



Broadcast Electronics

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Marti
Electronics
ARS-15A
Automatic Receiver Switcher

566-027 rev B
March 4, 2011

Marti Electronics

ARS-15A

Automatic Receiver Switcher

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Broadcast Electronics (BE) hereby warrants all new Marti Electronics branded products, including STL systems, manufactured by BE, against any defects in material or workmanship at the time of delivery thereof, or that develop under normal use within a period of one (1) year, from the date of shipment.

BE reserves the right to repair equipment under warranty with new or refurbished equipment or parts. BE's sole responsibility with respect to any equipment or parts not conforming to this warranty is to replace or repair such equipment upon the return thereof F.O.B. to BE's factory in Quincy, Illinois, U.S.A. In the event of replacement pursuant to the foregoing warranty, only the unexpired portion of the warranty from the time of the original purchase will remain in effect for any such replacement.

This warranty shall exclude the following products, component parts and/or assemblies:

- (a) Transmitter power output tubes shall only carry the original manufacturer's or supplier's standard warranty in effect on their original shipment date.
- (b) All computers, computer peripherals, cables, hard disk drives, etc., shall only carry the manufacturer's or supplier's standard warranty in effect on their original shipment date.
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- (d) "Resale Equipment", defined as equipment purchased from another manufacturer or supplier, then resold by BE, shall only carry such manufacturer's or supplier's standard warranty in effect as of the original shipment date.. All warranty claims against any and all 'resale equipment' sold by BE must be filed directly with the original equipment manufacturer. BE is unable to process or resolve equipment defects or performance concerns on products or services not manufactured by BE.

This warranty shall not extend to claims resulting from any acts of God, terrorism, war, defects or failures caused by Purchaser or user abuse or misuse, operator error, or unauthorized attempts to repair or alter the equipment in any way.

Under no circumstances shall BE be responsible for indirect, incidental or consequential damages, including, but not limited to transportation costs, non-authorized repair or service costs, downtime costs, costs for substituting equipment or loss of anticipated profits or revenue, incurred by Purchaser, whether based in contract, tort or for negligence or breach of statutory duty or otherwise.

The terms of the foregoing warranty shall be null and void if the equipment has been altered or repaired without specific written authorization from BE, or if not installed according to BE's instruction manuals, including, but not limited to, the absence of proper grounding, surge (TVSS) protection on the AC circuit panel or proper lightning protection/grounding on all output circuits, or if equipment is operated under environmental conditions or circumstances other than those specifically described in BE's product literature or instruction manual which accompany the



equipment. **The warranty shall be voided if the product or subassembly is equipped with a tamper seal and that tamper seal is broken.** BE shall not be liable for any expense of any nature whatsoever incurred by the original user without prior written consent of BE. The warranty provided herein shall terminate at the end of the period set forth above. **This warranty extends only to the original Purchaser and is not transferable.** There are no third party beneficiaries of any of the provisions of this warranty. If the equipment is described as "used" equipment, it is sold as is and where is and no warranty applies unless authorized in writing.

EXCEPT AS SET FORTH HEREIN, AS TO TITLE AND AS SPECIFICALLY REQUIRED BY LAW, THERE ARE NO OTHER WARRANTIES, OR ANY AFFIRMATIONS OF FACT OR PROMISES BY BE, WITH REFERENCE TO THE EQUIPMENT, OR TO MERCHANTABILITY, FITNESS FOR A PARTICULAR APPLICATION, SIGNAL COVERAGE, INFRINGEMENT, OR OTHERWISE, WHICH EXTEND BEYOND THE DESCRIPTION OF THE EQUIPMENT ON THE FACE HEREOF.



IMPORTANT INFORMATION

EQUIPMENT LOST OR DAMAGED IN TRANSIT -

When delivering the equipment to you, the truck driver or carrier's agent will present a receipt for your signature. Do not sign it until you have:

1) Inspected the containers for visible signs of damage and 2) Counted the containers and compared with the amount shown on the shipping papers. If a shortage or evidence of damage is noted, insist that notation to that effect be made on the shipping papers before you sign them.

Further, after receiving the equipment, unpack it and inspect thoroughly for concealed damage. If concealed damage is discovered, immediately notify the carrier, confirming the notification in writing, and secure an inspection report. This item should be unpacked and inspected for damage WITHIN 15 DAYS after receipt. Claims for loss or damage will not be honored without proper notification of inspection by the carrier.

