA-3 and SA-4, only the line output portion of the coupler is active.

3.0 AUTOMATIC GAIN CONTROL FOR TRUNK LINE AMPLIFIER

3.1 The AGC circuitry added to the basic trunk line amplifier circuitry is common to Models SA-1 and SA-3. It is mounted on a separate etched board in a shielded compartment of the plug-in chassis.

3.2 The AGC circuit consists of a preselector stage, an r-f amplifier, a d.c. detector, a d.c. amplifier and a differential amplifier stage.

3.3 A portion of the trunk line amplifier output is fed through the tap of directional coupling network T305, C321, R323 and then coupled through network L711, C718 into the preselector stage L709, L710. This stage is mounted within a shielded compartment, recessed in the bottom of the plug-in chassis.

The preselector is tuned to the pilot carrier frequency of 73.5 Mc/s introduced at the head-end.

3.4 From the preselector the signal is coupled through C717 to the base of the first r-f amplifier stage Q707. This and all following r-f amplifier stages are arranged in a common emitter configuration. Base bias for Q707 is provided by R721 and R722.

3.5 The output of Q707 is passed through impedance matching transformer T702 and through C712 into the manual LINE GAIN control R718 incorporated here on the etched circuit board.

In this circuit, with the AGC-MAN switch S701 set to AGC position, R718 acts as a threshold level control for the AGC circuit. With switch S701 set to MAN position, R718 acts through the differential amplifier stage as a level control for the gain reduction circuit in the trunk line amplifier itself; it operates in a similar manner as the LINE GAIN control in Models SA-2 and SA-4, where the control is mounted separately.

With the switch in MAN position the entire r-f amplifier section of Q706, Q705 and Q704 is disconnected.

3.6 The output of Q706 is coupled through C706 to the base of Q705 with T701 providing impedance match. Base bias for Q705 is provided by R713 and R714.

3.7 From the collector of Q705 the signal is fed to a voltage-doubling detector stage CR701 and CR702 whose output is filtered by C702 and kept constant by thermistor TR701.

3.8 With switch S701 in AGC position, the detector output is applied to the base of the first d.c. amplifier Q704 whose output in turn provides base current for the second d.c. amplifier Q703, arranged in a common collector circuit.

3.9 The Q703 emitter output drives the differential amplifier stage Q702, Q701. The output of this amplifier then drives the gain reduction circuit stage in the trunk line amplifier. Filter capacitor C701 prevents 60 cps hum modulation of the gain reduction circuit.

4.0 BRIDGING AMPLIFIER

4.1 The bridging amplifier circuitry is common to Models SA-1 and SA-2. The components are interconnected on an etched board mounted in a shielded compartment of the plug-in chassis.

4.2 The output of the trunk line amplifier is passed to a directional coupling network consisting of T401, T402, and R401 in the input stage of the bridging amplifier.

4.3 From this network the major portion of the signal is passed to the trunk line output terminal J102 with C401 adjusting the impedance match.

4.4 The small portion of the signal is fed through a gain reduction network controlled by DIST GAIN potentiometer R403 and then coupled through C402 to the base of the input stage Q401. This and all following stages are arranged in a common emitter circuit configuration.

4.5 The collector output of Q401 is coupled through C407 to the base of the second stage Q402, with T403 providing impedance match. A portion of the collector output of Q402 is fed back through DIST TILT control R414; this control is factory-adjusted and will need field adjustment only where system requirements call for a deviation from 5 dB block tilt at the output of the bridging amplifier.

4.6 The other portion of the collector output of Q402 is coupled through C410 to the base of Q403 arranged in a d.c. series circuit with Q402. The output of Q403 is coupled through C414 to the base of the output stage Q404.

4.7 The collector output of Q404 is coupled through C420 to the output terminal J103 which mates with the DIST IN push-on fitting P103 on the connector chassis of the Starline housing. T406, L407 provide impedance match at the output terminal.

4.8 From the junction of C420 and J103 a test point TP103 is brought out in form of a DIST TEST push-on fitting on the plug-in chassis.

4.9 From the DIST IN fitting on the connector chassis the signal is passed to the DIST OUT fitting on the connector chassis; the latter fitting mates with the IN fitting on the SO-type plug-in splitters.

5.0 INTERMEDIATE BRIDGING AMPLIFIER

5.1 This circuitry is found in Model SA-5 only. The connector chassis used with the Starline housing however is the same as used with Models SA-1 and SA-2.

5.2 The intermediate bridging amplifier circuitry is accommodated on two etched boards; one with a directional coupler and an equalizer network, the other with the amplifier circuit itself.

5.3 The trunk line is coupled through C508 to a directional coupling network on the first SA-5 amplifier board; this network consists of T501, T502, R501, C503. Trimmer C501 adjusts the impedance match at the input terminal J101.

