



Marti Electronics SR-20C SR-20M STL Receiver

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5/02/2013

Marti Electronics

SR-20C

SR-20M

STL Receiver

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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.

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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.

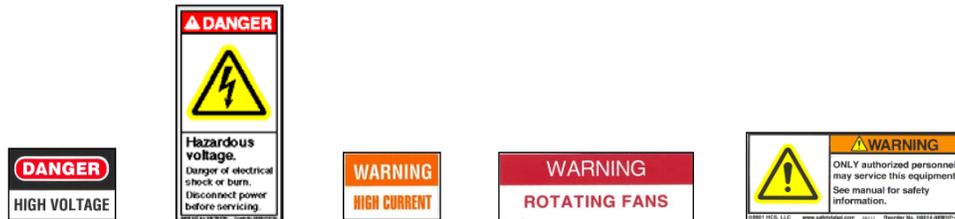




SAFETY PRECAUTIONS

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 SR-20M (Mono) and SR-20C (Composite) STL Receivers

The *Marti* STL Transmitters with companion SR-20C and SR-20M Receivers form a high quality FM, synthesized, point-to-point, line of sight, studio-to-transmitter link with two optional sub-channels. A dual link consisting of two SR-20M systems for stereo provides two identical broadcast quality channels with better than 70 dB stereo cross-talk and four optional sub-channels. Complex systems can be built from basic STL transmitters and SR-20M/SR-20C receivers having multiple relay (repeaters), bi-directional (full duplex), and automatic switching hot standby features.

The SR-20M receiver is a monophonic single channel unit that can be programmed on any frequency within a 50 MHz band. The SR-20C is a composite frequency agile receiver. The SR-20C can be programmed for any frequency within a 50 MHz band. Each SR-20M and SR-20C STL receiver is offered in a wide range of band models. Refer to the **SPECIFICATIONS & ORDERING** section for a listing of available frequency ranges.

The SR-20M/SR-20C receivers operate from: 1) an 85 to 264 volt, 47 to 63 Hz AC source or 2) a +10 to +14 volt DC source. SR-20M units are equipped with a multimeter and meter select switch for the monitoring of signal level, subcarrier level, power supply voltage, and program output level parameters. SR-20C units are also equipped with a multimeter and meter select switch for the monitoring of signal level, subcarrier level, power supply voltage, monophonic program output level, and composite output level parameters. A front panel attenuation switch allows the input level to be adjusted to minimize any IMD products. Additional front panel controls include: 1) a monophonic program output level control, 2) a squelch control, and 3) a composite level control for SR-20C units. The SR-20M/SR-20C front panel indicators include: 1) MAX signal, 2) ATT signal, 3) UNSQUELCHED, 4) POWER, and 5) AFC LOCK.

1.1 STL Transmitter/SR-20M Applications:

- STL for FM Stereo broadcast (dual system)
- STL for AM Stereo broadcast (dual system)
- STL for FM monaural or AM monaural broadcast
- Inter-city relay system for radio network distribution
- Communications link between satellite earth stations and broadcast facilities
- Data and Background Music links
- Private microwave service

1.2 STL Transmitter/SR-20C Applications:

- Composite FM Stereo audio with subcarrier
- Monophonic audio with two subcarriers
- Digital stereo audio (requires external modems)
- Multi-channel audio or data (requires external MUX)
- Digital data (requires external modems)

1.3 SR-20M/SR-20C Features:

- Mechanical – 19 inch rack mount design
- Wideband operation – 50 MHz
- SR-20M Models – Monophonic single channel operation within a 50 MHz band
- SR-40C Models – Composite frequency agile operation within a 50 MHz band



- Operation from: 1) 85V to 264V, 47 to 63 Hz AC source or 2) an external +10 to +14
- VDC source
- Frequency synthesized dual stage RF converter module with Automatic Frequency
- Control (AFC)
- Front panel signal attenuation control – used to minimize IMD products
- Front panel squelch control
- Front panel headphone control and receptacle
- A microcontroller programmed to perform the following functions:
 - Front-panel switch and indicator control
 - AFC lock control
 - Metering control
 - Auto recovery from loss of ac/dc power
- Squelch relay with contacts available for external switching



2 SPECIFICATIONS AND ORDERING

SR-20M STL Receiver

Frequency Bands:	See ORDERING INFORMATION below.
Type of technology to produce operating frequency:	Phase-locked loop; synthesized.
Operating Temp. Range:	-10°C to +50°C.
Frequency Stability (over operating temperature range):	0.0001 %.
SR-20M Signal-to-Noise @ 100 μ V: 200 kHz BW @ 50 kHz Dev 125 kHz BW @ 15 kHz Dev 125 kHz BW @ 9 kHz Dev	Greater than 77 dB. Greater than 66 dB. Greater
Frequency Response:	\pm 0.25 dB, 20 Hz to 15 kHz.
Distortion @ 100 μ V: 200 kHz BW @ 50 kHz Dev 125 kHz BW @ 15 kHz Dev 125 kHz BW @ 9 kHz Dev	0.25% or less, 20 Hz to 15 kHz. 0.3% or less, 20 Hz to 15 kHz. 0.3% or less, 20 Hz to 15 kHz.
Spurious Response:	-90 dB.
RF Input Impedance:	50 ohms.
RF Connector:	Type N-Female.
Output Level:	-10 to +11 dBm .
Output Impedance:	Balanced, 600 Ohms – terminal strip/15 pin D-Type. Unbalanced 600 Ohms – BNC.
Sensitivity:	3 microvolts for 50 dB signal-to-noise. 10 microvolts for 60 dB signal-to-noise. 100 microvolts for maximum signal-to-noise, typically 75 dB or
Metering/Indicators:	Illuminated meter indicates: 1) signal level, 2) subcarrier level, 3) power supply level, and 4) mono program output level. LEDs – MAX Signal, ATT Signal, UNSQUELCHED, POWER supply, and AFC
Front Panel Controls:	SIGNAL ATTENUATION, MONO PROGRAM OUTPUT LEVEL, SQUELCH LEVEL, meter selection control, HEADPHONE level control.
Power Requirements:	85 to 264 VAC, 47 to 63 Hz. External DC operation – +10 to +14 VDC.
Approximate AC Current Requirements:	1.5 Amps.
Accessory Connector:	Terminal strip or 15 pin D-Type.
Weight:	Net 7.6 pounds.(3.5 kilograms).
Dimensions:	3.5 in. high x 19 in. wide x 15 in. deep. (8.9 cm. high x 48.3 cm. wide x 38.1 cm. deep.)
Regulatory:	FCC, DOC.



SR-20C STL Receiver

Frequency Bands:	See ORDERING INFORMATION below.
Type of technology to produce operating frequency:	Phase-locked loop; synthesized.
Operating Temp. Range:	-10°C to +50°C.
Frequency Stability (over operating temperature range):	0.0001%.
Monophonic Signal-to-Noise @ 100 μ V: 200 kHz BW @ 50 kHz Dev 125 kHz BW @ 15 kHz Dev 125 kHz BW @ 9 kHz Dev	Greater than 75 dB. Greater than 64 dB. Greater
Monophonic Frequency Response:	\pm 0.2 dB, 20 Hz to 15 kHz.
Monophonic Distortion @ 100 μ V: 200 kHz BW @ 50 kHz Dev 125 kHz BW @ 15 kHz Dev 125 kHz BW @ 9 kHz Dev	0.25% or less, 20 Hz to 15 kHz. 0.3% or less, 20 Hz to 15 kHz. 0.3% or less, 20 Hz to 15 kHz.
Composite Signal-to-Noise:	Greater than 75 dB, dependent upon the operating frequency, demodulated, deemphasized.
Composite Frequency Response: Composite Wideband	\pm 0.2 dB, 30 Hz to 53 kHz. \pm 0.3 dB, 30 Hz to 100 kHz.
Composite Distortion:	0.2% or less, 20 Hz to 15 kHz, demodulated, deemphasized, low-pass filtered, left or right channel.
Spurious Response:	-90 dB.
RF Input Impedance:	50 ohms.
RF Connector:	Type N-Female.
Monophonic Output Level:	-10 to +11 dBm.
Monophonic Output Impedance:	Balanced, 600 Ohms – terminal strip/15-pin D-Type.
Composite Output Level:	2.2 Vpp to 8 Vpp.
Sensitivity:	4 microvolts for 50 dB signal-to-noise. 14 microvolts for 60 dB signal-to-noise. 100 microvolts for maximum signal-to-noise, typically 75 dB or
Metering/Indicators:	Illuminated meter indicates: 1) signal level, 2) subcarrier level, 3) power supply level, 4) mono program output level, and composite program out- put level. LEDs – MAX Signal, ATT Signal, UNSQUELCHED, POWER supply, and AFC LOCK.
Front Panel Controls:	SIGNAL ATTENUATION, MONO PROGRAM OUTPUT LEVEL, COMPOSITE OUTPUT LEVEL, SQUELCH LEVEL, meter selection control, HEADPHONE level control.
Power Requirements:	85 to 264 VAC, 47 to 63 Hz. External DC operation – +10 to +14 VDC.
Approximate AC Current Requirements:	1.5 Amps.
Accessory Connector:	15-pin D connector or terminal strip.