RF PRODUCT TECHNICAL ASSISTANCE, REPAIR SERVICE, PARTS -

Technical assistance is available from Broadcast Electronics by letter, prepaid telephone or E-mail. Equipment requiring repair or overhaul should be sent by common carrier, prepaid, insured, and well protected. If proper shipping materials are not available, contact the RF Technical Services Department for a shipping container. Do not mail the equipment. We can assume no liability for inbound damage, and necessary repairs become the obligation of the shipper. Prior arrangement is necessary. Contact the RF Technical Services Department for a Return Authorization.

Emergency and warranty replacement parts may be ordered from the following address. Be sure to include the equipment model number, serial number, part description, and part number. Non-emergency replacement parts may be ordered directly from the Broadcast Electronics stock room at the number shown below.

RF TECHNICAL SERVICES -

Telephone: +1 (217) 224-9617

E-Mail: rfservice@bdcast.com

Fax: +1 (217) 224-6258

FACILITY CONTACTS -

Broadcast Electronics, - Quincy Facility

4100 N. 24th St. P.O. BOX 3606

Quincy, Illinois 62305

Telephone: +1 (217) 224-9600

Fax: +1 (217) 224-6258

General E-Mail: bdcast@bdcast.com

Web Site: www.bdcast.com

PARTS -

Telephone: +1 (217) 224-9617

E-Mail: parts@bdcast.com



RETURN, REPAIR, AND EXCHANGES -

Do not return any merchandise without our written approval and Return Authorization. We will provide special shipping instructions and a code number that will assure proper handling and prompt issuance of credit. Please furnish complete details as to circumstances and reasons when requesting return of merchandise. All returned merchandise must be sent freight prepaid and properly insured by the customer.

MODIFICATIONS -

Broadcast Electronics, reserves the right to modify the design and specifications of the equipment in this manual without notice. Any modifications shall not adversely affect performance of the equipment so modified.

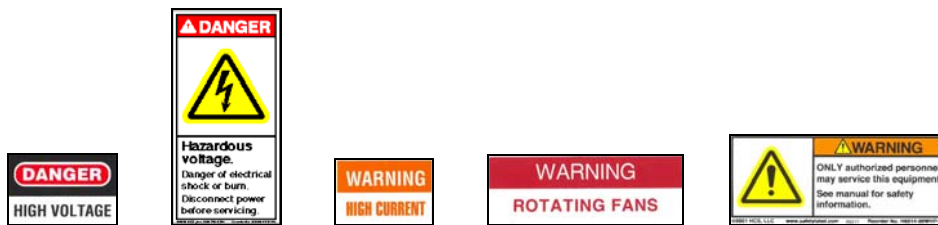




SAFETY PRECAUTIONS

PLEASE READ AND OBSERVE ALL SAFETY PRECAUTIONS!!

ALL PERSONS WHO WORK WITH OR ARE EXPOSED TO POWER TUBES, POWER TRANSISTORS, OR EQUIPMENT WHICH UTILIZES SUCH DEVICES MUST TAKE PRECAUTIONS TO PROTECT THEMSELVES AGAINST POSSIBLE SERIOUS BODILY INJURY. EXERCISE EXTREME CARE AROUND SUCH PRODUCTS. UNINFORMED OR CARELESS OPERATION OF THESE DEVICES CAN RESULT IN POOR PERFORMANCE, DAMAGE TO THE DEVICE OR PROPERTY, SERIOUS BODILY INJURY, AND POSSIBLY DEATH.



DANGEROUS HAZARDS EXIST IN THE OPERATION OF POWER TUBES AND POWER TRANSISTORS -

The operation of power tubes and power transistors involves one or more of the following hazards, any one of which, in the absence of safe operating practices and precautions, could result in serious harm to personnel.

- A. HIGH VOLTAGE** - Normal operating voltages can be deadly. Additional information follows.
- B. RF RADIATION** - Exposure to RF radiation may cause serious bodily injury possibly resulting in Blindness or death. Cardiac pacemakers may be affected. Additional information follows.
- C. HOT SURFACES** - Surfaces of air-cooled radiators and other parts of tubes can reach temperatures of several hundred degrees centigrade and cause serious burns if touched. Additional information follows.
- D. RF BURNS** - Circuit boards with RF power transistors contain high RF potentials. Do not operate an RF power module with the cover removed.