5.4 From the primary of T501 the major portion of the input signal is passed to the trunk line output terminal J102. The lesser portion of the signal is fed to the equalizer network consisting of C505, C506, C507, L501, L502, L503, R502, R503, R504, and R506. This network is designed to compensate for tilt in cable of a length equivalent to 11 dB.

5.5 From the equalizer the signal is passed to the ATTEN switch S601 with trimmer C601 compensating for the inductance between the two etched boards.

5.6 With switch S601 in OUT position the signal is coupled directly through C602 to the base of Q601; with the switch in IN position, attenuation network R601, R602, and R603 are switched into the circuit, providing a fixed gain reduction of 6 dB.

5.7 Q601 and all following stages are arranged in a common emitter circuit configuration. Q601 and Q602 constitute a d.c. series circuit with T601 providing impedance match for the interstage and C606 acting as coupling capacitor.

5.8 The output of Q602 is coupled through C608 to a variable gain reduction circuit consisting of R612, R614, C609 and GAIN potentiometer R613. Transformer T602 provides impedance match for this interstage.

5.9 From R613 the signal is coupled through C613 to the base of Q603. A portion of the Q603 collector output is fed back through TILT control R615; this control permits varying the fixed cable compensation of 11 dB available from the equalizer at the input stage by ±4 dB.

5.10 The other portion of the collector output of Q603 is coupled through C616 to the base of Q604 with T603 providing impedance match between the stages. Q604 and Q605 again are arranged in a d.c. series circuit, with T604 providing impedance match and C620 acting as coupling capacitor.

5.11 The collector of Q605 is coupled through C623 to the base of the output stage Q606. Transformer T605 matches the impedance between the collector of Q605 and the base of Q606; transformer T606 matches the impedance of the collector of Q606 to the output terminal J103, with trimmer C630 permitting match adjustment. C629 is the output coupling capacitor.

5.12 The amplifier output terminal J103 mates with the DIST IN fitting on the connector chassis of the Starline housing; from there the signal passes to the DIST OUT fitting on the connector chassis. This fitting mates with the IN fitting on an SO-type plug-in splitter.

5.13 From a tie-point between L605 and C629 a test point TP103 is coupled through C628 to the amplifier output and brought out as DIST TEST fitting on the plug-in chassis.

5.14 In the SA-5 intermediate bridging amplifier station, an RF OUT TEST and a DIST OUT TEST fitting are available; no RF IN TEST point is included here (see Chart of Controls and Connections).

B. LINE EXTENSION AMPLIFIER MODEL SX-1

6.0 Model SX-1 consists of two printed circuit boards, one for the amplifier itself, the other for a d.c. power supply, mounted in a double-decker fashion in a utility housing equipped with adapters for VSF-type fittings.

6.1 Both a.c. power and r-f signal enter the amplifier at terminal J1. The r-f signal is blocked in L8 from where 30 vac is passed on one side to the d.c. power supply for conversion into B+ and B— voltages necessary for driving the amplifier circuitry.

6.2 On the other side, 30 vac can be passed through switch S1 in T (thru) position to output terminal J3 for powering other units along the feeder line. With S1 in S (stop) position, power is not passed.

6.3 The d.c. power supply consists of two half-wave rectifiers CR1 and CR2, and filter networks employing resistors R35 and R36 and capacitors C36, C37, C38 and C39. R33 and R34 are voltage dropping and current limiting resistors. Outputs are +8.4 and —8.4 vdc.

6.4 From J1 the r-f signal is applied through C2 to a cable equalizer (20 dB at channel 13) network consisting of L1, R1, R2, R3, C3, C4, L2 and C5. Its output is passed through C6 to a gain control circuit which permits fixed 6 dB gain reduction by a plug-in pad Model SXP-6 (available on order; shelf units are shipped with 0-attenuation pad Model SXP-0) and continuously variable gain reduction by GAIN control R6 over a minimum range of 6 dB.

6.5 From R6 the signal is coupled through C8 to the base of Q1. This and all other amplifier stages are arranged in a common emitter circuit configuration. Impedance match between the stages is achieved by T1, T2, T3, and T4 respectively.

6.6 A portion of the collector output of Q1 is shunted through TILT control R11 which permits varying of cable equalization over a range of ±4 dB from 16 to 24 dB at channel 13.

6.7 From the output stage Q4 the signal is coupled through C25, L7 and C26 to the output terminal J3. R-F OUTPUT TEST point TP1, with the r-f signal attenuated by 30 dB, is available in form of a G-type fitting.

EQUIPMENT MAINTENANCE

1. The low current drain, low heat development, voltage and current stabilizing circuitry, and complete weatherproof sealing designed into Starline solid-state equipment, as well as the use of devices compensating for signal fluctuations due to cable characteristics and environmental influences, require only a minimum of routine maintenance both of systems and of individual units.

2. Sound system operating practice requires the stocking of a reasonable number of spare plug-in units so that in the rare case of an equipment failure quick replacement of the faulty unit will ensure subscriber service with minimum interruption.

