



Broadcast Electronics

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**Marti
Electronics**

ATS-15E

ATS-20E

Automatic Transmitter Switcher

566-026 rev C
April 5, 2011

Marti Electronics

ATS-15E

ATS-20E

Automatic Transmitter Switcher

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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.

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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

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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.

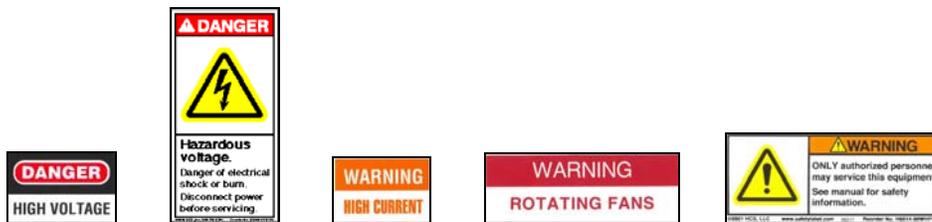




SAFETY PRECAUTIONS

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 ATS-15E Automatic Transmitter Switcher

2 UNPACKING & INSPECTING

WARNING

Contains Electrostatic Sensitive Devices. Service personnel must be grounded while handling the ATS-15E.

WARNING

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.

3 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.

3.1 STATIONARY BROADCAST INSTALLATION

The basic stationary installation consists of a rack mounted ATS-15E, two STL transmitters (one serves as a backup) or two remote-pickup transmitters (one serves as a backup), a 115 VAC power source, and may include the optional Marti UPS-12 Uninterruptible Power Supply which will provide power for the system during power failure of the AC mains.



The ATS-15E has been designed to operate with the STL-10 series transmitters and the RPT series remote pickup transmitters used in TSL service.

3.2 STATIONARY INSTALLATION PROCEDURE

1. Locate the ATS-15E between the primary transmitter (designated in this system as Transmitter 1) and the secondary transmitter (designated as Transmitter 2) in order to keep interconnecting RF cables as short as possible. It is recommended that 1-3/4" vent panels be installed immediately above and below the ATS-15E to provide adequate ventilation for the transmitters involved.
2. Parallel any sub-carrier inputs to the two transmitters. The ATS-15E switches only control voltages and RF outputs. Audio inputs are paralleled inside the ATS-15E.
3. J1, J2, and J3, located on the rear panel of the ATS-15E provide the interconnections between the transmitter control, audio, and power voltages, and the ATS-15E. There are a number of connections to be made. These connections must be made correctly or damage to the switcher and transmitters most certainly will occur. If you purchased the ATS-15E as part of a system use the interconnecting cables provided. If you purchased the ATS-15E separately follow the cable assembly directions carefully. **PROCEED CAREFULLY!**

J1 receives keying, ground, and B+ from Transmitter 1. J2 receives corresponding inputs from Transmitter 2. The receptacle at J3 provides interconnections to both transmitters.

4. Connect the RF output of Transmitter 1 to rear panel "N" connector marked "TX1."
5. Connect the RF output of Transmitter 2 to rear panel "N" connector marked "TX 2."
6. Connect the Antenna to the ATS-15E rear panel "N" connector marked "ANT."

This completes installation of your ATS-15E Automatic Transmitter Switcher.

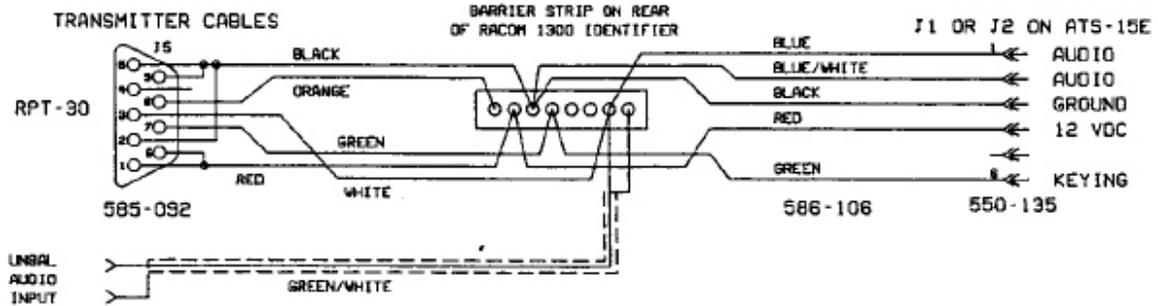
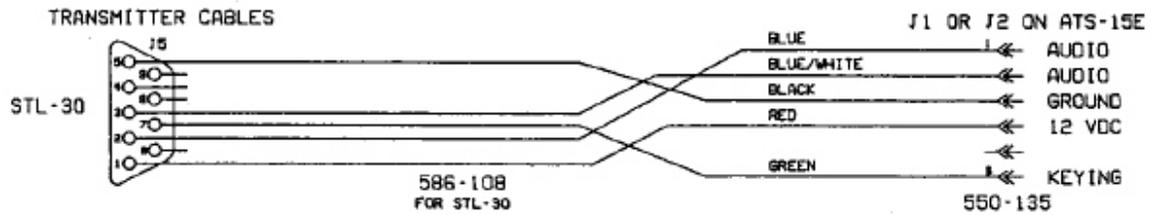
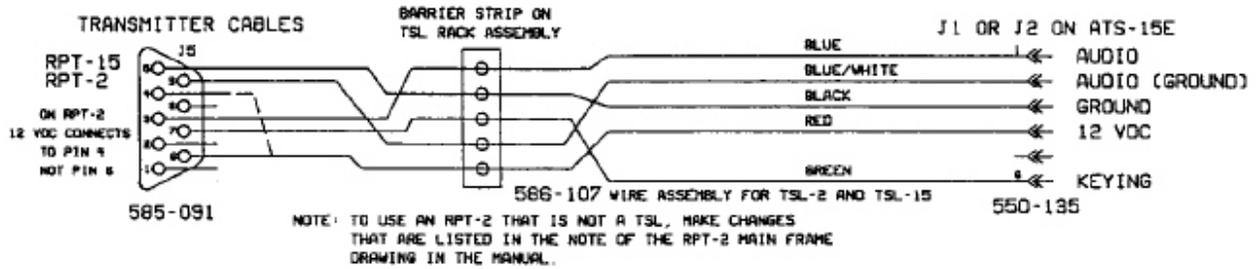
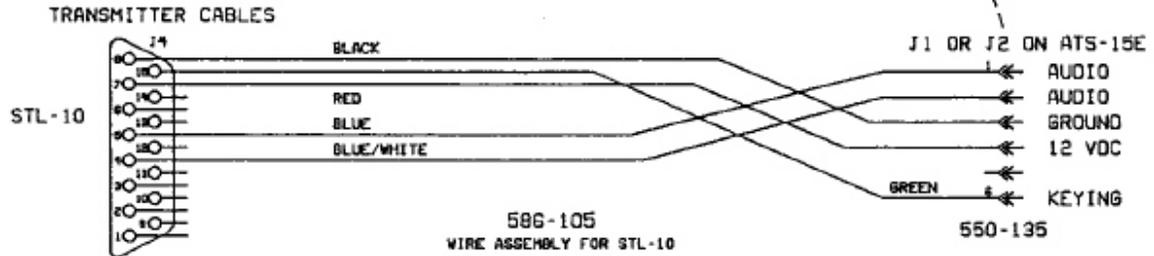
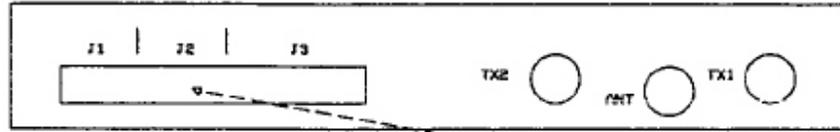
The functions of each connector terminal are listed and explained below:

Pin Outs for J1 and J2 Molex Connectors	Function
1 Audio Out	Audio from Pin 1 of J5, audio input.
2 Audio Out	Audio from Pin 2 of J5, audio input
3 Ground	Ground
4 B+	13.5 VDC from Transmitter power supply or, if used with UPS upon failure of AC mains, 12.6 VDC to Transmitter power supply.
5 No connection	Not used
6 Transmitter keying	Grounding turns transmitter on.