HIGH VOLTAGE –

Many power circuits operate at voltages high enough to kill through electrocution. Personnel should always break the primary AC Power when accessing the inside of the transmitter.

RADIO FREQUENCY RADIATION -

Exposure of personnel to RF radiation should be minimized, personnel should not be permitted in the vicinity of open energized RF generating circuits, or RF transmission systems (waveguides, cables, connectors, etc.), or energized antennas. It is generally accepted that exposure to “high levels” of radiation can result in severe bodily injury including blindness. Cardiac pacemakers may be affected.

The effect of prolonged exposure to “low level” RF radiation continues to be a subject of investigation and controversy. It is generally agreed that prolonged exposure of personnel to RF radiation should be limited to an absolute minimum. It is also generally agreed that exposure should be reduced in working areas where personnel heat load is above normal. A 10 mW/cm² per one tenth hour average level has been adopted by several U.S. Government agencies including the Occupational Safety and Health Administration (OSHA) as the standard protection guide for employee work environments. An even stricter standard is recommended by the American National Standards Institute which recommends a 1.0 mW/cm² per one tenth hour average level exposure between 30 Hz and 300 MHz as the standard employee protection guide (ANSI C95.1-1982).

RF energy must be contained properly by shielding and transmission lines. All input and output RF connections, such as cables, flanges and gaskets must be RF leak proof. Never operate a power tube without a properly matched RF energy absorbing load attached. Never look into or expose any part of the body to an antenna or open RF generating tube or circuit or RF transmission system while energized. Monitor the tube and RF system for RF radiation leakage at regular intervals and after servicing.

HOT SURFACES –

The power components in the transmitter are cooled by forced-air and natural convection. When handling any components of the transmitter after it has been in operation, caution must always be taken to ensure that the component is cool enough to handle without injury.



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1 Model ARS-15A Automatic Receiver Switcher

1.1 APPLICATION

The ARS-15A has been designed to operate with the SR20-C and SR-20M used in TSL service. It provides composite, subcarrier 1, subcarrier 2, and audio switching between two receivers on the same frequency.

1.2 SPECIFICATIONS

Application	Provides composite, subcarrier 1, subcarrier 2, and audio switching between two receivers on the same frequency.
Switching Activation	The ARS-15A, upon loss of signal, switches all functions of one receiver to a second receiver. The switching threshold is determined by the squelch relay setting in each receiver. An alarm output is provided when both receivers fail.
Remote Operation	One of two receivers may be selected by grounding one of the two remote control terminals. A positive output voltage indicates which receiver is in use; the remote signal level sample is also available for metering by the station's remote control.
Local Operation	Two LEDs are provided on the front panel to indicate which receiver is in use. Manual selection of a receiver is possible by using the front panel mounted momentary toggle switch.
Fail-Safe	The ARS-15A provides a separate fail-safe relay with normally closed contacts. A second set of contacts is available for alarm purposes.
Power Requirements	12 volts DC (supplied by each receiver)
Dimensions	1 3/4" High x 19" Wide x 13" Deep
Weight	3.5 pounds

1.3 UNPACKING & INSTALLATION

WARNING

Contains Electrostatic Sensitive Devices. Service personnel must be grounded while handling the ARS-15A.

This equipment was factory tested, inspected, packed, and delivered to the carrier with utmost care. Do not accept shipment from carrier which shows damage or shortage until the carrier's agent endorses a statement of the irregularity on the face of the carrier's receipt. Without documentary evidence, a claim cannot be filed.



Unpack equipment immediately upon receipt and thoroughly inspect for concealed damage. If damage is discovered, cease further unpacking and request immediate inspection by local agent of carrier. A written report of the agent's findings, with his signature is necessary to support claim. Check your shipment against the shipping papers for possible shortage. Do not discard any packing material until all items are accounted for. Small items are often thrown away with packing material.

Packing material should be retained until equipment testing is completed. Any equipment returned to the factory should be packed in original cartons, insured, and prepaid.

1.4 INSTALLATION

Install rack-mounted equipment in a well-ventilated, well-grounded, and shielded rack cabinet. Do not locate solid-state equipment in a rack above tube-type equipment which produces high temperatures.

Problems can also be avoided by locating this unit away from other equipment which has transformers that produce strong magnetic fields. These fields can induce hum and noise into the Marti equipment thus reducing performance. Strong radio-frequency (RF) fields should be avoided where possible. Extensive shielding and filtering have been incorporated into this equipment to permit operation in moderate RF environments. All equipment racks, cabinets, etc., should be bonded together by wide copper grounding strap to ensure that all system elements are at the same RF ground potential.