Weight:	Net 7.8 pounds.(3.5 kilograms).
Dimensions:	3.5 in. high x 19 in. wide x 15 in. deep. (8.9 cm. high x 48.3 cm. wide x 38.1 cm. deep.)
Regulatory:	FCC. DOC.

ORDERING INFORMATION

MARTI PART #	Description
SR20M-150-200	SR-20M Mono STL Receiver, 135 to 182 MHz, Single Channel, 200 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.
SR20M-150-125	SR-20M Mono STL Receiver, 135 to 182 MHz, Single Channel, 125 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.
SR20M-240-200	SR-20M Mono STL Receiver, 215 to 265 MHz, Single Channel, 200 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.
SR20M-240-125	SR-20M Mono STL Receiver, 215 to 265 MHz, Single Channel, 125 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.
SR20M-330-200	SR-20M Mono STL Receiver, 300 To 350 MHz, Single Channel, 200 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.
SR20M-330-125	SR-20M Mono STL Receiver, 300 To 350 MHz, Single Channel, 125 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.
SR20M-450-200	SR-20M Mono STL Receiver, 430 To 480 MHz, Single Channel, 200 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.
SR20M-450-125	SR-20M Mono STL Receiver, 430 To 480 MHz, Single Channel, 125 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.
SR20M-950-200	SR-20M Mono STL Receiver, 935 To 965 MHz, Single Channel, 200 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.
SR20C-150-250	SR-20C Composite STL Receiver, 135 to 182 MHz, Frequency Agile, 250 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.
SR20C-240-250	SR-20C Composite STL Receiver, 215 to 265 MHz, Frequency Agile, 250 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.
SR20C-330-250	SR-20C Composite STL Receiver, 300 To 350 MHz, Frequency Agile, 250 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.
SR20C-450-250	SR-20C Composite STL Receiver, 430 To 480 MHz, Frequency Agile, 250 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.
SR20C-950-250	SR-20C Composite STL Receiver, 935 To 965 MHz, Frequency Agile, 250 kHz Receive Bandwidth, 110/220VAC 50/60 Hz Operation.

2.1 UNPACKING & INSPECTING

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, stop 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 pre-paid.

2.2 INSTALLATION

IMPORTANT NOTICE

This equipment must be operated in a well-ventilated rack cabinet.

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 has 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 RF ground potential.

2.3 SR-20M CONNECTIONS

Refer to Figure 2-1 as required for the following connections.

1. Connect the receiving antenna coax to the ANTENNA TYPE N port on the rear-panel using a type-N male connector. A short flexible jumper, 20 inches maximum, may be used between the ANTENNA port and the Heliax. Marti Part No. 585-017 Double-Shielded, Low-Loss RG-214/U jumper is recommended.
2. Balanced program audio output is located at accessory circuit board connector J2-1 and J2-2 (refer to Figure 2-2).

The output level can be adjusted from -10 to +11 dBm. Connect shielded audio cable to J2-1 and J2-2. If unbalanced audio is desired, connect a cable to BNC receptacle J2 on the rear panel.

3. Connect a Remote Control or Subcarrier Demodulator to the SUB1 OUT J1 or SUB2 OUT J3 BNC connectors on the rear-panel. The subcarrier: 1) impedance may be 600 to 10 K ohms and 2) the output level is approximately 0.5 Volts peak-to-peak. Subcarrier frequencies may be between 26 KHz and 110 KHz.



4. For dual channel stereo operation, use only Marti MTS-1 coaxial transformer for splitting the received signal to the two receivers.

CAUTION

IF DC OPERATION IS REQUIRED, DO NOT APPLY MORE THAN +14V
TO THE UNIT.

5. Ensure the receiver rear-panel ON/OFF switch is OFF. Connect the rear-panel AC line receptacle to an 85 to 264V, 47 to 63 Hz AC power source. **USE ONLY A 3-PRONG GROUNDED OUTLET RECEPTACLE FOR SAFETY.** The unit can also be operated from a +10V to +14V external dc supply. If dc operation is required, refer to Figure 2 and connect: 1) the positive wire to J2-13 and 2) ground to J2-14.
6. The receiver is equipped with a rear-panel ground terminal. Connect a ground wire between earth ground and the GND terminal on the receiver rear panel.

2.4 SR-20C MONOPHONIC OPERATION CONNECTIONS

Refer to Figure 2-3 as required for the following connections.

1. Connect the receiving antenna coax to the ANTENNA TYPE N port on the rear-panel using a type-N male connector. A short flexible jumper, 20 inches maximum, may be used between the ANTENNA port and the Helix. Marti Part No. 585-017 Double-Shielded, Low-Loss RG-214/U jumper is recommended.
2. Balanced program audio output is located at accessory circuit board connector J2-1 and J2-2 (refer to Figure 2-2).
The output level can be adjusted from -10 to +11 dBm. Connect shielded audio cable to J2-1 and J2-2. If unbalanced audio is desired, connect a cable to BNC receptacle J2 on the rear panel.
3. Connect a remote control or subcarrier demodulator to the jack marked, "J1". The subcarrier load may be 600 to 5K ohms impedance, and the output level is approximately 0.5 Volts peak-to-peak. Systems factory supplied with 250 KHz IF bandwidth will carry subcarriers up to 110 KHz. For other subcarrier frequencies or narrow IF bandwidth systems contact the factory. A second subcarrier system can be connected to "J3". Subcarrier frequencies may be between 26 KHz and 110 KHz.
4. For dual channel stereo operation, use only Marti MTS-1 coaxial transformer for splitting the received signal to the two receivers.

CAUTION

IF DC OPERATION IS REQUIRED, DO NOT APPLY MORE THAN +14V
TO THE UNIT.

5. Ensure the receiver rear-panel ON/OFF switch is OFF. Connect the rear-panel AC line receptacle to an 85 to 264V, 47 to 63 Hz AC power source. **USE ONLY A 3-PRONG GROUNDED OUTLET RECEPTACLE FOR SAFETY.** The unit can also be operated from a +10V to +14V external dc supply. If