Pin Out for J3, 10-Pin Connector	Function
1 Audio Input	600 ohm balanced audio in from console, processor, etc.
2 Audio Input	600 ohm balanced audio in from console, processor, etc.
3 Closed Upon Alarm	Connects to "Common" when ALARM is "ON."
4 Closed No Alarm	Connects to "Common" when ALARM is "OFF."
5 Common	Common contacts of Alarm Relay.
6 B+ Out	Combined 12 VDC bus from both transmitters. Can be used to supply remote LED indicators.
7 Signal (RF sample-DC)	DC sample corresponds proportionally to RF power to antenna.
8 Ground	Ground.
9 UPS In	DC input voltage from external Uninterruptible Power Supply (optional). Paralleled with Pin 10.
10 UPS in	DC input voltage from external Uninterruptible Power Supply (optional). Paralleled with Pin 9.





CABLES FOR INTERCONNECTING ATS-15E WITH MARTI TRANSMITTERS



4 OPERATION

4.1 TRANSMITTER SETUP

4.1.1 RPT SERIES TRANSMITTERS

When using the RPT Series transmitters (RPT-2, RPT-15, RPT-25, RPT-30) place the CONTROL switch (on the RPT Series transmitters) in the "STANDBY" position.

4.1.2 STL-10 SERIES TRANSMITTERS

When using the STL-10 Series transmitters place the CONTROL switch (on the STL-10 Series transmitters) in the "OFF" position.

WARNING
DO NOT OPERATE ANY TRANSMITTER UNLESS IT IS
CONNECTED TO A 50 OHM DUMMY LOAD OR
ANTENNA.

4.2 ATS-15E AUTOMATIC TRANSMITTER SWITCHER SETUP

1. Using a miniature screwdriver or slotted tuning tool turn the SWITCHING LEVEL ADJUST pot (available through hole in the front panel) fully clockwise.
2. Place the CONTROL switch in either "TRANSMITTER 1" or "TRANSMITTER 2" position.
 NOTE: Before continuing consult the instruction manual for your particular transmitter to find out how to lower the power output of the transmitter. The RPT-2, 15, and 30 "POWER" control is a pot (R14) located on Multiplier Board, 800-163. Power control for the STL-10 Series is located on the front panel of the transmitter. Before continuing note the power output of the transmitters.
3. Lower the power output of the transmitter to the level desired for switching to occur (normally set to approximately 75% of specified output power). This will be the power level below which switching will occur for either transmitter.
4. Turn "SWITCHING LEVEL ADJUST" pot counter-clockwise until the "ALARM" LED turns on.
5. Re-adjust the transmitter output power to level noted earlier.

4.2.1 ALARM OPERATION

External alarms (maximum current 1 Ampere at 12 VDC) may be operated when the ATS-15E switches from one transmitter to the other. When the primary transmitter fails or power drops below

the previously set level and the ATS-15E switches to the secondary transmitter the ALARM INDICATOR will light and the internal ALARM relay will pull in. Consult Schematic Drawing, 800-296, for the proper relay connections available on the rear panel.

4.2.2 UNINTERRUPTIBLE POWER SUPPLY

The ATS-15E may be operated with an external Uninterruptible Power Supply to provide uninterrupted power for the system in the event of AC mains failure.

See *INSTALLATION* for rear panel connections.

Fuses F1 and F2 must be installed on the ATS-15E circuit board before operation with an external uninterruptible power supply is attempted. Remove the top cover and install the correct fuses in the clips provided. Consult the table below to select the correct fuses:

If Transmitters are:	Use:
RPT-2	1.5 A, 3AG
RPT-15	4.0 A, 3AG
RPT-30	8.0 A, 3AG
STL-10	4.0 A, 3AG

5 THEORY OF OPERATION

Refer to Block Diagram Drawing No. 702-093 and Schematic Diagram 800-298.

The purpose of the switcher is to automatically select, out of two transmitters, the one providing the expected output level. If neither transmitter is providing the expected output level the switcher will continuously toggle between them until it finds the expected output level, or until it is forced manually, by the operator, to select one transmitter or the other.

There are four modes of operation selected sequentially by switch S1: "AUTOMATIC", "TRANSMITTER 1", "TRANSMITTER 2", and "OFF". In the "AUTOMATIC" mode the switcher automatically selects the transmitter providing the expected output level. In the "TRANSMITTER 1" and "TRANSMITTER 2" modes the switcher is forced to the selected transmitter.

5.1 Control Switch in "AUTOMATIC Position"

At power-up the ATS-15E will automatically energize KEY 1 and select TRANSMITTER 1. KEY 1 stays energized for a time determined by R9 and C6 irrespective of the status of TRANSMITTER 1 output (thus providing a settling time).

If TRANSMITTER 1 provides the expected output level (sensed by IC1) beyond the settling time provided by R9 and C6, TRANSMITTER 1 and the TRANSMITTER 1 LED will remain on. If it does not, the ALARM LED is turned on, TRANSMITTER 1 LED is turned off and the TRANSMITTER 2 LED is turned on. At the



same time KEY 2 is energized. The selection process is identical to that of TRANSMITTER 1 except that R8 and C5 now determine the settling time.

If TRANSMITTER 2 also does not provide expected output the circuit is reset with a pulse (pulse duration determined by R5, R22, R23, C10 and C1 1) at IC2-Pin 14. After resetting, the circuit looks for acceptable output from the either transmitter, and, if not found, continues to toggle between TRANSMITTER 1 and TRANSMITTER 2 as indicated by the front panel LEDs.

5.2 Control Switch in "TRANSMITTER 1" Position

When Switch S1 is switched to TRANSMITTER 1 the TRANSMITTER 1 LED lights and KEY 1 is energized (settling time provided by R6 and C4). If TRANSMITTER 1 does not provide the expected output level (sensed at IC1) the ALARM LED turns on and remains on, TRANSMITTER 1 remains selected and TRANSMITTER 1 LED remains on.

5.3 Control Switch in "TRANSMITTER 2" Position

Operation is identical to TRANSMITTER 1 mode described above except that settling time is determined by R4 and C2.

5.4 Control Switch in "OFF" Position

The ATS-15E is disabled in the "OFF" mode.