1.4.1 STATIONARY BROADCAST INSTALLATION

The basic stationary installation consists of a rack mounted ARS-15A, two STL receivers (one serves as a backup) or two remote-pickup receivers (one serves as a backup), a 115 VAC power source.

The ARS-15A has been designed to operate with the SR20-C and SR20-M used in TSL service.

1. The ARS-15A should be rack mounted between Receiver 1 and Receiver 2. Normally Receiver 1 is mounted above the ARS-15A with Receiver 2 mounted below.
2. When subcarriers are in use, then J1 or J3 of each receiver must be connected to the subcarrier inputs of the ARS-15A. They are labeled "Subcarrier 1" and "Subcarrier 2". The ARS-15A provides two subcarrier outputs labeled "SUBCARRIER OUT".
3. The ARS-15A provides two 10 position screw terminal push-on connectors. Each screw terminal, labeled 1 through 10, has its function screened on the chassis rear apron.

The functions of each connector terminal are listed and explained below:

<i>CONNECTOR TB-1</i>	<i>Name</i>	<i>Function</i>
Terminal 1	Control	Grounding one of the two "remote" terminals enables remote selection of the desired receiver. Grounding Terminal 1 selects Receiver 2 and grounding of Terminal 2 selects Receiver 1.
Terminal 2	Control	
Terminal 3	GND	Ground.



Terminal 4	Audio	Terminal 4 & 6 provide mono output of the selected receiver.
Terminal 5	GND	Ground.
Terminal 6	Audio	Terminal 4 & 6 provide mono output of the selected receiver.
Terminal 7	Failsafe	The Fail-safe function provides a closure between terminals 7 and 8 when either receiver is operating. When both receivers fail terminals 7 and 8 open and 8 and 9 provide a closure.
Terminal 8	Failsafe	
Terminal 9	Failsafe	
Terminal 10	Alarm	The Alarm function provides a closure between terminal 10 of TB-1 and 1 of TB-2 when either receiver is operating. When both receivers fail terminals 10 (TB-1) and 1 (TB-2) provide a closure.

<i>CONNECTOR TB-2</i>	<i>Name</i>	<i>Function</i>
Terminal 1	Alarm	The Alarm function provides a closure between terminal 10 of TB-1 and 1 of TB-2 when either receiver is operating. When both receivers fail terminals 10 (TB-1) and 1 (TB-2) provide a closure.
Terminal 2		
Terminal 3	RX1 ON	Terminals 3 and 4 provide a positive voltage indication of which receiver is in use. These outputs can be connected to metering positions on the station's remote control for indication in the studio.
Terminal 4	RX2 ON	
Terminal 5	GND	Ground
Terminal 6	RX1 Sig Level	These signal level outputs for each receiver can be connected to metering positions on the remote control to remotely monitor received signal levels.
Terminal 7	RX2 Sig Level	
Terminal 8	Standby PWR 12VDC	This terminal when connected to the optional Marti UPS-12 (uninterruptible power supply) provides power to both receivers upon loss of primary power.
Terminal 9	GND	Ground
Terminal 10	GND	Ground

1.4.2 RECEIVER INTERCONNECT CABLES

The ARS-15A is supplied with two identical interconnect cables, **Marti Part Number 586-062**, used to connect each receiver to the receiver switcher. One end plugs into J4, the accessory port on the receiver, and the other end plugs into the ARS-15A "RECEIVER 1" and "RECEIVER 2" positions. (See Schematic 800-304 for cable connections.)

1.4.3 RELAYS

The functions of each connector terminal are listed and explained below:

RELAY NAME	Function
K1	Switches balanced mono audio from each receiver to terminals 4 and 6 of the first push-on connector.
K2	Provides fail-safe outputs to terminal 7, 8, & 9 of CONNECTOR TB-1 and terminals 10 of TB-1, 1 & 2 OF connector TB-2. Contacts are rated at 1 Ampere, 125 VAC.
K3	Selects one of two composite receivers & outputs to the "Composite Out" BNC connector on the rear panel. Also switches 13.5 VDC to the front panel LED indicators and terminals 3 and 4 of TB-2 which may be used for remote indication of which receiver is operating.
K4	Switches both SCA outputs of both receivers.
K5	Controls switching of composite, subcarrier 1, subcarrier 2 and fail-safe relays.