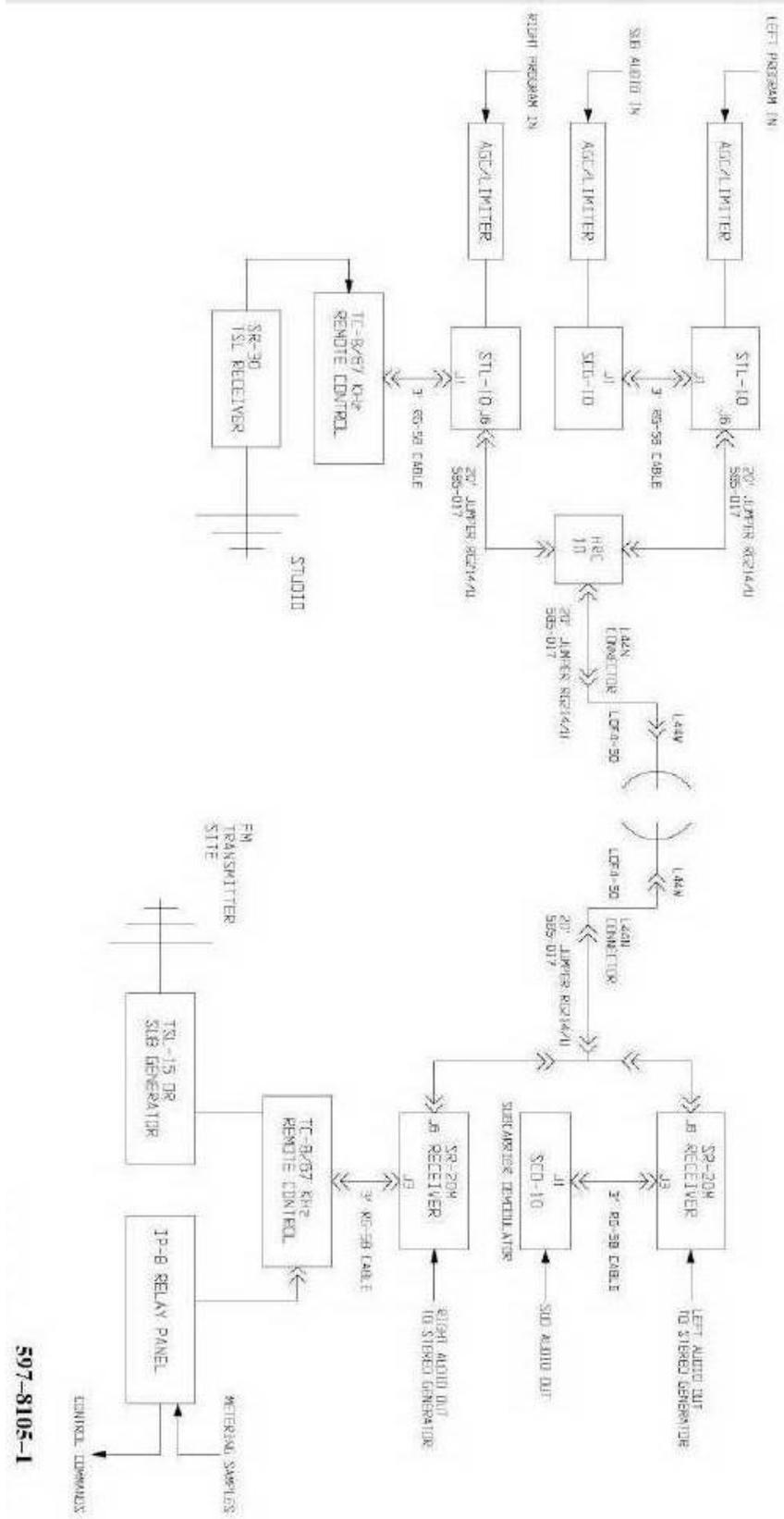
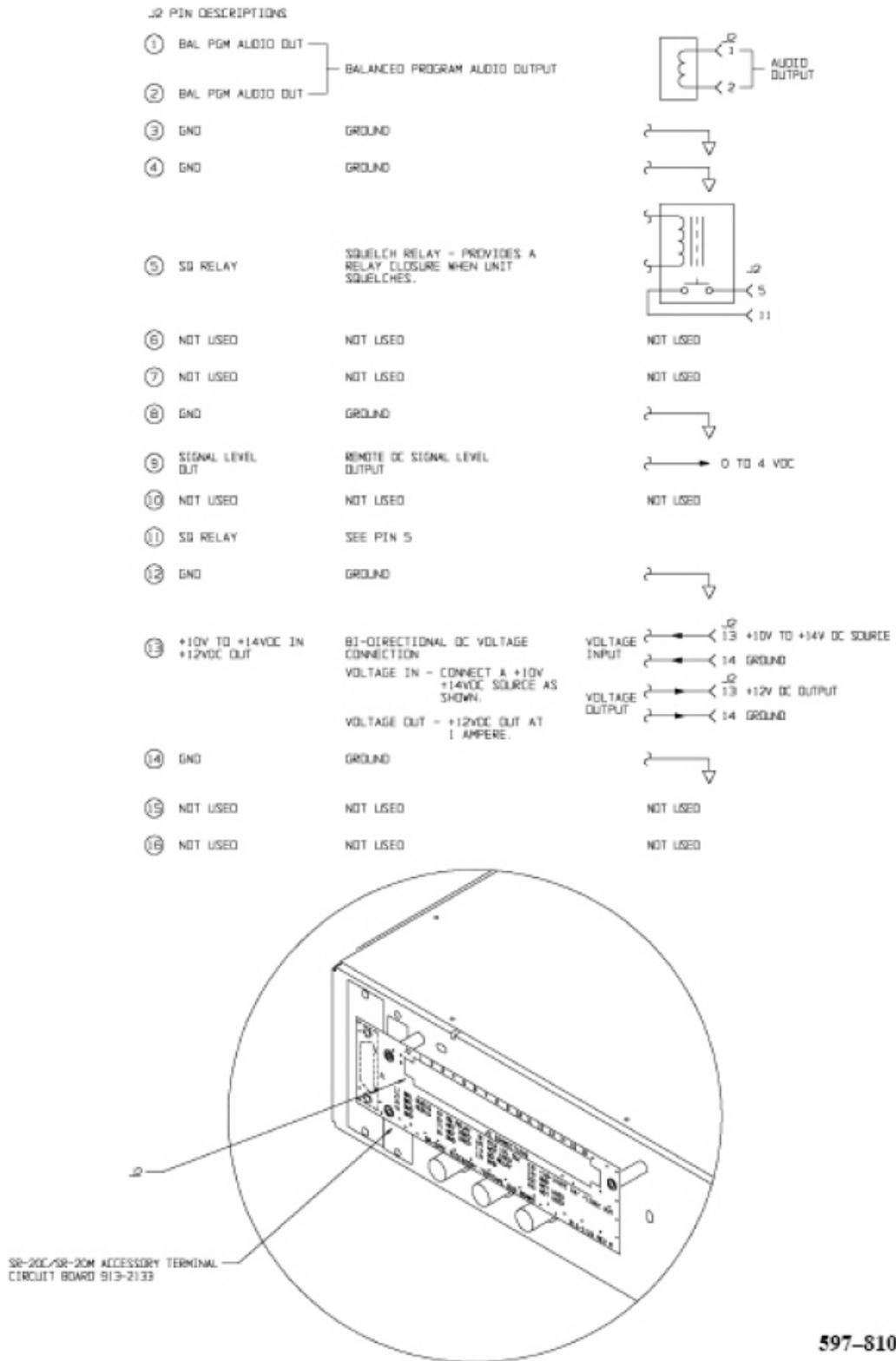


Figure 2-1: Single/Dual SR-20M System





597-8105-2

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Figure 2-2: Accessory/Remote Connections



dc operation is required, refer to Figure 2 and connect: 1) the positive wire to J2-13 and 2) ground to J2-14.

- The receiver is equipped with a rear-panel ground terminal. Connect a ground wire between earth ground and the GND terminal on the receiver rear panel.

2.5 SR-20C COMPOSITE OPERATION CONNECTIONS

- Connect the receiving antenna coax to the ANTENNA TYPE N port on the rear-panel using a type-N male connector. A short flexible jumper, 20 inches maximum, may be used between the ANTENNA port and the Heliax. Marti Part No. 585-017 Double-Shielded, Low-Loss RG-214/U jumper is recommended.
- Balanced monophonic program audio output is located at accessory circuit board connector J2-1 and J2-2 (refer to Figure 2-2). The output level can be adjusted from -10 to +11 dBm. Connect shielded audio cable to J2-1 and J2-2. If unbalanced audio is desired, connect the cable between J2-1 (audio) and J2-3 (ground).
- The composite signal output of the receiver is located at J2 on the rear panel. The composite output is connected to the composite signal input of the FM transmitter exciter by a short length of RG-58 coaxial cable. Connect the cable between J2 COMPOSITE OUT and the composite input on the exciter.
- A subcarrier demodulator or remote control can be connected to the SUB 1 OUT J1 or SUB 2 OUT J3 BNC receptacles on the rear panel. The ability of the STL transmitter system to transmit subcarriers depends upon the channel bandwidth available. The SR-20C receiver IF filter selectivity must be compatible with the available interference free channel bandwidth. The following text presents the approximate bandwidth required for various sub carriers using 50 KHz deviation for 100% modulation.

Subcarrier Frequency	Receiver IF Bandwidth (3 dB)
67 KHz	234 KHz
92 KHz	284 KHz
110 KHz	320 KHz

Actual bandwidth may require an additional 10% to 15% to allow for the modulation on the subcarrier itself. With severe STL channel crowding with resulting interference prevalent around large markets, subcarriers above 110 KHz are not recommended.

- For subcarrier operation, connect a Remote Control or Subcarrier Demodulator to the SU1 OUT J1 or SUB2 OUT J3 BNC connectors on the rear-panel. The subcarrier: 1) impedance may be 600 to 10 K ohms and 2) the output level is approximately 0.5 Volts peak-to-peak. Subcarrier frequencies may be between 85 kHz and 110 kHz.

CAUTION

IF DC OPERATION IS REQUIRED, DO NOT APPLY MORE THAN +14V
TO THE UNIT.

- Ensure the receiver rear-panel ON/OFF switch is OFF. Connect the rear-panel AC line receptacle to an 85 to 264V, 47 to 63 Hz AC power source. **USE ONLY A 3-PRONG GROUNDED OUTLET RECEPTACLE FOR SAFETY.** The unit can also be operated from a +10V to +14V external dc supply.



- If dc operation is required, refer to Figure 2-2 and connect: 1) the positive wire to J2-13 and 2) ground to J2-14.
7. The receiver is equipped with a rear-panel ground terminal. Connect a ground wire between earth ground and the GND terminal on the receiver rear panel.