3. Unless system operators have adequate facilities and instruments, as well as personnel thoroughly familiar with solid-state and printed circuitry, no on-site equipment repair should be attempted.

   A faulty unit should be returned to Jerrold's Servicing Department where it will be repaired at no charge under warranty conditions; otherwise it will be repaired at a nominal charge.

   The unit should be carefully packed and shipped with freight and insurance charges prepaid, and be accompanied by a letter stating the difficulties encountered.

4. For the convenience of servicing personnel, this section gives replacement parts lists for the principal Starline units and their subassemblies, as well as the relevant schematic circuit diagrams.

REPLACEMENT PARTS LIST

MODELS SA-1 THRU SA-5

ASSEMBLY: STARLINE HOUSING				REF. DWG. NO.:
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
1	——	1	Chart, maintenance	219-386
2	——	2	Clamp, bottom	C228-170
3	——	2	Clamp, top	C228-171
4	——	3	Plug, test ass'y	B821-225
5	——	41"	R-F shielding	616-012
6	——	4	Screw, 10-32 x ⅜, SS, soc. hd. cap	716-043
7	——	2	Screw, 5/16-18 x ¾, HWH, MS	B704-013
8	——	4	Spring, contact	224-061
9	——	1	Weather gasket	295-131

MODELS SA-1, SA-2, SA-5

ASSEMBLY: CONNECTOR CHASSIS, TYPE WB			REF. DWG. NO: 861-838 861-830 861-828	
ITEM	DESIGNATION SCHEMATIC	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C1, 18, 22, 29	4	1.0 pF, Gim.	122-004
2	C2, 5, 8, 21, 24	5	330 pF, 500V	126-114
3	C3, 4, 7, 10-17, 25, 27, 30, 31	15	0.01 uF, 600V, disc	124-134
4	C6, 9, 19, 26	4	1.5 pF, Gim.	122-006
5	C20, 23	2	3.0 pF, Gim.	122-033
6	C28	1	160 pF, 500V	126-123
			CONNECTORS	
7	J1	1	Socket, power	A182-607
8	P1	1	Plug, power	B184-052
9	P101, 102, 103, 104, Dist. Out, 1, 2, 3, 4	9	PG-61	B821-227-0
			FUSEHOLDER	
10	FS-1, 2, 3, 4	4	Fuseholder	101-803

MODELS SA-3, SA-4

ASSEMBLY: CONNECTOR CHASSIS, TYPE NB			REF. DWG. NO.: 861-842 861-840	
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C1, 9	2	1.0 pF, Gim.	122-004
2	C2	1	330 pF, 500V	126-114
3	C3 thru 7	5	0.01 uF, 600V, dic.	124-134
4	C8	1	160 pF, 500V	126-123
			CONNECTORS	
5	J1	1	Socket	A182-607
6	P1	1	Plug, power	B184-052
7	P101, P102, P104	3	PG-61	B821-227-0

MODELS SA-1 THRU SA-5

ASSEMBLY: D-C POWER SUPPLY			REF. DWG. NO.: 861-838 861-830 861-842 861-840 861-828	
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C101, 105	2	0.01 uF, disc.	124-031
2	C102, 103, 106, 107	4	40 uF, 40V, electrolytic	127-078
3	C104, 108	2	250 uF, 25V, electrolytic	127-062
			DIODES	
4	CR101, 107	2	Silicon, 140V RMS, 3A, 200PIV	137-737
5	CR102, 103, 104, 108, 109	5	Silicon, 70V RMS, 100 PIV	137-718
6	CR105, 106	2	Factory-selected	137-736
			RESISTORS	
7	R101 thru 104	4	150 ohms, 5%, 3W	110-103
8	R105, 106	2	1 ohm, 5%, 2W	110-105
			TRANSISTORS	
9	Q101	1	Factory-selected	130-146
10	Q102	1	Factory-selected	130-104

MODEL SA-1

ASSEMBLY: PLUG-IN CHASSIS			REF. DWG. NO.: 861-838	
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C109 thru 113	5	1000 pF, feed-thru	129-110
2	C206, 420	2	0.02 uF, 25V	124-078
3	C322, 323, 719, 720	4	470 pF, feed-thru	129-152
4	C324	1	160 pF, 500V	126-123
5	C718	1	13 pF, QC, Gim.	122-039
			CONNECTORS	
6	J101 thru 104 & TP101, 102, 103	7	G-61	821-195
7	TP104	1	Tip jack, red	185-133
8	TP105	1	Tip jack, violet	185-134
9	TP106	1	Tip jack, gray	185-135
			RESISTORS	
10	R425	1	82 ohms, 5%, 1W	112-090
11	R723	1	330 ohms, 5%, 1W	110-120
12	R725	1	1.1k, 5%, ¼W	112-927