2 Bill of Material

This bill of material uses an indented structure to show relationships of parts into sub assemblies. Example; all BOM LEVEL 2 parts are contained in the BOM LEVEL 1 part immediately above it.

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
0	705-ARS-15	ARS-15A Automatic Receiver Switcher, w/cables		
..1	510-066	Equipment Label, 2.5 x .937" Brady #10C8600890"	1	N/A
..1	566-027	INSTRUCTION MANUAL, ARS 15A RECEIVER SWITCHER	1	N/A
..1	585-018	Cable Assembly, MTS-1 (SBCM)	1	N/A
....2	550-013	Conn. UG-21D/U N Plug Amphenol 82-202-RFX Connex#172113	4	N/A
....2	550-036	CONNECTOR, UG-28/U N T" ADAPTER F-F-F" RG-11/U Coax 95% shield #991035 Polyethylene 95% Shield	1	N/A
....2	580-024	pvc	1.71	N/A
..1	586-062	Cable Assembly, ARS-15A	2	N/A
....2	510-090	Cable Ties, 4 Panduit PANPLT1M-M MS3367-4-9"	3	N/A
....2	550-030	CONNECTOR, D-SUB 15 PIN FEMALE	1	N/A
....2	550-126	Connector, crimp terminal pin Molex 08-50-0187	6	N/A
....2	550-135	Connector, 6 pin Molex housing 09-50-8060	1	N/A
....2	550-180	Connector, locking hood Keltron HD-15-10	1	N/A
....2	580-040	Wire, UL1061 22/7 OTC Black	1.17	N/A
....2	580-041	Wire, UL1061 22/7 OTC Brown	1.17	N/A
....2	580-043	Wire, UL1061 22/7 OTC Red	1.17	N/A
....2	580-044	Wire, UL1061 22/7 OTC Yellow	1.17	N/A
....2	580-047	Wire, UL1061 22/7 OS-1 Orange	1.17	N/A
....2	580-065	Wire, UL1061 22/7 OTC Yellow/Brown w/ overall tin coating	1.17	N/A
..1	586-125	Cable Assembly, ARS-15A Harness	1	N/A
....2	510-090	Cable Ties, 4 Panduit PANPLT1M-M MS3367-4-9"	15	N/A
....2	550-126	Connector, crimp terminal pin Molex 08-50-0187	23	N/A
....2	550-135	Connector, 6 pin Molex housing 09-50-8060	4	N/A
....2	580-040	Wire, UL1061 22/7 OTC Black	3.13	N/A
....2	580-045	Wire, UL1061 22/7 OTC Blue	1.25	N/A
....2	580-046	Wire, UL1061 22/7 OTC Green	2.233	N/A
....2	580-059	Wire, UL1061 22/7 OTC Yellow/Blue	1.75	N/A
....2	580-060	Wire, UL1429 22/7 OS-1 Yellow/Green	1.79	N/A
....2	580-090	Shielded Wire, 16-C-22-SPJ White/Yellow 1 Cond.22/19x34 pvc	1.5	N/A
....2	580-091	Shielded Wire, 16-C-22-SPJ White/Green 1 Cond.22/19x34 pvc	1.54	N/A
....2	580-092	Shielded Wire, 16-C-22-SPJ White/Blue 1 Cond.22/19x34 pvc	1.5	N/A
..1	700-247-4A	ARS-15A Final Assembly	1	N/A
....2	410-559	Diode, LED Dialight 559-0101-001	2	N/A
....2	420-4104	SCREW,4-40X.250,S.S. PH	8	N/A
....2	500-033	Screw, 6 x 1/4 phillips head SM SS type A"	14	N/A
....2	500-055	Lockwasher, #4 internal tooth small pattern zinc plated	4	N/A
....2	500-181	Screw, #4 x 1/4 phillips pan head S/M Black Zinc"	3	N/A
....2	500-187	Screw, #6 x 1/4 phillips pan head S/M type A black zinc	8	N/A
....2	510-259	Shrink-Tubing, 1/8 B2 Black"	0.35	N/A
....2	513-035	STANDOFF,1/4HEX x 0.625"LONG,4-40"	4	N/A