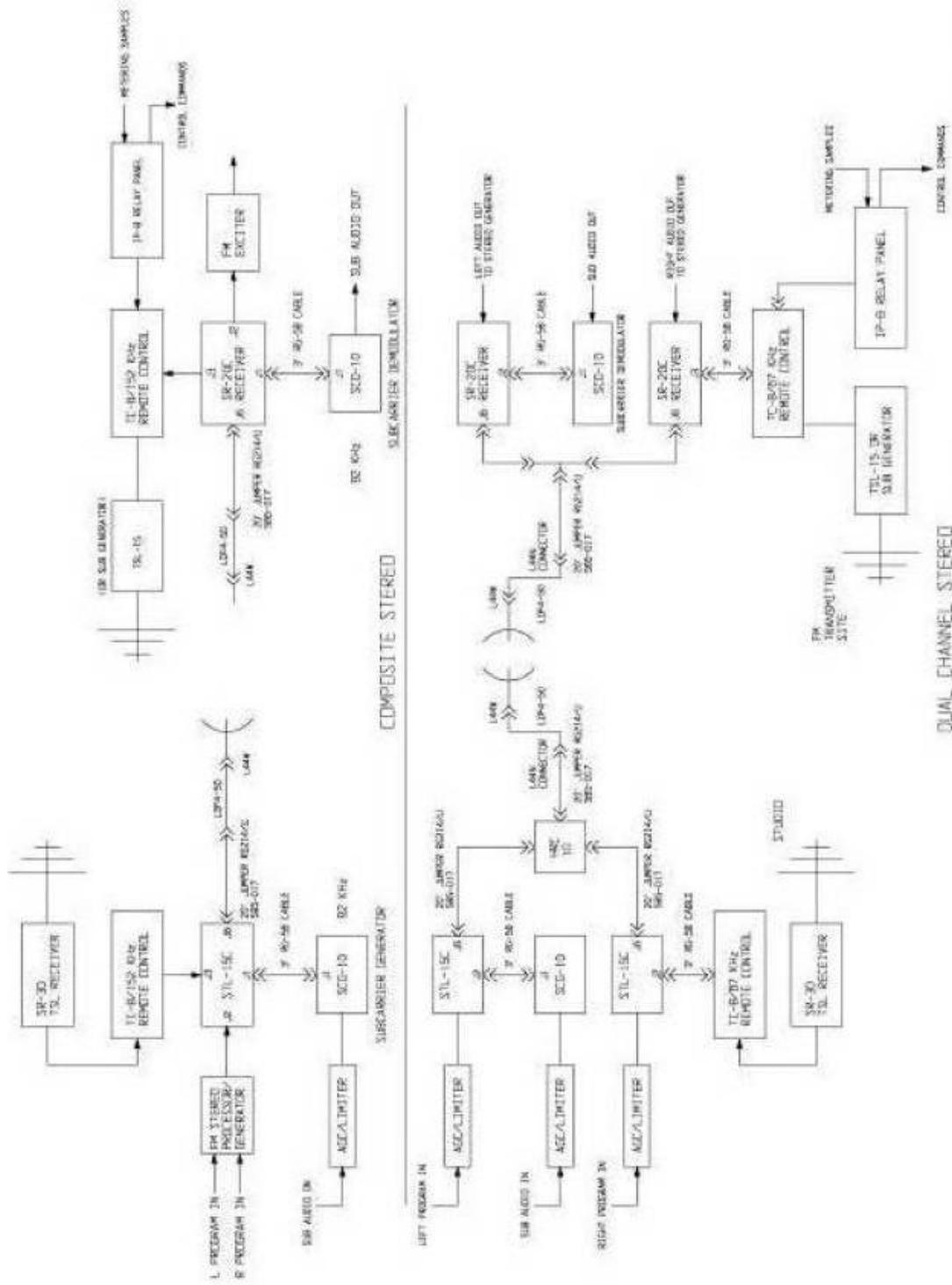


Figure 2-3: SR-20C System Diagram



3 ANTENNAS

CAUTION & WARNING

You can be killed if an antenna comes in contact with electric power lines or exposed electrical wiring. For your safety use extreme caution when installing antennas. Keep away from power lines.



Personnel must not be near the antenna when radiating. Locate antenna as far as possible from people and equipment susceptible to RF radiation. Do not mount antenna directly on transmitter. Refer to ANSI C95.1 "Limits on Non-Ionizing Radiation."

The following suggestions are offered to help those responsible for antenna installations avoid costly errors in assembly and adjustment. Marti Electronics, Inc. assumes no responsibility for the installation and performance of antenna systems associated with its equipment. The following suggestions are not intended to be a complete step-by-step procedure, simply a listing of some of the most frequently reported errors in antenna system installation.

3.1 Antenna Assembly

Follow the manufacturer's instructions carefully. If no instructions were included with the antenna, call or write the antenna manufacturer for instructions. Antennas which have phasing or stacking cables must be assembled carefully to avoid phase reversal or signal cancellation.

3.2 Transmission Line Connector Assembly

Do not use RG-58U or RG-8U cable for STL station antennas! They have too much loss at VHF and UHF frequencies. Follow the instructions furnished by the manufacturer when cutting coaxial cable. Inspect the cable ends for small metal fragments which can short-circuit the line inside the connector assembly. Check the line for a short-circuit condition after each connector is installed by using an ohmmeter. Pressurized line should be checked for several days under pressure before installation on a tower to ensure that there are no leaks in the line or fittings

3.3 Moisture Proofing Coax Connectors and Fittings

Extreme care must be exercised with coaxial cable before and after connectors have been installed to ensure that moisture does not enter the line. Foam dielectric line can take on moisture by absorption which is difficult to detect and remedy. Therefore, keep the line dry while in storage with ends tightly capped. Coaxial splices, connectors, and fittings to be located outside should be made mechanically tight, then coated with a weather-proofing material over at least two layers of vinyl plastic electrical tape. Moisture problems in antenna systems are usually traced back to connectors which have NOT been properly taped. The Marti K-1 Grounding and Weatherproofing Kit is recommended for use in each new antenna installation.

3.4 Location and Grounding of Coaxial Cable

Keep the STL receiver coaxial cable as far from the broadcast transmitter and its coaxial cable as possible. DO NOT STRAP RECEIVER CABLE TO THE MAIN ANTENNA CABLE AT ANY POINT. PLACE THE RECEIVER ANTENNA COAXIAL CABLE ON THE OPPOSITE SIDE OF THE TOWER FROM THE MAIN ANTENNA CABLE. Maintain maximum separation between these cables at all points, including the distance from tower base to transmitter building as well as inside the building.

3.5 System Grounding

It is essential that the STL antenna system be properly grounded for safety and proper operation.

3.6 Antenna Installation and Adjustment

The polarization of the transmit and receive antennas of the STL system must be the same! This means that if the transmitting antenna is vertical, the receiving antenna must also be vertical. Each antenna should be attached to the tower using the proper side mount or top mount hardware. If an RF wattmeter is available, each antenna and transmission line can be checked for VSWR when the transmitter is supplying power to it. The VSWR should be less than 1.5 to 1 (1.5:1). IF THE ANTENNA SYSTEM FAILS TO GIVE THE PREDICTED SIGNAL STRENGTH LEVEL, THE FOLLOWING ITEMS SHOULD BE CHECKED:

1. Check for correct assembly of antenna.
2. Check that antennas have same polarity.
3. Check VSWR of both transmit and receive antennas. VSWR should be less than 1.5:1.
4. Check for obstructions in the path such as trees and man-made structures. The base antenna must be high enough to provide a line-of-sight path to the remote transmitting antenna.

4 OPERATION

4.1 CONTROLS AND INDICATORS

4.1.1 SIGNAL ATTENUATION CONTROL

The SIGNAL ATTENUATION control adjusts a variable attenuator at the input of the converter. This control is designed to minimize the reception of unwanted signals during interference conditions. These conditions are due to extremely high intermodulation from a combination of neighboring signal frequencies. This unwanted signal can be reduced or eliminated by attenuating the received signal



using the SIGNAL ATTENUATION control. However, the desired signal will also be attenuated and may result in degraded audio performance.

The SIGNAL ATTENUATION MAX SIG and ATT indicators present the state of the attenuator. When the MAX SIG indicator is illuminated, the attenuator is off (maximum input signal level). When the ATT indicator is illuminated, the attenuator is reducing (attenuating) the input signal level. The level of signal attenuation is indicated by operating the front panel multimeter switch to SIGNAL LEVEL (ATT).

To raise the attenuation level, depress the SIGNAL ATTENUATION A section of the control. The ATT indicator will illuminate and the input signal level will be lowered as viewed on the multimeter. To lower the attenuation level, depress the SIGNAL ATTENUATION I' section of the control. The input signal level will raise as viewed on the multimeter.

Typically, the control is adjusted to provide maximum signal to the receiver. As a result, the MAX SIG indicator will illuminate. Adjust the control only to reduce unwanted signals during extreme interference conditions.

4.1.2 MONO PROGRAM LEVEL CONTROL

The monophonic audio output level is adjusted using the MONO PROGRAM LEVEL control. The audio level can be adjusted from -10 dBm to $+11$ dBm. Observe the audio level by operating the multimeter switch to MONO PROGRAM LEVEL.

To adjust the output level, operate the multimeter switch to MONO PROGRAM LEVEL. To raise the output level, depress the MONO PROGRAM LEVEL A section of the control. To lower the output level, depress the MONO PROGRAM LEVEL I' section of the control. Adjust the audio level until the desired output level is displayed on the multimeter.

The control can be operated using two methods. If the control is depressed and held, the level will change rapidly. If the control is momentarily depressed, the level will change in approximately 0.150 dB increments.