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6 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 LEV EL	PART NO.	DESCRIPTION	QTY	REF. DES.
0	705-ATS	ATS-15E, AUTOMATIC TRANSMITTER SWITCHER W/CABLES		
..1	510-066	Equipment Label, 2.5 x .937" Brady #10C8600890"	1	
..1	566-026-001	INSTRUCTION MANUAL ATS-15E / ATS-20E	1	
....2	566-026	INSTRUCTION MANUAL, ATS 15E/ATS 20E TRANSMITTER SWITCHER	1	
....2	598-0013	BINDER,MARTI,1 IN,BLUE,W CD POCKET	1	
..1	585-096	Cable Assembly, PG-2B w/RG214 (SBCM)	2	
....2	510-002	Shrink-Tubing, 3/4 black W3B2 3/4" Sumitomo"	0.5	
....2	550-013	Conn. UG-21D/U N Plug Amphenol 82-202-RFX Connex#172113	2	
....2	580-034	RG-214/U COAX	2	
..1	586-105	Cable Assembly, ATS-15E/STL-10	2	
....2	510-090	Cable Ties, 4 Panduit PANPLT1M-M MS3367-4-9"	3	
....2	550-030	CONNECTOR, D-SUB 15 PIN FEMALE	1	
....2	550-126	Connector, crimp terminal pin Molex 08-50-0187	5	
....2	550-135	Connector, 6 pin Molex housing 09-50-8060	1	
....2	550-180	Connector, locking hood Keltron HD-15-10	1	
....2	580-040	Wire, UL1061 22/7 OTC Black	1.04	
....2	580-043	Wire, UL1061 22/7 OTC Red	1.04	
....2	580-045	Wire, UL1061 22/7 OTC Blue	1.04	
....2	580-046	Wire, UL1061 22/7 OTC Green	1.04	
....2	580-051	Wire, UL1061 22/7 OTC White/Blue	1.04	
..1	586-110	Cable Assembly, ATS-15E Harness	1	
....2	510-090	Cable Ties, 4 Panduit PANPLT1M-M MS3367-4-9"	8	
....2	550-126	Connector, crimp terminal pin Molex 08-50-0187	20	
....2	550-135	Connector, 6 pin Molex housing 09-50-8060	2	
....2	550-159	Connector, 4 pin Molex housing 09-50-8040	2	
....2	580-040	Wire, UL1061 22/7 OTC Black	2.12	
....2	580-041	Wire, UL1061 22/7 OTC Brown	1.04	
....2	580-043	Wire, UL1061 22/7 OTC Red	2.15	
....2	580-044	Wire, UL1061 22/7 OTC Yellow	1.04	
....2	580-045	Wire, UL1061 22/7 OTC Blue	2.11	



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	580-047	Wire, UL1061 22/7 OS-1 Orange	1.07	
....2	580-053	Wire, UL1061 22/7 OTC White/Black	1.04	
..1	700-227-18A	ATS-15E Final Assembly	1	
....2	410-113	LED,YELLOW RECTANGLE	2	
....2	410-155	LED, Red rectangular #604-L113HDT	1	
....2	420-4104	SCREW,4-40X.250,S.S. PH	4	
....2	500-002-1	Hex Nut, #4-40 Regular Nickel Plated	4	
....2	500-033	Screw, 6 x 1/4 phillips head SM SS type A"	12	
....2	500-055	Lockwasher, #4 internal tooth small pattern zinc plated	4	
....2	500-162	Screw, 4-40 x 7/16 phillips pan head MS zinc plated"	12	
....2	500-180	Screw, 4-40 x 1/4 phillips pan head M/S Black Zinc"	2	
....2	500-181	Screw, #4 x 1/4 phillips pan head S/M Black Zinc"	3	
....2	500-187	Screw, #6 x 1/4 phillips pan head S/M type A black zinc	8	
....2	500-199	Keps nut 4 x 40 zinc 4CNKEOZ	8	
....2	500-203	Screw, 6 x 3/16 Philips Pan Head SMS	1	
....2	510-212	CONTROL KNOBS, #45KNO23	1	
....2	510-258	Bushing, SB-375-3 black Heyco 2020	1	
....2	513-042	Spacer,4-40 x 3/16,Hex,Threaded	4	
....2	700-227-18	Front Panel, ATS-15E	1	
.....3	700-227-18-009	Front Panel, ATS-15E/20E UNSCREENED	1	
....2	700-227-19P	Rear Panel, ATS-15E (SBCM)	1	
.....3	700-227-19	Rear Panel, ATS-15E	1	
....2	700-227-2	Top Cover, ATS/ARS/SCG/SCD/CD	1	
....2	700-227-3	Bracket,SCG/SCD/ATS/ARS/CD Rack	2	
....2	700-259-1	Chassis, SCG/SCD/CD-15/ATS/ARS	1	
..1	800-296A	ATS-15E I/O Board	1	
....2	103-4753	RES,475 OHM,1/4W,1%,METAL	4	R1,R2,R3,R4
....2	211-3904	TSTR,2N3904	4	Q1,Q2,Q3,Q4
....2	217-104	CAPACITOR, .01 UF 50V GMV DISC	12	C2,C3,C5,C7,C9,C12,C14,C16,C18,C20,C21,C23
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	10	C1,C4,C6,C8,C10,C11,C13,C17,C19,C22
....2	330-012	Inductor, 15 uH Coilcraft 90-27	1	L1
....2	330-018	INDUCTOR, 10 uH, 10%	6	L2,L3,L4,L5,L6,L7
....2	330-019	INDUCTOR, 2.5 TURN, HIGH FREQUENCY SUPPRESSION	5	L8,L9,L10,L11,L12
....2	414-007	Diode, General Instruments 1N4007	3	D1,D2,D3
....2	415-2068	CLIP,FUSE,15AMP,LITTLEFUSE,102071	4	XF1,XF2
....2	550-136	Connector, 6 pin Molex header (cut from 550-162)	1	P1
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.25	



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
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....2	550-147	Connector,Horizontal Socket,10 Pin, 0.2 Spacing"	1	P5
....2	550-148	Connector,Plug,10 Pin,0.2 Spacing"	1	J5
....2	550-149	Connector, 6 pin Molex angle header (cut from 550-163)	2	P3,P4
.....3	550-163	Connector, 24 pin break-away (angle) Molex 26-48-6246	0.25	
....2	550-161	IC Socket, 16 pin Aries 16-3518-11	1	XK1
....2	550-165	Connector, 4 pin Molex header (cut from 550-162)	1	P2
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.167	
....2	570-035-1	Relay, Aromat HB2E-DC12V	1	K1
....2	580-040	Wire, UL1061 22/7 OTC Black	0.208	
....2	580-057	Wire, UL1061 22/7 OTC White/Green	0.233	
....2	580-130	Wire, Stranded UL1015-20/10 Black Tinned Copper	0.275	
....2	800-296B	PC Board, ATS-15E I/O	1	
..1	800-297A	ATS-15E Antenna Relay Board	1	
....2	100-1041	RES,1K OHM,1/4W,1%	1	R3
....2	100-1051	RES,10K OHM,1/4W,1%	1	R1
....2	145-221	Resistor, 220 ohm 1/4 watt 1% metal film Mepco SFR25	2	R2,R4
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	5	C1,C2,C3,C4,C5
....2	290-524	Capacitor, variable trimmer .4 - 2.5 pf	3	C6,C7,C8
....2	350-140	Inductor, 16 turn 20 AWG Red	1	L1
.....3	555-140	COST, LABOR FOR 350-140	1	
.....3	580-103	Magnet Wire, #20AWG Single Nyleze (RED)	0.001	
....2	410-305	Diode, Motorola MMBD101L chip	2	D1,D2
....2	414-007	Diode, General Instruments 1N4007	1	D3
....2	500-105	Pop-Rivet, AD42BS Aluminum	8	
....2	510-191	#4 Bracket, Keystone 612	4	
....2	550-037	CONNECTOR, UG-58A/U N PANEL RECEPTICLE	1	
....2	550-158	Connector, 4 pin Molex angle header (cut from 550-163)	1	P1
.....3	550-163	Connector, 24 pin break-away (angle) Molex 26-48-6246	0.167	
....2	570-038	Relay, Aromat RG1ET-12V	1	K1
....2	580-057	Wire, UL1061 22/7 OTC White/Green	0.25	
....2	586-192	Cable Assembly,ATS-15E Antenna Relay Board	2	
.....3	500-128	Eyelet, GS4-4 brass	2	
.....3	550-037	CONNECTOR, UG-58A/U N PANEL RECEPTICLE	1	
.....3	550-057	Connector, UG-177/U UHF hood Amphenol 83-765	1	
.....3	580-033	Coax high shield RG-316/U Manhattan M4259	0.21	
....2	700-227-20	Output Filter Box, ATS-15	1	