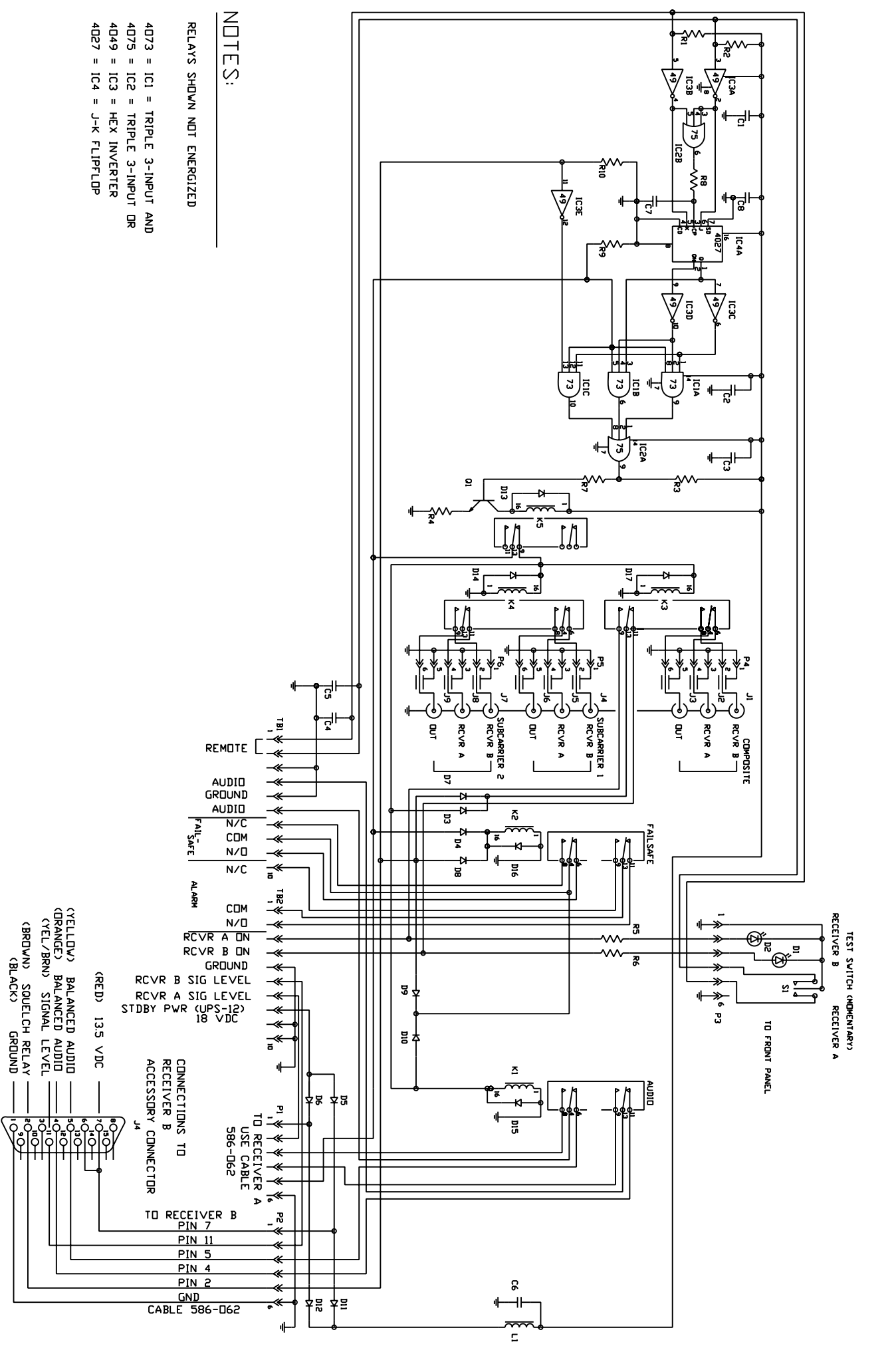


BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	550-015	Connector, UG-625B/U BNC receptacle Amphenol 31-236 *NOTE*	9	N/A
....2	700-227-2	Top Cover, ATS/ARS/SCG/SCD/CD	1	N/A
....2	700-227-3	Bracket,SCG/SCD/ATS/ARS/CD Rack	2	N/A
....2	700-247-3P	Rear Panel, ARS-15A (SBCM)	1	N/A
.....3	700-247-3	Rear Panel, ARS-15A	1	N/A
....2	700-247-4P	Front Panel, ARS-15A	1	N/A
.....3	700-247-4	Front Panel, ARS-15A	1	N/A
.....4	698-247-4	Front Panel, ARS-15A Bare Metal	1	N/A
.....4	699-247-4	Front Panel, ARS-15A Contract Labor Painting	1	N/A
....2	700-259-1	Chassis, SCG/SCD/CD-15/ATS/ARS	1	N/A
..1	800-304A	ARS-15A Logic and Switching Board	1	N/A
....2	100-1051	RES,10K OHM,1/4W,1%	4	R1,R2,R9,R10
....2	103-4753	RES,475 OHM,1/4W,1%,METAL RESISTOR, 1.5K OHM 1/4 WATT 1% METAL FILM MEPCO	2	R7,R8
....2	145-152	SFR25	2	R5,R6
....2	145-470	Resistor, 47.5 ohm 1/4 watt 1% metal film Mepco SFR25	1	R4
....2	203-4148	DIODE,1N4148	5	D13,D14,D15, D16,D17
....2	211-3904	TSTR,2N3904	1	Q1
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	9	C1,C2,C3,C4,C5, C6,C7,C8,C9
....2	330-012	Inductor, 15 uH Coilcraft 90-27	1	L1
....2	404-027	Integrated Circuit, 570-CD4027BE, Harris	1	IC4
....2	404-049	Integrated Circuit, CD4049UBCN National	1	IC3
....2	404-073	Integrated Circuit, 511-4073	1	IC1
....2	404-075	Integrated Circuit, 570-CD4075	1	IC2