4.1.3 COMPOSITE PROGRAM LEVEL CONTROL (SR-20C MODELS ONLY)

The composite output level is adjusted using the COMPOSITE PROGRAM LEVEL control. The level can be adjusted from 0.5V p-p to +8V p-p. Observe the composite level by operating the multimeter switch to COMPOSITE PROGRAM LEVEL.

To adjust the output level, operate the multimeter switch to COMPOSITE PROGRAM LEVEL. To raise the output level, depress the COMPOSITE PROGRAM LEVEL A section of the control. To lower the output level, depress the COMPOSITE PROGRAM LEVEL I' section of the control. Adjust the level until the desired output level is displayed on the multimeter.

The control can be operated using two methods. If the control is depressed and held, the level will change rapidly. If the control is momentarily depressed, the level will change in small increments.

4.1.4 SQUELCH LEVEL CONTROL

The level at which the receiver will squelch is controlled by the SQUELCH LEVEL control. The UNSQUELCHED indicator illuminates to indicate the receiver is unsquelched. The squelch level is raised by depressing the SQUELCH LEVEL A section of the control. The squelch level is lowered by depressing the SQUELCH LEVEL I' section of the control. To adjust the control, proceed as follows:

1. Operate the multimeter switch to SIGNAL LEVEL (ATT).



2. Depress and hold the SQUELCH LEVEL I section of the control for approximately 10 seconds. This will lower the squelch point to the lowest level.
3. Lower the input signal level to the desired squelch point as viewed on the multimeter.
4. Depress the SQUELCH LEVEL A section of the control until the UNSQUELCHED indicator extinguishes.
5. Return the signal level to the normal level.

4.1.5 MULTIMETER

The SR-20M/SR-20C is equipped with a multimeter. The multimeter is controlled by the meter select switch. The following text presents a description of the multimeter switch positions. To use the multimeter, operate the switch to the desired position and view the indication on the meter. The green values on each meter scale present nominal values.

SIGNAL LEVEL (ATT) – Displays the input signal level in microvolts. The nominal level is 100 μ V. The signal level will be accurate only when the MAX SIG indicator is illuminated. For example, if the ATT indicator is illuminated and the meter indicates 100 μ V, the actual signal level is less than 100 μ V due to the attenuation.

SUBCARRIER LEVEL – Displays the subcarrier level in volts peak-to-peak. The nominal level is 0.5V p-p.

POWER SUPPLY – Displays the dc power supply voltage. The nominal level is +12V dc.

MONO PROGRAM LEVEL – Displays the audio output level in dBm. The nominal level is +8 dBm.

COMPOSITE PROGRAM LEVEL – Displays the composite level in volts peak-to-peak. The nominal level is 3.5V p-p.

4.1.6 POWER INDICATOR

An indication that power is applied to the unit is provided by the POWER indicator. The POWER indicator will illuminate when power is applied to the unit.

4.1.7 AFC LOCK INDICATOR

The AFC LOCK indicator illuminates to indicate the receiver is locked to the selected frequency. The indicator will flash to indicate the receiver has become unlocked from the selected frequency.

4.1.8 SR-20C FREQUENCY SELECT

The SR-20C operating frequency is controlled by the internal frequency select switches and execute switch (refer to Figure 4). The operating frequency is selected using the rotary frequency select switches. The execute button is used to assign the frequency once selected. To change the operating frequency, proceed as follows:

1. Determine the operating frequency. Use the frequency select switches to enter the operating frequency.
2. Depress the execute switch.

The AFC LOCK indicator will flash quickly to indicate the unit has changed frequencies.



4.1.9 HEADPHONE RECEPTACLE/LEVEL CONTROL

The receiver monophonic audio can be monitored using the front-panel headphone receptacle and level control. A 1/4" inch stereo headphone receptacle is provided for headphone monitoring. A 40 Ohm or greater headphone impedance is required. Adjust the headphone level using the HEADPHONE LEVEL control.

On SR-20C units, the headphone audio is from the monophonic audio output circuit. As a result, the audio level to the headphone level control is adjusted by the front panel MONO PROGRAM LEVEL control. If a satisfactory level cannot be obtained using the headphone control: 1) raise the audio level using the MONO PROGRAM level control and 2) re-adjust the headphone level control. At normal monophonic audio output levels, no adjustment will be required.

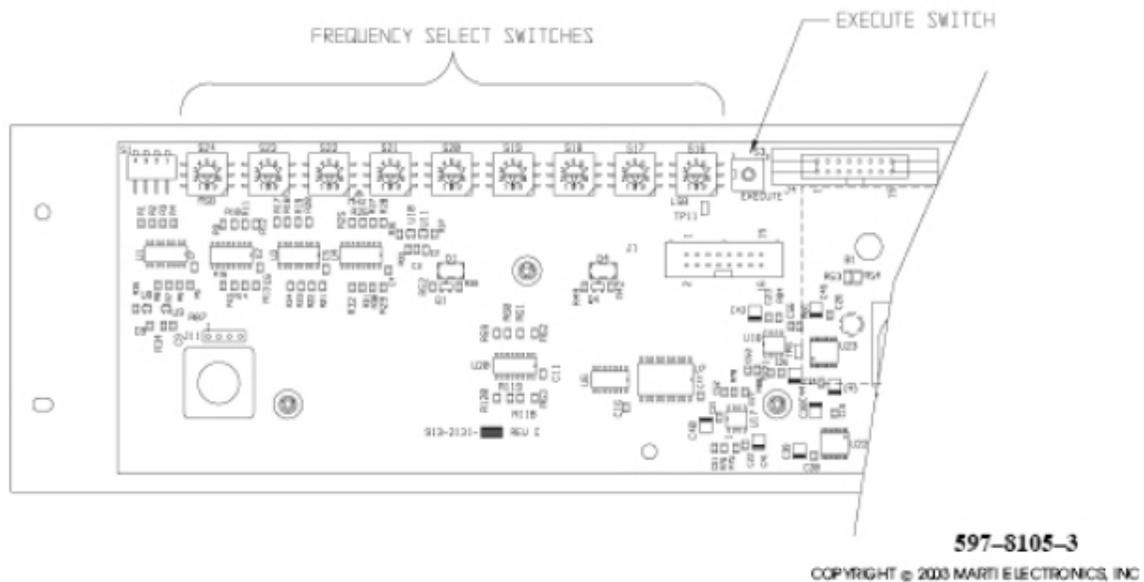


Figure 4-1: Frequency Select Switches and Execute Switch

5 INITIAL START-UP AND OPERATION

The following text presents initial start-up and operating procedures.

1. Apply power to the unit.

The POWER indicator will illuminate. The AFC LOCK indicator will illuminate when the unit locks to a frequency. The UNSQUELCHED indicator will illuminate if the unit signal level is above the squelch point. The MAX SIG level indicator will illuminate if no attenuation is applied. The ATT indicator will illuminate if attenuation is applied.

2. For SR-20M receivers, the receiver is programmed to a specific operating frequency. For SR-20C receivers, the frequency is programmed using the internal frequency programming switches and execution switch. To change the operating frequency, proceed as follows:

- A. Determine the operating frequency. Use the frequency select switches to enter the frequency (refer to Figure 4-1).

- B. Depress the execute switch.

The AFC LOCK indicator will flash quickly to indicate the unit has changed frequencies.

3. If squelch adjustment is required, use the SQUELCH LEVEL control to adjust the unit to the desired squelch point.
4. To view the monophonic program audio on the multimeter, operate the multimeter switch to MONO PROGRAM LEVEL. The audio will appear on the multimeter.
5. Adjust the program audio output level to the desired level using the MONO PROGRAM LEVEL control.
6. For SR-20C units, adjust the composite output to the desired level as follows:
 - A. To view the composite audio on the multimeter, operate the multimeter switch to COMPOSITE PROGRAM LEVEL.
 - B. Adjust the composite output to the desired level using the COMPOSITE PROGRAM LEVEL control.
7. Use the multimeter to monitor the SIGNAL LEVEL, SUBCARRIER LEVEL, POWER SUPPLY LEVEL, MONO PROGRAM LEVEL, or COMPOSITE PROGRAM LEVEL (for SR-20C models only) as required.
8. To monitor the monophonic program audio, insert a stereo headphone jack into the HEADPHONE receptacle. Adjust the headphone level using the HEADPHONE LEVEL control.



6 INTERNALLY SELECTED AUDIO OPTIONS

6.1 SR-20M Pre-Emphasis Options

Two programmable switches, S1 and S2, on the SR20M audio board 913-2137 to enable the user to select $0\mu\text{s}$, $25\mu\text{s}$, $50\mu\text{s}$, or $75\mu\text{s}$ pre-emphasis characteristics. Refer to 597-8105-4 in the SCHEMATIC AND ASSEMBLY DRAWINGS section or assembly drawing 913-2137 for the location of these switches. $75\mu\text{s}$ pre-emphasis and de-emphasis produces the best threshold noise performance in an FM system.