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	800-297B	PC Board, Antenna Relay Bd ATS-15E	1	PCB
..1	800-298A	ATS-15E Logic & Switching Board	1	
....2	100-1041	RES,1K OHM,1/4W,1%	3	R7,R10,R24
....2	100-2041	RES,2K OHM,1/4W,1%	1	R20
....2	100-523	Potentiometer, 5k ohm cermet trimmer Piher PTC15YD5K	1	R1
....2	103-1007	RES,1 MEG OHM,1/4W,1%,METAL	7	R4,R5,R6,R8,R9, R22,R23
....2	103-1062	RES,100K OHM,1/4W,1%,METAL	1	R21
....2	103-2211	RES,22.1K OHM,1/4W,1%,METAL	1	R11
....2	103-4753	RES,475 OHM,1/4W,1%,METAL	3	R16,R17,R18
....2	103-5623	RES,562 OHM,1/4W,1%,METAL	1	R12
....2	145-010	RESISTOR, 1 OHM 1/4 WATT 5% CARBON FILM 29AB250-1	8	R25,R26,R27,R28, R29,R30,R32,R33
....2	145-152	RESISTOR, 1.5K OHM 1/4 WATT 1% METAL FILM MEPCO SFR25	3	R13,R15,R19
....2	203-4148	DIODE,1N4148	2	D4,D5
....2	211-3904	TSTR,2N3904	3	Q1,Q2,Q3
....2	217-103	CAP,0.1UF 250VDC 5%,POLY FILM	9	C1,C2,C4,C5,C6, C7,C9,C10,C11
....2	219-470	CAP,ELECTROLYTIC 47uF 16V RADIAL	1	C8
....2	330-021	INDUCTOR, 3.3uH AXIAL LEAD CHOKE	1	L1
....2	400-293	IC, DUAL DIFFERENTIAL COMPARATOR	1	IC1
....2	404-049	Integrated Circuit, CD4049UBCN National	2	IC2,IC4
....2	404-081	Integrated Circuit, 570-CD4081BF	2	IC3,IC5
....2	407-032	IC,QUAD 2-INPUT OR GATE,PDIP	1	IC6
....2	420-4104	SCREW,4-40X.250,S.S. PH	2	
....2	500-055	Lockwasher, #4 internal tooth small pattern zinc plated	2	
....2	513-045	STANDOFF,1/4HEX x 0.75"LONG,4-40"	2	
....2	530-059	SWITCH, ROTARY	1	S1
....2	550-149	Connector, 6 pin Molex angle header (cut from 550-163)	1	P1
.....3	550-163	Connector, 24 pin break-away (angle) Molex 26-48-6246	0.25	
....2	800-298B	PC Board, Logic & Switching Bd ATS-15E	1	PCB



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
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0	705-ATS20	ATS-20E AUTOMATIC TRANSMITTER SWITCHER		
..1	510-066	Equipment Label, 2.5 x .937" Brady #10C8600890"	1	
..1	566-026-001	INSTRUCTION MANUAL ATS-15E / ATS-20E	1	
....2	566-026	INSTRUCTION MANUAL, ATS 15E/ATS 20E TRANSMITTER SWITCHER	1	
....2	598-0013	BINDER,MARTI,1 IN,BLUE,W CD POCKET	1	
..1	585-096	Cable Assembly, PG-2B w/RG214 (SBCM)	2	
....2	510-002	Shrink-Tubing, 3/4 black W3B2 3/4" Sumitomo"	0.5	
....2	550-013	Conn. UG-21D/U N Plug Amphenol 82-202-RFX Connex#172113	2	
....2	580-034	RG-214/U COAX	2	
..1	586-105	Cable Assembly, ATS-15E/STL-10	2	
....2	510-090	Cable Ties, 4 Panduit PANPLT1M-M MS3367-4-9"	3	
....2	550-030	CONNECTOR, D-SUB 15 PIN FEMALE	1	
....2	550-126	Connector, crimp terminal pin Molex 08-50-0187	5	
....2	550-135	Connector, 6 pin Molex housing 09-50-8060	1	
....2	550-180	Connector, locking hood Keltron HD-15-10	1	
....2	580-040	Wire, UL1061 22/7 OTC Black	1.04	
....2	580-043	Wire, UL1061 22/7 OTC Red	1.04	
....2	580-045	Wire, UL1061 22/7 OTC Blue	1.04	
....2	580-046	Wire, UL1061 22/7 OTC Green	1.04	
....2	580-051	Wire, UL1061 22/7 OTC White/Blue	1.04	
..1	586-110	Cable Assembly, ATS-15E Harness	1	
....2	510-090	Cable Ties, 4 Panduit PANPLT1M-M MS3367-4-9"	8	
....2	550-126	Connector, crimp terminal pin Molex 08-50-0187	20	
....2	550-135	Connector, 6 pin Molex housing 09-50-8060	2	
....2	550-159	Connector, 4 pin Molex housing 09-50-8040	2	
....2	580-040	Wire, UL1061 22/7 OTC Black	2.12	
....2	580-041	Wire, UL1061 22/7 OTC Brown	1.04	
....2	580-043	Wire, UL1061 22/7 OTC Red	2.15	
....2	580-044	Wire, UL1061 22/7 OTC Yellow	1.04	
....2	580-045	Wire, UL1061 22/7 OTC Blue	2.11	
....2	580-047	Wire, UL1061 22/7 OS-1 Orange	1.07	
....2	580-053	Wire, UL1061 22/7 OTC White/Black	1.04	
..1	700-227-18A-001	ATS-20E Final Assembly	1	
....2	410-113	LED,YELLOW RECTANGLE	2	
....2	410-155	LED, Red rectangular #604-L113HDT	1	



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	420-4104	SCREW,4-40X.250,S.S. PH	4	
....2	500-002-1	Hex Nut, #4-40 Regular Nickel Plated	4	
....2	500-033	Screw, 6 x 1/4 phillips head SM SS type A"	12	
....2	500-055	Lockwasher, #4 internal tooth small pattern zinc plated	4	
....2	500-162	Screw, 4-40 x 7/16 phillips pan head MS zinc plated"	12	
....2	500-180	Screw, 4-40 x 1/4 phillips pan head M/S Black Zinc"	2	
....2	500-181	Screw, #4 x 1/4 phillips pan head S/M Black Zinc"	3	
....2	500-187	Screw, #6 x 1/4 phillips pan head S/M type A black zinc	8	
....2	500-199	Keps nut 4 x 40 zinc 4CNKEOZ	8	
....2	500-203	Screw, 6 x 3/16 Philips Pan Head SMS	1	
....2	510-212	CONTROL KNOBS, #45KNO23	1	
....2	510-258	Bushing, SB-375-3 black Heyco 2020	1	
....2	513-042	Spacer,4-40 x 3/16,Hex,Threaded	4	
....2	700-227-18-001	Front Panel, ATS-20E	1	
.....3	700-227-18-009	Front Panel, ATS-15E/20E UNSCREENED	1	
....2	700-227-19P	Rear Panel, ATS-15E (SBCM)	1	
.....3	700-227-19	Rear Panel, ATS-15E	1	
....2	700-227-2	Top Cover, ATS/ARS/SCG/SCD/CD	1	
....2	700-227-3	Bracket,SCG/SCD/ATS/ARS/CD Rack	2	
....2	700-259-1	Chassis, SCG/SCD/CD-15/ATS/ARS	1	
..1	800-296A	ATS-15E I/O Board	1	
....2	103-4753	RES,475 OHM,1/4W,1%,METAL	4	R1,R2,R3,R4
....2	211-3904	TSTR,2N3904	4	Q1,Q2,Q3,Q4
....2	217-104	CAPACITOR, .01 UF 50V GMV DISC	12	C2,C3,C5,C7,C9, C12,C14,C16,C18 ,C20,C21,C23
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	10	C1,C4,C6,C8,C10 ,C11,C13,C17, C19,C22
....2	330-012	Inductor, 15 uH Coilcraft 90-27	1	L1
....2	330-018	INDUCTOR, 10 uH, 10%	6	L2,L3,L4,L5,L6,L7
....2	330-019	INDUCTOR, 2.5 TURN, HIGH FREQUENCY SUPPRESSION	5	L8,L9,L10,L11, L12
....2	414-007	Diode, General Instruments 1N4007	3	D1,D2,D3
....2	415-2068	CLIP,FUSE,15AMP,LITTLEFUSE,102071	4	XF1,XF2
....2	550-136	Connector, 6 pin Molex header (cut from 550-162)	1	P1
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.25	
....2	550-147	Connector,Horizontal Socket,10 Pin, 0.2 Spacing"	1	P5
....2	550-148	Connector,Plug,10 Pin,0.2 Spacing"	1	J5