REPLACEMENT PARTS LIST *(Continued)*

MODEL SA-2

ASSEMBLY: PLUG-IN CHASSIS			REF. DWG. NO.: 861-830	
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C109 thru 113	5	1000 pF, feed-thru	129-110
2	C206, 240	2	0.02 uF, 25V	124-078
3	C322, 323	2	470 pF, feed-thru	129-152
4	C324	1	160 pF, 500V	126-123
			CONNECTORS	
5	J101 thru 104 & TP101, 102, 103	7	G-61	821-195
6	TP104	1	Tip jack, red	185-133
7	TP105	1	Tip jack, violet	185-134
8	TP106	1	Tip jack, gray	185-135
			DIODE	
9	CR301	1	Zener diode	137-724
			RESISTORS	
10	R324	1	Factory-selected	
11	R325	1	470 ohms, 5%, ½W	112-317
12	R326	1	15 k, 10%, 2W, potentiometer	118-142
13	R425	1	82 ohms, 5%, ¼W	112-090

MODEL SA-3

ASSEMBLY: PLUG-IN CHASSIS			REF. DWG. NO.: 861-842	
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C10	1	1.5—20 pF, trimmer	128-537
2	C109, 110, 111	3	1000 pF, feed-thru	129-110
3	C206	1	0.02 pF, 25V	124-078
4	C322, 323, 719, 720	4	470 pF, feed-thru	129-152
5	C718	1	13 pF, Gim.	122-039
			CONNECTORS	
6	J101, 102, 104 & TP101, 102	5	G-61	821-195
7	TP104	1	Tip jack, red	185-133
8	TP105	1	Tip jack, violet	185-134
9	TP106	1	Tip jack, gray	185-135
			RESISTORS	
10	R723	1	330 ohms, 5%, ¼W	110-120
11	R725	1	1.1 k, 5%, ¼W	112-927

MODEL SA-4

ASSEMBLY: PLUG-IN CHASSIS			REF. DWG. NO.: 861-840	
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C10	1	1.5—20 pF, trimmer	128-537
2	C109, 110, 111	3	1000 pF, feed-thru	129-110
3	C206	1	0.02 uF, 25V	124-078
4	C322, 323	2	470 pF, feed-thru	129-152
			CONNECTORS	
5	J101, 102, 104 & TP101, 102	5	G-61	821-195
6	TP104	1	Tip jack, red	185-133
7	TP105	1	Tip jack, violet	185-134
8	TP106	1	Tip jack, gray	185-135
			DIODE	
9	CR301	1	Zener diode	137-724
			RESISTORS	
10	R324	1	Factory-selected	
11	R325	1	470 ohms, 5%, ½W	112-317
12	R326	1	15 k, 10%, 2W, potentiometer	118-142

MODELS SA-1 THRU SA-4

ASSEMBLY: TRUNK LINE AMPLIFIER			861-838 861-830 861-842 REF. DWG. NO.: 861-840	
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C301 thru 320	20	0.02 uF, 25V	124-078
2	C321	1	2.0 pF, Gim.	122-030
3	C322	1	6.8 pF, 600V, NPO	124-112
4	C323	1	2—8 pF, trimmer	128-546
			RESISTORS	
5	R301	1	240 ohms, 5%, ¼W	112-975
6	R302, 317	2	24 ohms, 5%, ¼W	112-985
7	R303	1	3 k, 5%, ¼W	112-934
8	R304	1	1.1 k, 5%, ¼W	112-927
9	R305	1	120 ohms, 5%, ¼W	112-093
10	R306	1	680 ohms, 5%, ½W, w.w.	113-092
11	R307	1	270 ohms, 5%, ¼W	112-993
12	R308, 314	2	3.6 k, 5%, ¼W	112-999
13	R309	1	22 ohms, 5%, ¼W	112-971
14	R310, 322	2	51 ohms, 5%, ¼W	112-087
15	R311, 312, 323	3	75 ohms, 5%, ¼W	112-954
16	R313	1	500 ohms, 20%, potentiometer	118-141
17	R315	1	2.4 k, 5%, ¼W	112-918
18	R316	1	150 ohms, 5%, ¼W	112-974
19	R318	1	180 ohms, 5%, ¼W	112-994
20	R319	1	1.3 k, 5%, ¼W	112-064
21	R320	1	2.7 k, 5%, ¼W	112-931
22	R321	1	30 ohms, 5%, ¼W	112-982
			TRANSISTORS	
23	Q301, 302	2	Factory-selected	130-150
24	Q303, 304	2	Factory-selected	S130-147
25	Q305, 306	2	Factory-selected	130-144