It does, however, present problems in modulation control. Some users, therefore, may wish to use $50\mu\text{s}$, $25\mu\text{s}$, or flat processing. AM stations will find flat processing desirable since the STL can be treated as a pair of wires in proof-of-performance tests without possible over modulation of the link at high audio frequencies. With $75\mu\text{s}$ pre-emphasis, audio input levels to the transmitter should be reduced 20 dB below 100% modulation when running frequency response tests to prevent over modulation at the higher audio frequencies. With a full-quieting RF signal into the receiver ($0\mu\text{s}$ de-emphasis), $0\mu\text{s}$ pre-emphasis will produce a system signal-to-noise ratio approximately 6 dB less than $75\mu\text{s}$ pre-emphasis. Received signal levels less than full quieting may produce a difference of as much as 13 dB between flat and $75\mu\text{s}$ pre-emphasis.

6.2 SR-20C Monophonic Operation, Composite Operation, And Pre-Emphasis Options

The SR-20C is equipped with several internally selected options. Refer to SR-20C AUDIO CIRCUIT BOARD, 913-2135 in the TUNE UP AND ADJUSTMENTS section to select these options.

7 SYSTEM PERFORMANCE TESTS

The STL transmitter and receiver with the associated antenna system can be tested and compared with factory test data. The following procedures should be followed in order to obtain reliable and accurate results.

Before audio tests or subcarrier tests are begun check the receiver signal level for required minimum signal. For a 950 MHz system using 50 KHz FM deviation, typical noise levels are:

SR-20M	SR-20C
3 μ v for 50 dB S/N ratio	4 μ v for 50 dB S/N ratio
10 μ v for 60 dB S/N ratio	14 μ v for 50 dB S/N ratio
100+ μ v for ultimate S/N ratio	100+ μ v for ultimate S/N ratio

For the above system with 20% subcarrier injection, the following noise level on the subcarrier (Marti SCG-10 – SCD-10 System) was measured (no modulation main or sub):

10 μ v for 40 dB Subcarrier S/N ratio
20 μ v for 46 dB Subcarrier S/N ratio
30 μ v for 49 dB Subcarrier S/N ratio
150 μ v for ultimate Subcarrier S/N ratio

With ultimate S/N ratio, main to sub crosstalk should be –45 to –50 dB with 50 KHz deviation (using Marti SCG-10 – SCD-10 Subcarrier System).

7.1 NOISE (MONOPHONIC MODE)

Noise measurements should be made first, since high noise levels will influence distortion readings. Also ground loops in the audio oscillator to transmitter connections and distortion analyzer to receiver connections must be resolved before testing begins. The influence of high RF fields upon the test equipment must be determined and corrected before accurate measurements can be made. NOTE: NOISE AND DISTORTION MEASUREMENTS ARE MADE WITH SUBCARRIER AND REMOTE CONTROL INPUT SIGNALS REMOVED. System signal to noise ratio is determined while modulating the transmitter 100% at 400 Hz. A level of +8 dBm across the balanced audio input terminals at TB-1 will produce a reading of 100% modulation on the "PEAK MODULATION" indicator. Adjust the receiver monophonic program output level for +8 dBm output into the distortion analyzer. If the distortion analyzer has a high impedance input, add a 600 ohm load resistor to match the receiver. Establish +8 dBm on the analyzer as the reference level for 100% modulation. Next, remove the audio signal from the transmitter input and measure noise level below reference (100% modulation).

7.2 DISTORTION (MONOPHONIC MODE)

Harmonic distortion is usually measured at 100% modulation and at several frequencies. If pre-emphasis processing is used in the transmitter with corresponding de-emphasis in the receiver, it is normal for available audio level at the receiver to drop with increasing frequency according to the de-emphasis curve selected. At 15 KHz, there is sufficient level to operate most modern distortion analyzers. Distortion levels should be within specifications. If distortion is out of specs, check system noise, check for test equipment ground loops, RFI, and transmitter/receiver operating frequency. If either unit is off frequency, the FM modulation sidebands are not centered within the IF filter bandpass, which can cause audio distortion.



7.3 FREQUENCY RESPONSE (MONOPHONIC MODE)

If the transmitter system is switched to flat processing, frequency response can be measured as if the signal were being sent over straight wires. If pre-emphasis processing is used (especially 75 μ s) allowance must be made in the transmitter audio input level to prevent over-modulation at test frequencies above 400 Hz. The simplest and fastest method is to set the transmitter audio input level for 100% modulation at 400 Hz., then attenuate this level 20 dB.

Set receiver output level to -10 dBm as the reference, then sweep the audio band for response.
COMPOSITE (STEREO) SEPARATION, NOISE, DISTORTION AND FREQUENCY RESPONSE

This procedure consists of feeding a stereo encoder (generator) capable of more than 60 dB separation (50 Hz- 15 KHz) into the composite input of the S1L transmitter and connecting a stereo decoder (monitor) to the composite output of the SR-20C receiver. The actual test procedure may vary with different decoders (monitors). Therefore the procedure prescribed in the decoder (monitor) instruction manual should be followed.

8 THEORY OF OPERATION

Refer to SR-20M block diagram 597-8105-6 and SR-20C block diagram 597-8105-7 in the SCHEMATIC AND ASSEMBLY DRAWINGS section as required for the following discussion.

8.1 Converter, 913-2132-150/-240/-330/-450/-950

The received RF signal is applied to the converter circuit board. This circuit board is: 1) assembled for specific bands of operation and 2) can accept a 50 MHz (30 MHz for 950 units) wide group of frequencies within the specific band. The received signal passes through pre-selector filter FL1. Following the filter, the signal is routed to a second filter network consisting of FL2, FL3, FL4, FL5, FL6, FL7, FL8, and FL9. This network consists of filter sections divided into 12.5 MHz segments. As determined by the operating frequency, the RF signal is routed to the appropriate filter section. Once filtered, the signal is routed to 2 frequency systemized PLL down converter circuits. The first PLL circuit converts the signal to 70.7 MHz. The second PLL circuit converts the signal to a 10.7 MHz output. The output of the second PLL circuit is then routed to the IF bandpass filter.

Control of the converter is provided by microprocessor U1. This microprocessor is also used to control all of the operating functions of the unit.

8.2 SR-20M IF Bandpass Filter, 800-207 AND 800-275SR-20C IF Bandpass Filter, 800-250

The IF signal output of the CONVERTER is impedance matched to the IF Bandpass Filter which provides the selectivity or channel bandwidth of the receiver. Several IF filters are available for various bandwidth requirements. The output of the IF Bandpass Filter is impedance matched to the following stage.

8.3 SR-20M IF Amplifier/Detector, 800-208

The IF amplifier chain consists of two discrete transistor stages coupled by ceramic filters to an integrated circuit. IC-1 contains high-gain FM limiters, quadrature detection, audio preamplification and wide range signal level metering. IF symmetry at the IC input is compensated by L1 and C19.

8.4 SR-20C IF Amplifier/Detector, 800-293A

The 50 ohm output from the IF bandpass filter is connected to J1 of this board by a short coaxial cable. The signal is amplified by Q1 and Q2 with filtering by CF1 and CF2. IC5 combines the functions of IF amplifier/limiter, quadrature detector, and receive signal strength (signal level metering). The wide band output of Q5 appears at Pin 6, and is connected to IC1 – IC4 for pre-processing of the composite, mono, and subcarrier signals, and for level metering.

8.5 SR-20M Audio Circuit, 913-2137

The audio input signal is connected to the non-inverting input of De-Emphasis Amplifier, IC-1A. The negative feedback circuit of this amplifier has two capacitors C4, C5 selected by switches S1 and S2 which provide the option of 0 μ s (flat), 25 μ s, 50 μ s, and 75 μ s de-emphasis. Pot R4 permits precise adjustment of the time constant. Following the de-emphasis circuit, the signal passes through to the Program Level Control then back into the Audio board through two stages of Butterworth low-pass filtering, IC-2A and IC-2B, then to a bridge connected dual op-amp for the audio output, IC-3A and IC-3B. Diodes D1 and D2 rectify the output audio for audio level metering. A 600/600 ohm transformer T2 located on I/O FILTER BOARD 800-193 is used to isolate the output op-amps from the line.

8.6 SR-20C Audio Amplifier, 913-2135

Audio circuit board 913-2135 processes composite and mono audio for the SR-20C and is programmable (by jumper plugs) for composite stereo or monaural signal processing. Using "jumper plugs" the user may select "HI-SUB" for subcarrier operation in composite mode or "LO-SUB" for subcarrier operation in mono mode. See the NOTE on Schematic, 913-2135 to set jumpers properly.

8.6.1 Composite Processing:

Composite processing entails low pass filtering, delay equalization, and high pass filtering (for subcarriers). Low pass filtering achieves a flat amplitude response to 57 KHz with a "brick-wall" cut-off using elliptic filters. Group delay, introduced by the low pass filter, is equalized using active all-pass filters and achieves a flat group delay across a frequency band of 50 Hz to 57 KHz. High pass filtering, using elliptic filters, has a "brick-wall" cut-off at 80 KHz with a flat response beyond 80 KHz. The output, as indicated on schematic 913-2135 is labeled "SUB OUT".