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
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....2	550-149	Connector, 6 pin Molex angle header (cut from 550-163)	2	P3,P4
.....3	550-163	Connector, 24 pin break-away (angle) Molex 26-48-6246	0.25	
....2	550-161	IC Socket, 16 pin Aries 16-3518-11	1	XK1
....2	550-165	Connector, 4 pin Molex header (cut from 550-162)	1	P2
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.167	
....2	570-035-1	Relay, Aromat HB2E-DC12V	1	K1
....2	580-040	Wire, UL1061 22/7 OTC Black	0.208	
....2	580-057	Wire, UL1061 22/7 OTC White/Green	0.233	
....2	580-130	Wire, Stranded UL1015-20/10 Black Tinned Copper	0.275	
....2	800-296B	PC Board, ATS-15E I/O	1	
..1	800-297A20	ATS-20E Antenna Relay Board	1	
....2	100-1041	RES,1K OHM,1/4W,1%	1	R3
....2	100-1051	RES,10K OHM,1/4W,1%	1	R1
....2	145-221	Resistor, 220 ohm 1/4 watt 1% metal film Mepco SFR25	2	R2,R4
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	5	C1,C2,C3,C4,C5
....2	290-524	Capacitor, variable trimmer .4 - 2.5 pf	1	C6
....2	410-305	Diode, Motorola MMBD101L chip	2	D1,D2
....2	414-007	Diode, General Instruments 1N4007	1	D3
....2	500-105	Pop-Rivet, AD42BS Aluminum	8	
....2	510-191	#4 Bracket, Keystone 612	4	
....2	550-037	CONNECTOR, UG-58A/U N PANEL RECEPTICLE	1	
....2	550-158	Connector, 4 pin Molex angle header (cut from 550-163)	1	P1
.....3	550-163	Connector, 24 pin break-away (angle) Molex 26-48-6246	0.167	
....2	570-038	Relay, Aromat RG1ET-12V	1	K1
....2	580-057	Wire, UL1061 22/7 OTC White/Green	0.25	
....2	586-192	Cable Assembly,ATS-15E Antenna Relay Board	2	
.....3	500-128	Eyelet, GS4-4 brass	2	
.....3	550-037	CONNECTOR, UG-58A/U N PANEL RECEPTICLE	1	
.....3	550-057	Connector, UG-177/U UHF hood Amphenol 83-765	1	
.....3	580-033	Coax high shield RG-316/U Manhattan M4259	0.21	
....2	700-227-20	Output Filter Box, ATS-15	1	
....2	800-297B	PC Board, Antenna Relay Bd ATS-15E	1	PCB
..1	800-298A20	ATS-20E Logic & Switching Board	1	
....2	100-1041	RES,1K OHM,1/4W,1%	3	R7,R10,R24
....2	100-2041	RES,2K OHM,1/4W,1%	1	R20