....2	414-007	Diode, General Instruments 1N4007	10	D3,D4,D5,D6, D7,D8,D9,D10, D11,D12
....2	417-1604	SKT,16-PIN,DIP	2	N/A
....2	550-069	IC Socket, 14 pin Keltron ICS-14-3-T / Aries 14-3510-10	2	N/A
....2	550-136	Connector, 6 pin Molex header (cut from 550-162)	4	P3,P4,P5,P6
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.25	N/A
....2	550-147	Connector,Horizontal Socket,10 Pin, 0.2 Spacing"	2	N/A
....2	550-148	Connector,Plug,10 Pin,0.2 Spacing"	2	TB1,TB2
....2	550-149	Connector, 6 pin Molex angle header (cut from 550-163)	2	P1,P2
.....3	550-163	Connector, 24 pin break-away (angle) Molex 26-48-6246	0.25	N/A
....2	570-040	Relay, DIP Mouser#551-MR82-12USR	5	K1,K2,K3,K4, K5
....2	580-155	Wire, Kynar Black 30 Gauge Alpha #5951	0.292	N/A
....2	800-304B	PC Board, ARS-15A Logic Switching	1	PCB
..1	947-0020	ASSY,CBL BNC ACCESS (SBCM)	2	N/A
....2	417-0094	CONN,BNC RG/U58 31-320 AMPH	2	N/A
....2	622-0050	CBL,SH,50 OHM,RG-58/CU	2.5	N/A



3 Schematic

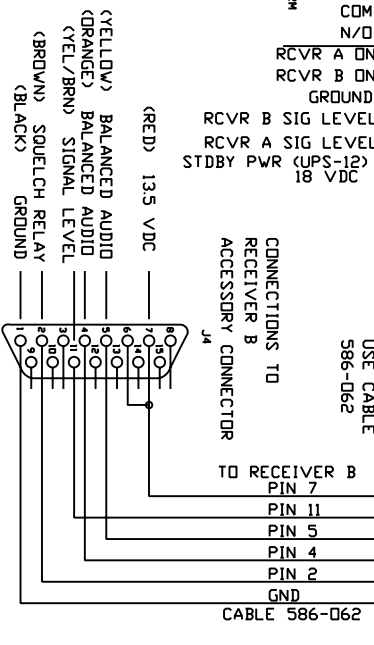




NOTES:
RELAYS SHOWN NOT ENERGIZED

4073 = IC1 = TRIPLE 3-INPUT AND
4075 = IC2 = TRIPLE 3-INPUT OR
4049 = IC3 = HEX INVERTER
4027 = IC4 = J-K FLIPFLOP

CONNECTIONS TO RECEIVER A ACCESSORY CONNECTOR
SAME AS CONNECTIONS TO RECEIVER B ACCESSORY CONNECTOR



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DRAWING NO. 800-304
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TITLE
ARS-15A LOGIC/SWITCHING