MODELS SA-1, SA-2

ASSEMBLY: BRIDGING AMPLIFIER FOR SA-1 AND SA-2			861-838 REF. DWG. NO.: 861-830	
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C401	1	2—8 pF, trimmer	128-546
2	C402 thru 419	18	0.02 uF, 25V	124-078
			RESISTORS	
3	R401	1	75 ohms, 5%, ¼W	112-954
4	R402, 410	2	47 ohms, 5%, ¼W	112-992
5	R403, 414	2	500 ohms, 20%, potentiometer	118-141
6	R404	1	33 ohms, 5%, ¼W	112-995
7	R405	1	2 k, 5%, ¼W	112-930
8	R406	1	150 ohms, 5%, ¼W	112-974
9	R407	1	1.3 k, 5%, ¼W	112-064
10	R408	1	24 ohms, 5%, ¼W	112-985
11	R409	1	560 ohms, 5%, ¼W	112-104
12	R412	1	1.8 k, 5%, ¼W	112-972
13	R413, 423	2	820 ohms, 5%, ¼W	112-976
14	R415, 418, 424	3	20 ohms, 5%, ¼W	112-083
15	R416, 425	2	51 ohms, 5%, ¼W	112-087
16	R417, 421	2	270 ohms, 5%, ¼W	112-993
17	R419	1	3.9 k, 5%, ¼W	112-979
18	R420	1	2.4 k, 5%, ¼W	112-918
			TRANSISTORS	
19	Q401	1	Factory-selected	130-138
20	Q402, 403, 404	3	Factory-selected	130-144

REPLACEMENT PARTS LIST *(Continued)*

MODELS SA-1, SA-3

ASSEMBLY: AGC SECTION — REF. DWG. NO.: 861-838, 861-842

ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C701	1	4.7 uF, 20V, electrolytic	127-079
2	C702	1	22 uF, 15V, electrolytic	127-093
3	C703 thru 708, C710 thru 717	14	0.02 uF, 25V	124-078
4	C709	1	39 pF, 500V, NPO	124-126
			DIODES	
5	CR701, 702	2	Factory-selected	139-102
			RESISTORS	
6	R701	1	1.1 k, 5%, ¼W	112-927
7	R702	1	1.3 k, 5%, ¼W	112-064
8	R703	1	680 ohms, 5%, ¼W	112-338
9	R705	1	600 ohms, 5%, ¼W	110-107
10	R707	1	1 k, 5%, ¼W	112-977
11	R708	1	2.7 k, 5%, ¼W	112-931
12	R709	1	47 k, 5%, ¼W	111-004
13	R710	1	270 ohms, 5%, ¼W	112-993
14	R711, 720	2	560 ohms, 5%, ¼W	112-104
15	R712	1	6.2 k, 5%, ¼W	112-981
16	R713, 721	2	3 k, 5%, ¼W	112-934
17	R714	1	5.1 k, 5%, ¼W	112-980
18	R715	1	5.6 k, 5%, ¼W	112-919
19	R716	1	100 ohms, 5%, ¼W	112-950
20	R717	1	1.2 k, 5%, ¼W	112-921
21	R718	1	500 ohms, 20%, potentiometer	118-141
22	R719	1	75 ohms, 5%, ¼W	112-954
23	R722	1	4.7 k, 5%, ¼W	111-001
			SWITCH	
24	S701	1	Dpdt, slide	162-037
			THERMISTOR	
25	RT701	1	1 k @ 25°C	110-042
			TRANSISTORS	
26	Q701 thru 704	4	Factory-selected	130-149
27	Q705, 706, 707	3	Factory-selected	130-112

MODELS SA-1 THRU SA-4

ASSEMBLY: EQUALIZER FOR SA-1 THRU SA-4 — REF. DWG. NO.: 861-838, 861-830, 861-842, 861-840

ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C201, 205	2	2—8 pF, trimmer	128-546
2	C202	1	6.2 pF, 500V	124-139
3	C203	1	12 pF, 500V, NPO	124-135
4	C204	1	8.2 pF, 500V, NPO	124-103
			RESISTORS	
5	R201, 202	2	24 ohms, 5%, ¼W	112-985
6	R203	1	100 ohms, 5%, ¼W	112-950
7	R204	1	270 ohms, 5%, ¼W	112-993
8	R205, 206	2	75 ohms, 5%, ¼W	112-954
9	R207	1	20 ohms, 5%, ¼W	112-083
			SWITCHES	
10	S201, 202	2	Dpdt, slide	162-037

MODEL SO-1

ASSEMBLY: — REF. DWG. NO.: 861-773

ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CONNECTORS	
1	J1, 2	2	G-61	821-195
			FUSE	
2	——	1	2 amp.	101-240
			HARDWARE	
3	——	3	Plug	B221-488
4	——	3	Seal, plug	295-123

MODEL SO-2

ASSEMBLY: — REF. DWG. NO.: 861-769

ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C1	1	10 pF, 500V, Gim.	122-015
2	C2	1	56 pF, 500V	126-104
			CONNECTORS	
3	J1, 2, 3	3	G-61	821-195
			FUSES	
4	——	2	2 amp.	101-240
			HARDWARE	
5	——	2	Plug	B221-488
6	——	2	Seal, plug	295-123
			RESISTOR	
7	R1	1	150 ohms, 5%, ¼W	112-974
			TRANSFORMERS	
8	T1	1	Transformer ass'y	B144-093
9	T2	1	Transformer ass'y	B144-153