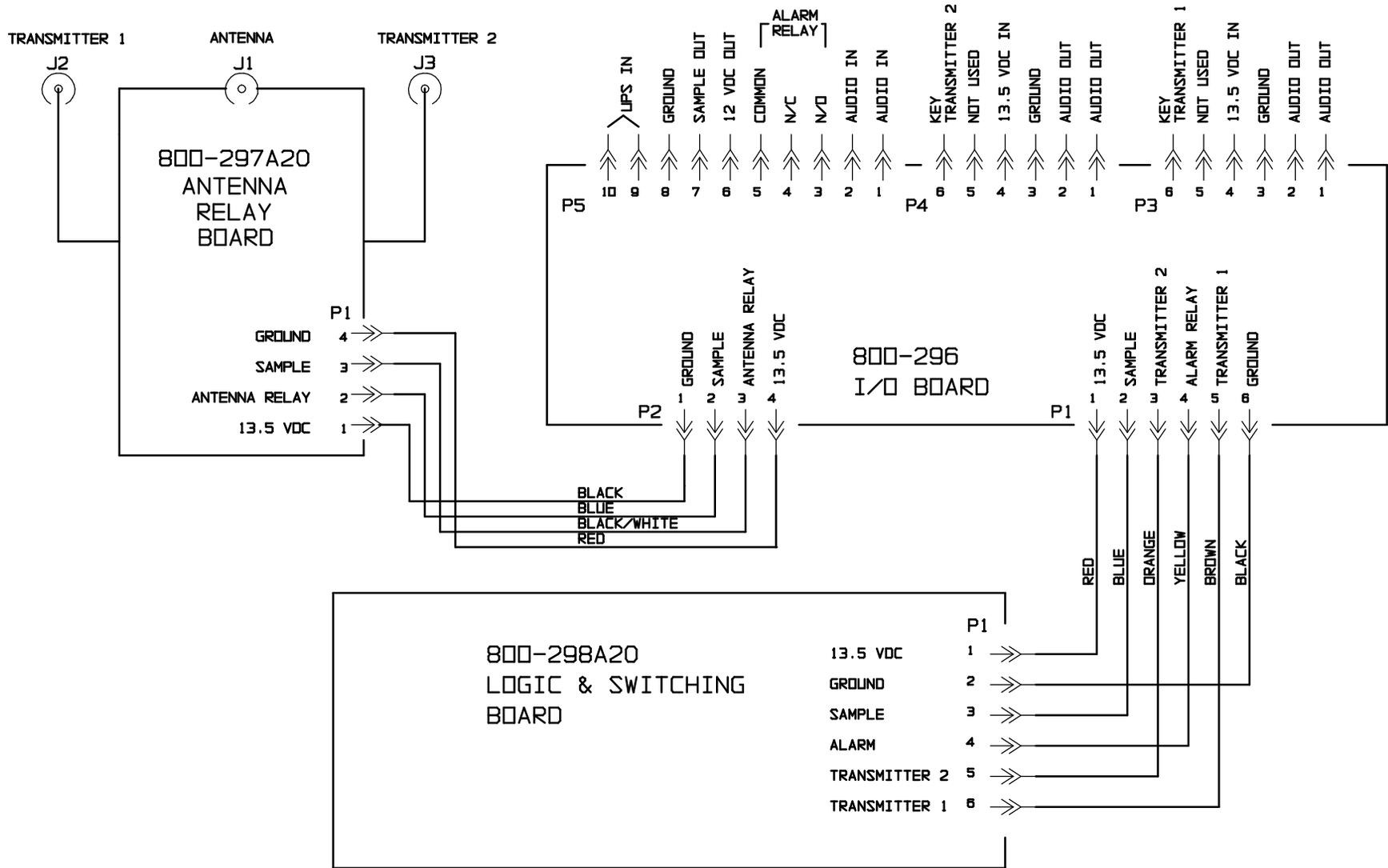


BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	100-523	Potentiometer, 5k ohm cermet trimmer Piher PTC15YD5K	1	R1
....2	103-1007	RES,1 MEG OHM,1/4W,1%,METAL	7	R4,R5,R6,R8,R9, R22,R23
....2	103-1062	RES,100K OHM,1/4W,1%,METAL	1	
....2	103-2211	RES,22.1K OHM,1/4W,1%,METAL	1	R11
....2	103-4753	RES,475 OHM,1/4W,1%,METAL	3	R16,R17,R18
....2	103-5623	RES,562 OHM,1/4W,1%,METAL	1	R12
....2	145-010	RESISTOR, 1 OHM 1/4 WATT 5% CARBON FILM 29AB250-1	8	R25,R26,R27,R28 ,R29,R30,R32, R33
....2	145-152	RESISTOR, 1.5K OHM 1/4 WATT 1% METAL FILM MEPCO SFR25	3	R13,R15,R19
....2	203-4148	DIODE,1N4148	2	D4,D5
....2	211-3904	TSTR,2N3904	3	Q1,Q2,Q3
....2	217-103	CAP,0.1UF 250VDC 5%,POLY FILM	5	C1,C2,C4,C7,C9
....2	219-001	Capacitor,1MFD Electrolytic Radial 50V Panasonic ECE-A1HU010	3	C5,C6,C10
....2	219-225	CAPACITOR,225 50V RADIAL ELECTROLYTIC	1	C11
....2	219-470	CAP,ELECTROLYTIC 47uF 16V RADIAL	1	C8
....2	330-021	INDUCTOR, 3.3uH AXIAL LEAD CHOKE	1	L1
....2	400-293	IC, DUAL DIFFERENTIAL COMPARATOR	1	IC1
....2	404-049	Integrated Circuit, CD4049UBCN National	2	IC2,IC4
....2	404-081	Integrated Circuit, 570-CD4081BF	2	IC3,IC5
....2	407-032	IC,QUAD 2-INPUT OR GATE,PDIP	1	IC6
....2	420-4104	SCREW,4-40X.250,S.S. PH	2	
....2	500-055	Lockwasher, #4 internal tooth small pattern zinc plated	2	
....2	513-045	STANDOFF,1/4HEX x 0.75"LONG,4-40"	2	
....2	530-059	SWITCH, ROTARY	1	S1
....2	550-149	Connector, 6 pin Molex angle header (cut from 550-163)	1	P1
.....3	550-163	Connector, 24 pin break-away (angle) Molex 26-48-6246	0.25	
....2	800-298B	PC Board, Logic & Switching Bd ATS-15E	1	PCB