8.6.2 Mono Processing:

Mono processing entails de-emphasis, low pass filtering, amplification, and high pass filtering (for subcarriers). User options provide for selection of 75 μ s, 50 μ s, 25 μ s, or 0 μ s de-emphasis. Active Butterworth low pass filtering achieves a flat amplitude response to 15 KHz rolling off sharply above 15 KHz. Active Butterworth high pass filtering provides a sharp roll-off at 25 KHz with flat amplitude response above 25 KHz for subcarriers. Output of the high pass filters is labeled "LO-SUB" on schematic 913-2135. See instructions on this schematic for selection of "mode", de-emphasis, and subcarrier.

8.7 Input/Output Filter, 800-193AD

All input/output circuits connected to the accessory connector as well as the AC line input have radio-frequency filters. The filter circuitry is located on I/O Filter Schematic 800-193AD.



8.8 Front Panel Circuit Board Assembly, 953–2131–001/–002

The SR–20M receiver uses front panel assembly 953–2131–001. This assembly includes three switching power supply circuits, the metering circuitry, and a digital-to-analog converter (DAC) circuit for control of the monophonic audio level. The SR–20C receiver uses front panel assembly 953–2131–002. This assembly is identical to the 953–2131–001 assembly with the following additions: 1) a decode circuit for the frequency programming switches and 2) a second DAC circuit for control of the composite output level.

A +12V dc from the switching power supply is applied to the front panel circuit board. U13, U14, and U24 use this voltage to create the following dc voltages: 1) +5V, 2) +14V, and 3) –12V. The +14V supply is routed to the IF detector and audio circuit boards. A DAC consisting of U16, U17, U18, U19, U22, and U23 is used to control the monophonic program audio output level. The DAC is controlled by the microprocessor. On SR–20C units, the frequency programming information from the frequency programming switches is converted to serial data and routed to the microprocessor by a decode circuit consisting of U1, U2, U3, U4, and U20. A second DAC circuit consisting of U27, U28, U29, U30, U31, and U32 is used to control the composite program level.



9 TEST EQUIPMENT

Distortion Analyzer	Krohn–Hite Model 6801
Oscillator	Krohn–Hite Model 4500
Attenuator Set	Hewlett–Packard Model 3500
Frequency Counter	Hewlett–Packard Model 5383A (option 001)
Digital Multimeter	Beckman Model 3030
Analog Multimeter	Triplet Model 630
RF Attenuator	adjustable 0–110 dB
RF Signal Generator	Marconi Model 2022C
Spectrum Analyzer	Hewlett–Packard Model 8558B
Oscilloscope	Tektronix Model 2215
Stereo Monitor	Belar Model FMS–2
Stereo Generator	Aphex Model AX400
Wattmeter (50 Ohms impedance)	Bird Model 43
25 Watt Element	100–250 MHz, 250–500 MHz, or 400–1000 MHz Bird
Automatic Modulation Meter	Wavetek Model 4101
50 Watt RF Load	Microwave Associates Model 44003

10 TOOLS FOR ALIGNMENT

Tuning Tool	GC 9300, GC 9440, Spectrol 8T000, Sprague–Goodman, Johanson 8762, Johanson 8766
Screwdriver	Xcelite R184, 1/8" x 4"

11 TUNE–UP AND ADJUSTMENTS

NOTICE

This equipment was thoroughly tested and inspected at the factory prior to shipment. Adjustments should rarely be necessary in the field and should only be attempted by highly trained technicians familiar with this type of equipment. Laboratory grade test equipment is required and is listed under TEST EQUIPMENT AND TOOLS.

The following text presents the adjustment procedures for the SR–20M/SR–20C receivers. Do not adjust any other controls in the unit. Refer to SR–20M component locator 597–8105–4 and SR–20C component locator 597–8105–5 in the SCHEMATIC AND ASSEMBLY DRAWINGS section as required for the following procedures.



11.1 SR–20M IF Amplifier/Detector Circuit Board Adjustments, 800–208AD

WARNING

AC LINE VOLTAGE IS PRESENT ON THE POWER SUPPLY TERMINAL STRIPS.
DO NOT TOUCH THE TERMINAL STRIPS DURING THE FOLLOWING ADJUSTMENT.

1. Connect the RF signal generator to the ANTENNA input. Adjust the signal generator for; 1) the desired operating frequency, 2) an output level of 4 mV, and 3) no modulation.
2. Connect a voltmeter between IC1–13 and ground.
3. Adjust coil L1 for a +5.0 v dc indication on the multimeter.
4. Connect a voltmeter between J1–3 and ground.
5. Adjust potentiometer R18 for a +4.0V dc indication on the multimeter.
6. Connect the distortion analyzer to the receiver audio output at J2 on the accessory terminal strip circuit board.
7. Adjust the RF signal generator for: 1) an output level of 100 uV and 2) modulation using a 400 Hz tone with a 50 KHz deviation. The deviation will vary depending on the bandwidth of the unit.
8. Adjust the primary and secondary coils of T1 for minimum distortion and maximum output level on the analyzer.
9. Remove the test equipment.

11.2 SR–20C IF Amplifier/Detector Circuit Board Adjustments, 800–293A

WARNING

AC LINE VOLTAGE IS PRESENT ON THE POWER SUPPLY TERMINAL STRIPS.
DO NOT TOUCH THE TERMINAL STRIPS DURING THE FOLLOWING
ADJUSTMENT.

1. Connect the RF signal generator to the ANTENNA input. Adjust the signal generator for; 1) the desired operating frequency, 2) an output level of 4 mV, and 3) no modulation.
2. Connect a voltmeter between IC5–13 and ground.
3. Adjust coil L4 for a +5.0 v dc indication on the multimeter.
4. Connect a voltmeter between J2–3 and ground.
5. Adjust potentiometer R14 for a +4.0V dc indication on the multimeter.



6. Connect the distortion analyzer to the receiver audio output at J2 on the accessory terminal strip circuit board.
7. Adjust the RF signal generator for: 1) an output level of 100 uV and 2) modulation using a 400 Hz tone with a 50 KHz deviation. The deviation will vary depending on the bandwidth of the unit.
8. Adjust the primary and secondary coils of T1 for minimum distortion and maximum output level on the analyzer.
9. Remove the test equipment.

11.3 SR-20M AUDIO CIRCUIT BOARD, 913-2137 (DE-EMPHASIS ADJUSTMENT)

WARNING

AC LINE VOLTAGE IS PRESENT ON THE POWER SUPPLY TERMINAL STRIPS.
DO NOT TOUCH THE TERMINAL STRIPS DURING THE FOLLOWING
ADJUSTMENT.

1. Connect an audio analyzer to the monophonic audio output at J1 on the circuit board.
2. Set pre-emphasis at JP5 and JP6 on **transmitter** audio board 800-285 to 75 μ s as shown on Drawing 800-285 of the **transmitter** instruction manual.
3. Refer to the **receiver** component locator drawing 597-8105-4 and set de-emphasis switches S1 and S2 on audio circuit board 913-2137 to 75 μ s.
4. Modulate the transmitter 100% with a 15 KHz tone. Operate the MONO PROGRAM LEVEL control for exactly -7 dBm on the analyzer.
5. Lower the audio signal generator frequency to exactly 400 Hz at the exact same level into the transmitter.
6. The receiver audio output level meter should read +10 dBm \pm 0.25 dBm. If not, adjust R4 on the receiver audio circuit board assembly 913-2137 for exactly +10 dBm.
7. Remove the test equipment.

11.4 SR-20C AUDIO CIRCUIT BOARD, 913-2135

WARNING

AC LINE VOLTAGE IS PRESENT ON THE POWER SUPPLY TERMINAL STRIPS.
DO NOT TOUCH THE TERMINAL STRIPS DURING THE FOLLOWING
ADJUSTMENT.

This circuit board has been thoroughly tested and adjusted at the factory. Only movement of jumper plugs to change between "COMPOSITE MODE", "MONO MODE", and de-emphasis options should be



necessary in the field. Refer to component locator drawing 597–8105–5 for JP (jumper plug) locations and schematic 913-2135 for NOTES on JP programming.

11.4.1 Monophonic Mode

To select monophonic (single program audio channel) mode, place jumper plugs at positions 2, 4, 5, and 7 (not used). These jumpers are used to select subcarrier operation with monophonic mode operation. With mono mode operation, subcarriers from 26 kHz to 110 kHz can be used.

11.4.2 De–Emphasis

In mono mode the user can select de–emphasis of 0, 25, 50 or 75 μ s. The U.S. standard is 75 μ s, the European is 50 μ s, and some users prefer zero or 25 μ s for various reasons. The emphasis selection must be the same for the transmitter and receiver.