MODEL SO-3

ASSEMBLY: — REF. DWG. NO.: 861-770

ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C1, 3	2	10 pF, Gim	122-016
2	C2	1	1.0 pF, Gim.	122-004
3	C4	1	56 pF, 500V	126-104
			CONNECTORS	
4	J1 thru 4	4	G-61	821-195
			FUSES	
5	——	3	2 amp.	101-240
			HARDWARE	
6	——	1	Plug	B221-488
7	——	1	Seal plug	295-123
			RESISTORS	
8	R1, 2	2	150 ohms, 5%, ¼W	112-974
			TRANSFORMERS	
9	T1, 3	2	Transformer ass'y	B144-093
10	T2, 4	2	Transformer ass'y	B144-153

REPLACEMENT PARTS LIST *(Continued)*

MODEL SO-4

ASSEMBLY: REF. DWG. NO.: 861-771

ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C1	1	1.2 pF, 500V, Gim.	122-005
2	C2	1	18 pF, 500V, Gim.	122-045
3	C3	1	7.5 pF, Gim.	122-040
4	C4	1	9.1 pF	121-042
5	C5, 6	2	56 pF	126-104
			CONNECTORS	
6	J1 thru 5	5	G-61	821-195
			FUSES	
7	——	4	2 amp.	101-240
			RESISTORS	
8	R1	1	75 ohms, 5%, ¼W	112-954
9	R2, 3	2	150 ohms, 5%, ¼W	112-974
			TRANSFORMERS	
10	T1, 2	2	Transformer ass'y	B144-152
11	T3, 4	2	Transformer ass'y	B144-181

MODEL SA-5

ASSEMBLY: PLUG-IN CHASSIS REF. DWG. NO.: 861-828

ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C109, 110, 111	3	1000 pF, feed-thru	129-110
2	C508	1	240 pF, 500V	126-124
3	C628, 629	2	0.02 uF, 25V	124-078
4	C630	1	0.9—7 pF, trimmer	128-530
			CONNECTORS	
5	J101 thru 104 & TP102, 103	6	G-61	821-195
6	TP104	1	Tip jack, red	185-133
7	TP105	1	Tip jack, violet	185-134
8	TP106	1	Tip jack, gray	185-135

MODEL SA-5

ASSEMBLY: INTERMEDIATE BRIDGING AMPLIFIER FOR SA-5 REF. DWG. NO.: 861-828

ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C601	1	2—8 pF, trimmer	128-546
2	C602 thru 608, 610 thru 628	26	0.02 uF, 25V	124-978
3	C609	1	9.1 pF, 600V, NPO	124-108
			RESISTORS	
4	R601, 602	2	24 ohms, 5%, ¼W	112-985
5	R603	1	100 ohms, 5%, ¼W	112-950
6	R604, 621	2	910 ohms, 5%, ¼W	112-920
7	R605, 607, 619, 623, 626, 632	6	22 ohms, 5%, ¼W	112-971
8	R606	1	220 ohms, 5%, ¼W	112-095
9	R608, 611	2	4.3 k, 5%, ¼W	111-006
10	R609, 625, 628, 629	4	270 ohms, 5%, ¼W	112-993
11	R610, 616	2	150 ohms, 5%, ¼W	112-974
12	R612	1	75 ohms, 5%, ¼W	112-954
13	R613, 615	2	500 ohms, 20%, potentiometer	118-141
14	R614	1	47 ohms, 5%, ¼W	112-992
15	R617	1	2.2 k, 5%, ¼W	112-932
16	R618, 631	2	820 ohms, 5%, ¼W	112-976
17	R620	1	130 ohms, 5%, ¼W	112-997
18	R622, 630	2	2 k, 5%, ¼W	112-930
19	R624, 633	2	51 ohms, 5%, ¼W	112-087
20	R627	1	2.4 k, 5%, ¼W	112-918
			SWITCH	
21	S601	1	Dpdt, slide	162-037
			TRANSISTORS	
22	Q601, 602	2	Factory-selected	130-138
23	Q603 thru 606	4	Factory-selected	130-144

MODEL SA-5

ASSEMBLY: EQUALIZER FOR SA-5 REF. DWG. NO.: 861-828

ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C501	1	2—8 pF, trimmer	128-548
2	C502, 503, 504	3	4.7 pF, 500V, NPO	124-061
3	C505	1	33 pF, 500V, NPO	124-125
4	C506	1	12 pF, 500V, NPO	124-135
5	C507	1	8.2 pF, 500V, NPO	124-103
			RESISTORS	
6	R501, 502, 504	3	75 ohms, 5%, ¼W	112-954
7	R503	1	100 ohms, 5%, ¼W	112-950
8	R506	1	56 ohms, 5%, ¼W	112-088