7 SCHEMATICS



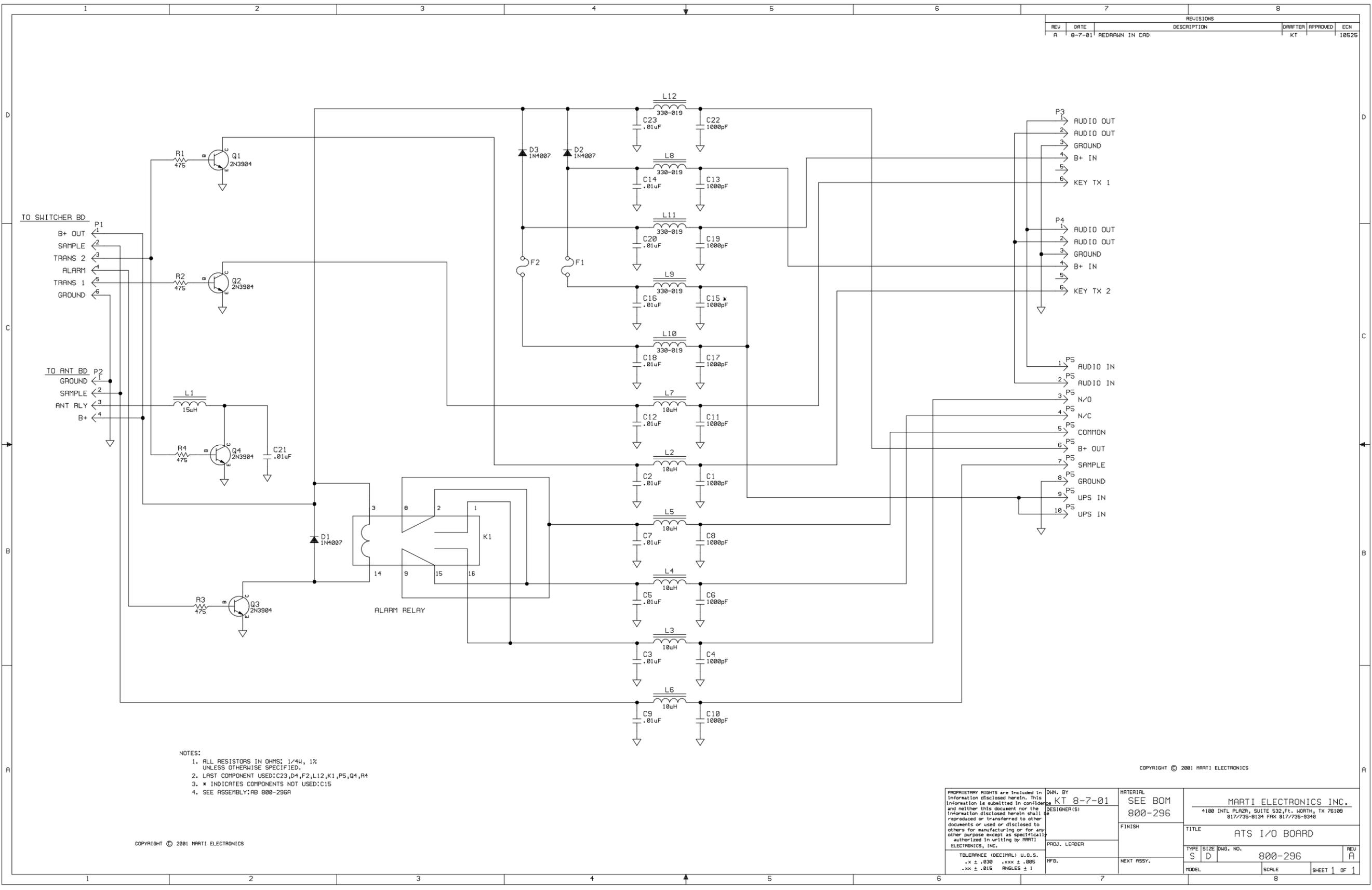


MARTI ELECTRONICS
CLEBURNE, TX 76033-0661

DRAWING NO.
COPYRIGHT 1992 702-093

TITLE
ATS MAINFRAME

REVISIONS				
REV	DATE	DESCRIPTION	DRAWN	APPROVED
A	8-7-01	REDRAWN IN CAD	KT	10525



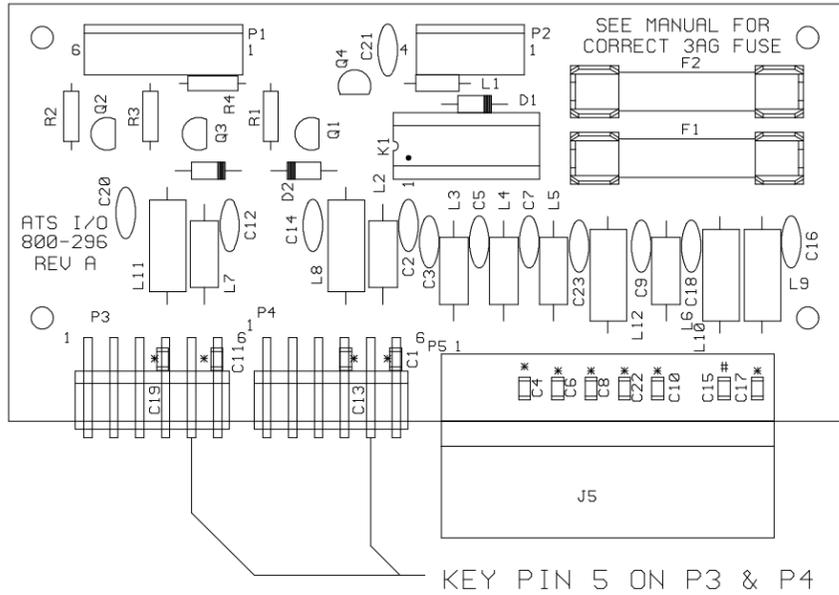
- NOTES:
1. ALL RESISTORS IN OHMS: 1/4W, 1% UNLESS OTHERWISE SPECIFIED.
 2. LAST COMPONENT USED: C23, D4, F2, L12, K1, P5, Q4, R4
 3. * INDICATES COMPONENTS NOT USED: C15
 4. SEE ASSEMBLY: AB 800-296A

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	<small>DESIGNER(S)</small>	<small>FINISH</small>	<small>TITLE</small> ATS I/O BOARD
<small>PROJ. LEADER</small>	<small>PROJ. LEADER</small>	<small>TYPE SIZE DWG. NO.</small> S D 800-296	<small>REV</small> A
<small>TOLEANCE (DECIMAL) U.O.S.</small> * ± .030 * ± .005 ** ± .015 ANGLES ± 1	<small>PROJ. LEADER</small>	<small>NEXT ASSY.</small>	<small>SCALE</small> SHEET 1 OF 1

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	9-5-01	REDRAWN IN CAD, RAN TRACES IN PLACE OF WIRES.	KT		10525



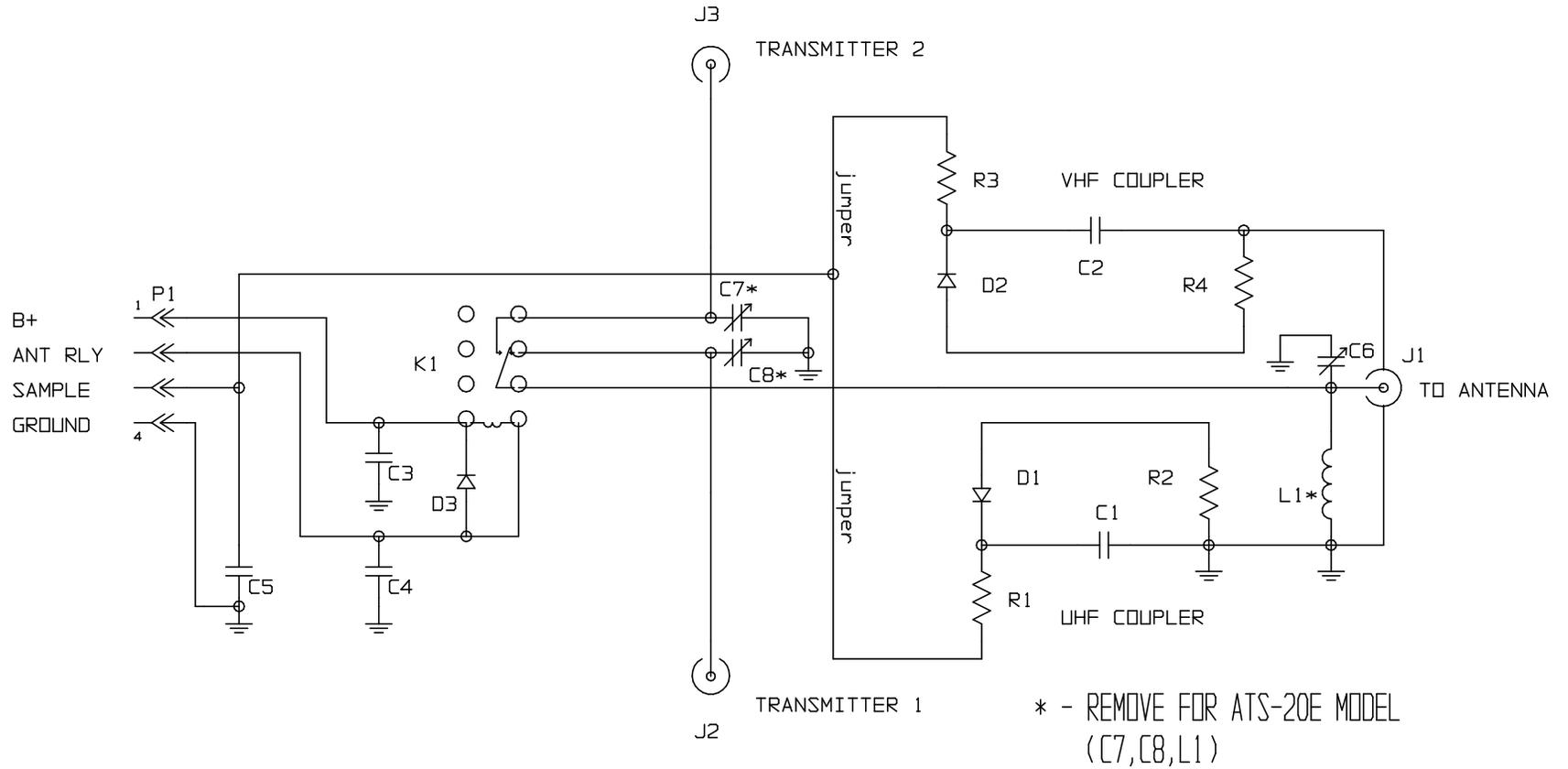
- NOTES:
- * INDICATES COMPONENTS STUFFED ON SOLDER SIDE OF PCB. (C1, C4, C6, C8, C10, C11, C13, C17, C19, C22)
 - # INDICATES COMPONENT NOT STUFFED (C15)

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	DESIGNER(S)	FINISH	TITLE ATS I/O BOARD			
	PROJ. LEADER	NEXT ASSY.	TYPE A	SIZE B	DWG No. 800-296A	REV A
	MFG.		MODEL ATS	SCALE 1/1	SHEET 1 OF 1	
TOLERANCE (DECIMAL) U.O.S. .X ± .030 .XXX ± .005 .XX ± .015 ANGLES + 1°						