REPLACEMENT PARTS LIST *(Continued)*

UTILITY HOUSING

ASSEMBLY:			REF. DWG. NO.:	
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
1	——	4	Bolt, ¼-20 x ¾, SS, hex hd.	B-716-043
2	——	1	Clamp, bottom	C228-170
3	——	1	Clamp, top	C228-171
4	——	1	Cover	D228-165
5	——	1	Housing	D228-166-2
6	——	3	Insert, threaded	B221-480
7	——	1	Screw, 5/16-18 x ¾, HWH, MS	B740-013
8	——	2	Screw, 10-32 x ⅜, SS, soc. hd. cap	716-043
9	——	14½"	R-F shielding	616-012
10	——	1	Weather gasket	B295-133

MODEL STE

ASSEMBLY:			REF. DWG. NO.: 861-782	
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C1, 6	2	1000 pF, GMV	123-115
2	C2	1	12 pF, NPO	121-012
3	C3, 4	2	20 pF, NPO	121-014
4	C5	1	15 pF, NPO	121-013
5	C7	1	2.4 pF, NPO	121-063
6	C8	1	0.01 uF, GMV	124-031
			INDUCTORS	
7	L1	1	Air coil	C150-006-17
8	L2, 6	2	Air Coil	C150-009-1
9	L3, 5	2	Coil ass'y	B155-003
10	L4	1	Air coil	C150-006-19
11	L7	1	Air Coil	C150-006-18
			RESISTORS	
12	R1, 6	2	68 ohms, 5%, ¼W	112-916
13	R2	1	200 ohms, 5%, ¼W	112-984
14	R3, 4	2	75 ohms, 5%, ¼W	112-954
15	R5	1	33 ohms, 5%, ¼W	112-995
			THERMISTORS	
16	RT1, 2, 3	3	Thermistor	110-026

MODEL SDC-8

ASSEMBLY:			REF. DWG. NO.: 861-777	
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C1, 4, 9	3	2.0 pF, Gim.	122-030
2	C2, 3, 6, 8	4	220 pF, 5%	126-122
3	C5	1	3.9 pF, Gim.	122-034
4	C7	1	0.01 uF, GMV, disc	124-031
			INDUCTORS	
5	L1	1	Coil ass'y	B155-003
6	L2, 3	2	Coil ass'y	B155-050
			RESISTOR	
7	R1	1	75 ohms, 5%, ¼W	112-954
			TRANSFORMERS	
8	T1, 2	2	Transformer ass'y	C144-122

MODEL SDC-12

ASSEMBLY:			REF. DWG. NO.: 861-777	
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C1, 4	2	0.24 pF, Gim.	122-047
2	C2, 3, 6, 8	4	330 pF, 5%	126-114
3	C5	1	2.7 pF, Gim.	122-009
4	C7	1	0.01 uF, GMV, disc	124-031
5	C9	1	1.5 pF, Gim.	122-006
			INDUCTORS	
6	L1	1	Coil ass'y	B155-003
7	L2, 3	2	Coil ass'y	B155-050
			RESISTOR	
8	R1	1	75 ohms, 5%, ¼W	112-954
			TRANSFORMERS	
9	T1, 2	2	Transformer ass'y	C144-122-1

MODEL SDC-16

ASSEMBLY:			REF. DWG. NO.: 861-777	
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C1, 4	2	0.51 pF, Gim.	122-037
2	C2, 3	2	560 pF, 5%	126-029
3	C5	1	3.0 pF, Gim.	122-033
4	C6, 8	2	300 pF, 5%	126-113
5	C7	1	0.01 uF, GMV, disc	124-031
6	C9	1	1.5 pF, Gim.	122-006
			INDUCTORS	
7	L1	1	Coil ass'y	B155-003
8	L2 ,3	2	Coil ass'y	B155-050
			RESISTOR	
9	R1	1	75 ohms, 5%, ¼W	112-954
			TRANSFORMERS	
10	T1, 2	2	Transformer ass'y	C144-122-2

REPLACEMENT PARTS LIST *(Continued)*

MODEL SHS-2

ASSEMBLY:				REF. DWG. NO.: 861-776
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C1, 2, 7	3	1000 pF, GMV, disc	123-115
2	C3	1	2.2 pF, Gim.	122-008
3	C4	1	13 pF, Gim.	122-039
4	C5	1	2.7 pF, Gim.	122-009
5	C6	1	560 pF, 5%	126-029
			INDUCTORS	
6	L1, 3	2	Coil ass'y	B155-003
7	L2	1	Air coil	C150-006-20
			RESISTOR	
8	R1	1	150 ohms, 5%, ¼W	112-254
			TRANSFORMERS	
9	T1	1	Transformer ass'y	B144-045
10	T2	1	Transformer ass'y	B144-046

MODEL SPJ-2

ASSEMBLY:				REF. DWG. NO.: 861-827
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C1	1	1.2 pF, composition	122-005
2	C2	1	1000 pF, GMV, disc	123-115
3	C3	1	0.01 uF, disc	124-031
			INDUCTORS	
4	L1	1	Coil ass'y	B155-177
5	L2	1	Coil ass'y	B155-178
			RESISTOR	
6	R1	1	1.5 k, 10%, ¼W	112-924

MODEL SPS-12

ASSEMBLY:				REF. DWG. NO.: 861-780
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C1	1	6.0 uF, 660Vac (Part of T1)	
2	C2	1	0.01 uF, disc	124-134
3	C3	1	1.2 pF, 500V, Gim.	122-005
4	C4	1	1000 pF, feed-thru	123-115
5	C5	1	1000 pF, disc	129-108
			CIRCUIT BREAKER	
6	CB1	1	15A	205-009
			CONNECTORS	
7	J1	1	Socket, power	B184-046
8	J2	1	Socket, power	188-120
9	P1	1	Plug, power	184-007
10	TP1	1	Binding post	189-107
			DIODE	
11	CR1	1	Transient voltage suppressor, 92Vrms, 3.0A @ 30V	137-254
			RESISTOR	
12	R1	1	1.5 k, 10%, ¼W	112-924
			TRANSFORMER	
13	T1	1	Power transformer	C141-217 or C141-218

MODEL SX-1

ASSEMBLY:				REF. DWG. NO. 861-856
ITEM	SCHEMATIC DESIGNATION	QTY.	DESCRIPTION	JERROLD PART NO.
			CAPACITORS	
1	C1, 22, 30	3	2.2 pF, 500V, NPO	124-064
2	C2, 25	2	1000 pF, GMV, disc	123-115
3	C3, 31	2	4.7 pF, 500V, NPO	124-061
4	C4	1	6.8 pF, 600V, NPO	124-112
5	C5	1	9.1 pF, 600V, NPO	124-108
6	C6 thru 21, 23, 24, 28, 29	20	0.02 uF, 25V	124-065
7	C26	1	12 pF, 600V, NPO	124-102
8	C27	1	3.3 pF, 600V, NPO	124-113
9	C32 thru 35	4	0.01 uF, 600V, GMV	124-031
10	C36, 37	2	250 uF, 40V, electrolytic	127-075
11	C38, 39	2	250 uF, 25V, electrolytic	127-062
			CONNECTORS	
12	J1, 3	2	Connector VSF-adapter	C821-262
13	J2	1	Socket, plug-in pad	182-133
14	J4	1	G-61	B821-197
			DIODES	
15	CR1, 2	2	Silicon, 750 mA, 250V	137-712
			HARDWARE	
16	——	4	Bolt, ¼-20 x ¾, SS, hex hd.	B716-073
17	——	1	Clamp, bottom	C228-170
18	——	1	Clamp, top	C228-171
19	——	1	Cover	D228-165
20	——	1	Housing	D228-106-3
21	——	1	Screw, 5/16-18 x ¾, HWH, MS	B704-013
22	——	2	Screw, 10/32 x ⅜, SS, soc. hd. cap	716-043
23	——	14½"	R-F shielding	616-012
24	——	1	Weather gasket	295-129
			RESISTORS	
25	R1, 3, 7	3	75 ohms, 5%, ¼W	112-954
26	R2	1	300 ohms, 5%, ¼W	112-096
27	R4	1	15 ohms, 5%, ¼W	112-973
28	R5	1	560 ohms, 5%, ¼W	112-104
29	R6	1	200 ohms, 20%, potentiometer	118-146
30	R8, 14	2	1.2 k, 5%, ¼W	112-921
31	R9, 16, 27	3	2.4 k, 5%, ¼W	112-918
32	R11	1	500 ohms, 20%, potentiometer	118-141
33	R12, 17, 23, 29	4	27 ohms, 5%, ¼W	112-085
34	R13, 18	2	200 ohms, 5%, ¼W	112-984
35	R10, 15, 28	3	270 ohms, 5%, ¼W	112-993
36	R19, 26, 32	3	1 k, 5%, ¼W	112-977
37	R20, 21	2	68 ohms, 5%, ¼W	112-916
38	R22	1	330 ohms, 5%, ¼W	112-975
39	R24	1	2.2 k, 5%, ¼W	112-932
40	R25, 30	2	51 ohms, 5%, ¼W	112-087
41	R31	1	1.1 k, 5%, ¼W	112-927
42	R33, 34	2	25 ohms, 5%, 5W	110-121
43	R35, 36	2	39 ohms, 5%, 2W	112-184
			SWITCH	
44	S1	1	Dpst, slide	162-040
			TRANSFORMERS	
45	T1, 2	2	Transformer ass'y	B144-138
46	T3, 4	2	Transformer ass'y	B144-190
			TRANSISTORS	
47	Q1, 2	2	Factory-selected	130-138
48	Q3, 4	2	Factory-selected	130-144

JERROLD ELECTRONICS CORPORATION

CATV SYSTEMS DIVISION

Philadelphia, Pa. 19132

JERROLD