REV	DATE	DESCRIPTION
A	3-28-02	ADDED C6-C8 & ATS-20E

DRAFTER	APPROVED	ECN
KT		10653



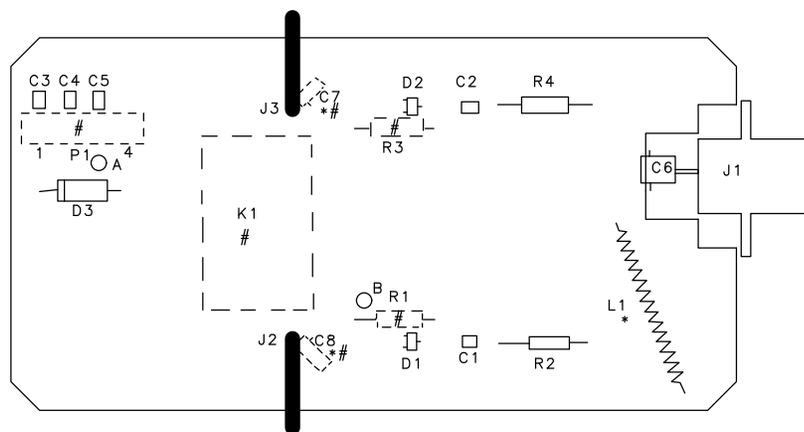
VHF OPERATION REQUIRES JUMPER FROM R3 TO P1-3

UHF OPERATION REQUIRES JUMPER FROM R1 TO P1-3

<p>MARTI ELECTRONICS CLEBURNE, TX 76033-0661</p>	<p>DRAWING NO. 800-297A/A20 COPYRIGHT 1992 REV A</p>	<p>TITLE ATS-15E/20E ANTENNA RELAY BOARD</p>
--	--	--

REV	DATE	DESCRIPTION
A	4-1-02	CREATED ASSEMBLY DRAWING
B	12-24-04	ADD 550-158 (P1) TO BOM

DRAFTER	APPROVED	ECN
KT	EJ	10653
KT	LF	11207



NOTES:

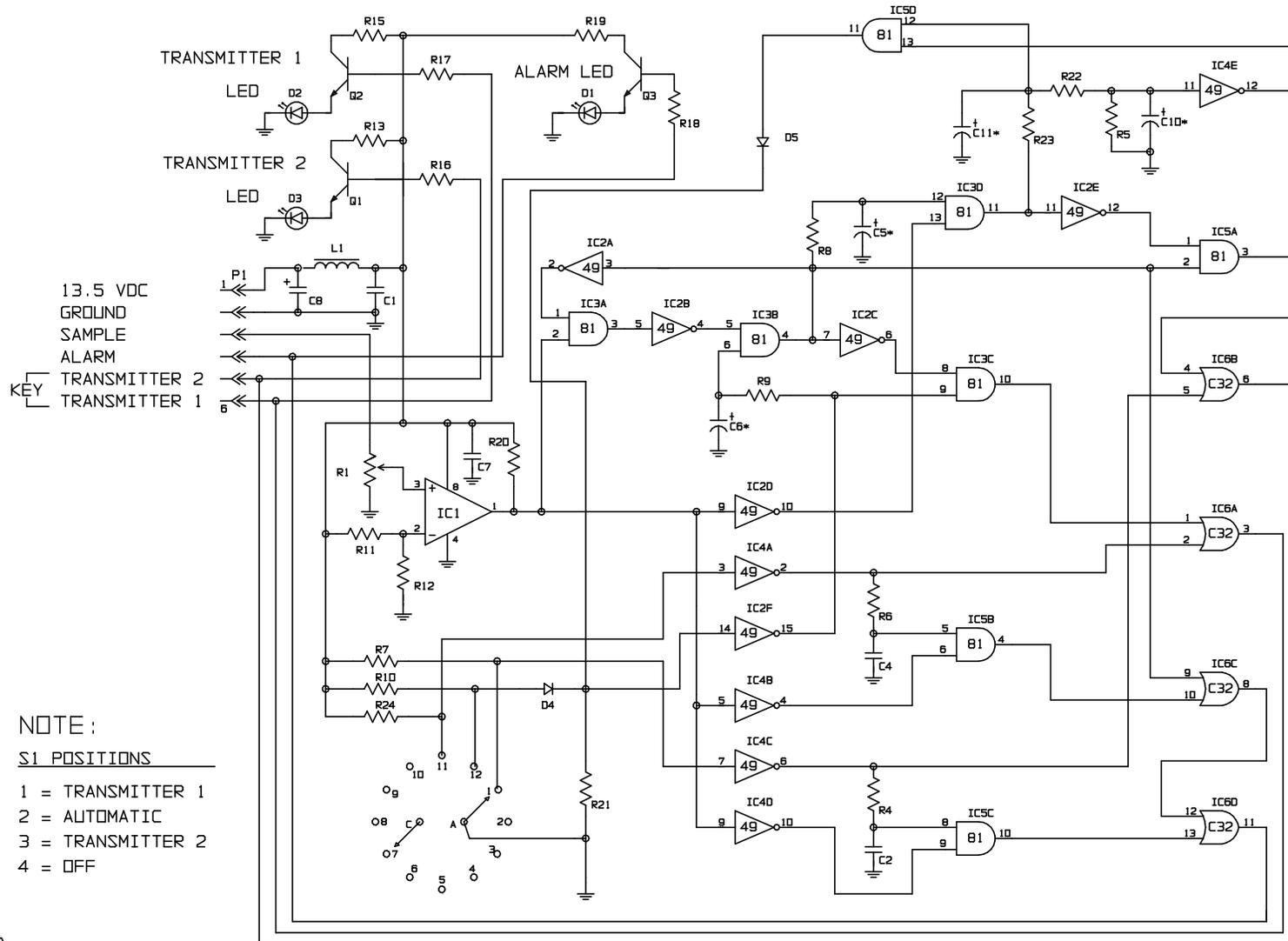
- 1) * REMOVE FOR ATS-20E (C7,C8,L1)
- 2) # INSTALLED ON SOLDER SIDE
(C6,C7,C8,P1,R1,R3,K1)
- 3) INSTALL A JUMPER WIRE ON SOLDER SIDE
FROM POINT "A" TO POINT "B".

MARTI ELECTRONICS
ATS-15E/20E ANTENNA
RELAY BOARD
800-297A/A20 REV B

REV DATE DESCRIPTION
 A 2-28-02 ADDED TABLE AND NOTE 1

DRAFTER APPROVED ECN
 KT 10652

MODEL	C5	C6	C10	C11
ATS-15E	.1uF	.1uF	.1uF	.1uF
ATS-20E	1.0uF	1.0uF	1.0uF	2.2uF

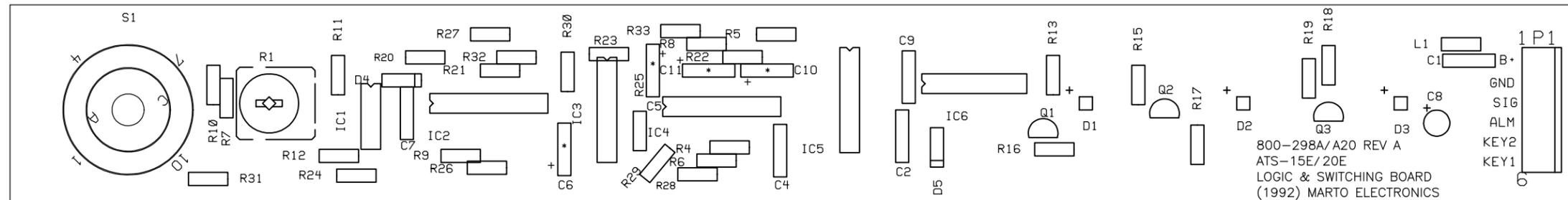


NOTES:
 1) * REFER TO TABLE FOR VALUE OF PART

ATS-15E/20E LOGIC & SWITCHING BOARD

800-298A/A20 REV A

MARTI ELECTRONICS



NOTE:
 1) * FOR C5,C6,C10 & C11
 REFER TO BOM 800-298A FOR ATS-15E OR
 REFER TO BOM 800-298A20 FOR ATS-20E