De–Emphasis in μ (microseconds)	Jumper Plug(s)
0	remove 9 & 10
25	9 only
50	10 only
75	9 & 10

11.5 Factory Calibration of De–Emphasis (mono mode)

WARNING

AC LINE VOLTAGE IS PRESENT ON THE POWER SUPPLY TERMINAL STRIPS.
DO NOT TOUCH THE TERMINAL STRIPS DURING THE FOLLOWING
ADJUSTMENT.

1. Connect an audio analyzer to the monophonic audio output at J1 on the accessory terminal strip circuit board.
2. Set pre–emphasis jumper plugs on **transmitter** processor board 800–285 to 75 μ s as shown on Drawing 800–285 of the **transmitter** instruction book.
3. Refer to the **receiver** component locator drawing 597–8105–5 and select 75 μ s on the 913-2135 circuit board by inserting jumper plugs 9 and 10.
4. Modulate the transmitter 100% with a 15 KHz tone. Operate the MONO PROGRAM LEVEL control for exactly –7 dBm on the analyzer.
5. Lower the audio signal generator frequency to exactly 400 Hz at the exact same level into the transmitter.
6. The audio analyzer should read +10 dBm \pm 0.25 dB. If not, adjust R22 on the audio circuit board for exactly +10 dBm.
7. Remove the test equipment.



11.6 Composite Mode

To select the "COMPOSITE" stereo mode, place jumper plugs (JP) at positions 1, 3, 6, and 8 (not used). These jumpers are used to select subcarrier operation with composite mode operation. With composite mode operation, subcarriers from 85 kHz to 110 kHz can be used.

11.7 Power Supply/Meter Calibration

1. Connect a voltmeter between TP-17 and ground on the front panel circuit board.

WARNING

AC LINE VOLTAGE IS PRESENT ON THE POWER SUPPLY TERMINAL STRIPS.
DO NOT TOUCH THE TERMINAL STRIPS DURING THE FOLLOWING
ADJUSTMENT.

2. Adjust SVR1 on the power supply for a +12V dc indication on the multimeter.
3. Operate the multimeter switch to POWER SUPPLY.
4. Adjust R65 on the front panel circuit board for a 12V indication on the multimeter.
5. Remove the test equipment.



12 SR-20C BILL OF MATERIAL

This section provides parts lists for the SR-20C. The parts lists provide descriptions and part numbers of electrical components, assemblies, and selected mechanical parts required for maintenance. Each parts list entry in this section is indexed by reference designators appearing on the applicable schematic diagrams.

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	SR20C-xxx-250	SR-20C,xxx-xxx MHZ,STL REC,250 KHZ REC BW,110/220V		
..1	339-0008	FILTER,RFI,3A 250VAC 50/60HZ	1	
..1	400-0600	STRIP,QUIET SHIELD,6.00x.197	1	
..1	402-0005	PRESS CLIP,NYLON W/ADHESIVE BACK	3	
..1	403-0001	FOOT,RUBBER-COMPACT CASE	4	
..1	420-0817	ASSY,FEMALE SCREWLOCK 205817-1	4	
..1	420-2105	SCREW,2-56X.312,S.S. PH SC	2	
..1	420-3706	SCREW,M3 X 6,PHILLIPS PAN HEAD,SS	2	
..1	420-4105	SCREW,4-40X.312,S.S. PH	2	
..1	421-0102	10-32 KEP NUT	1	
..1	421-4008	4-40 KEP NUT	2	
..1	421-8028	NUT,JAM,1/2-28 UNEF-2B	1	
..1	422-6106	SCREW,SEMS 6-32 X 3/8 PAN PH. ST."	5	
..1	423-9002	WASH,INT TOOTH,1/2	1	
..1	469-0021	FINGER STOCK,LAIRD 97-550,24 LONG"	1.195	
..1	469-0022	FINGER STOCK,LAIRD 97-654,12 LONG"	0.1	
..1	471-5347	ENCLOSURE,CONVERTER,MARTI SR SERIES RECEIVERS (NOTE)	1	
..1	471-5353	PANEL,REAR,SR20C/SR20M	1	
..1	471-5354	COVER,SR20C/SR20M	1	
..1	471-5355	CHASSIS,SR20C/SR20M	1	
..1	471-5385	FILLER,REAR,SRPT-30	1	
..1	500-187	Screw, #6 x 1/4 phillips pan head S/M type A black zinc	8	
..1	500-188	Screw, 4-40 x 3/8 phillips,flat head,black oxide"	2	
..1	500-210	Screw,SEMS 4-40x1/4 Phil Pan Head MS Blk Zinc(external lock)	67	
..1	540-0018	POWER SUPPLY, 40 WATT, 12 VOLT	1	
..1	550-015	Connector, UG-625B/U BNC receptacle Amphenol 31-236 *NOTE*	3	
..1	586-101	Cable Assy, Input Filter Bd STL10/R10/R15C/STL15C (SBCM)	1	
....2	550-126	Connector, crimp terminal pin Molex 08-50-0187	3	
....2	550-183	Connector, 3 pin Molex housing 09-50-8030	1	
....2	580-053	Wire, UL1061 22/7 OTC White/Black	0.4	
....2	580-062	Wire, UL1061 22/7 OTC Yellow/Slate	0.4	
....2	580-064	Wire, UL1061 22/7 OTC Yellow/Orange	0.4	

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
..1	594-0503	LABEL, DANGER-HAZARDOUS VOLTAGE	2	
..1	594-0505	LABEL, WARNING-ONLY AUTHORIZED PERSONNEL	1	
..1	700-226-3	Bracket, STL-10/Rec. Rack	2	
..1	800-193AD	SR30/SR40A/SR20M/SR20C I/O PCB (SBCM)	1	
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	13	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C15, C16
....2	270-220	Cap, monolithic chip, 22 pf 50v 5% KEMET C1206C220J5GACTR	3	C12, C13, C14
....2	310-014	TRANSFORMER, AUDIO, MIDCOM 671-9041 TECATE VFT 950-0394	1	T1
....2	330-018	INDUCTOR, 10 uH, 10%	14	L1, L2, L3, L4, L5, L7, L8, L9, L11, L12, L13, L14, L15, L16
....2	330-019	INDUCTOR, 2.5 TURN, HIGH FREQUENCY SUPPRESSION	2	L6, L10
....2	340-0004	SW,JUMPER PROGRAMMABLE	5	JP1, JP1, JP2, JP1, JP1
....2	500-162	Screw, 4-40 x 7/16 phillips pan head MS zinc plated"	2	
....2	550-123	Connector, 10 pin header (cut from 550-162)	1	P1
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.417	
....2	550-136	Connector, 6 pin Molex header (cut from 550- 162)	2	P2, P3
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.25	
....2	550-170	Connector, D-Sub 15 pin angle	1	J4
....2	550-184	Connector, 1 dual pin header (cut from 550- 316)	1	JP2
.....3	550-316	HEADER, BREAKAWAY 40x2, 0.1 SPACING"	0.025	
....2	550-185	Connector, 5 dual pin header (cut from 550- 316) (note)	1	JP1
.....3	550-316	HEADER, BREAKAWAY 40x2, 0.1 SPACING"	0.125	
....2	550-186	Connector, 3 pin Molex header (cut from 550- 162)	1	P4
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.125	
....2	800-193B	PC Board, I/O Filter STL-10 R-10	1	PCB
..1	800-207-250	FILTER, ASSEMBLY 250 KHZ	1	
....2	255-161	CAPACITOR, 160 PF 300V 5% SIVLER MICA	1	C1A
....2	255-241	Capacitor, 240 pf 500v 5% silver mica CD10FD241J03	2	C3A, C4A
....2	255-470C	CAP, 47pF 5% 200V CERAMIC DIPPED	1	C5
....2	256-131	CAPACITOR, 130 pF 5% 50V NPO DISC	1	C6
....2	256-151	CAPACITOR, 150 pF 5% NPO DISC	1	C2B
....2	350-025	INDUCTOR, 1.5 - 3 UH WITH SHIELD CAN #47271-021	3	L1, L2, L3
....2	360-037	FILTER, LC 250 KHZ	1	FL1
....2	421-6008	6-32 KEP NUT	2	
....2	550-084	CONNECTOR,PHONO JACK,PCB MOUNT	2	J1, J2



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	800-207B	PC Board, IF Filter R Receiver	1	PCB
..1	800-293A	R-15C IF Amp/FM Detector (SBCM)	1	
....2	100-1041	RES,1K OHM,1/4W,1%	4	R3, R21, R44, R48
....2	100-1051	RES,10K OHM,1/4W,1%	6	R15, R33, R34, R38, R41, R50
....2	100-2041	RES,2K OHM,1/4W,1%	5	R20, R29, R30, R31, R32
....2	101-502	POT,5K,SINGLE TURN,HORIZONTAL PCB MOUNT	1	R37
....2	103-1062	RES,100K OHM,1/4W,1%,METAL	1	R16Replaced 145-104 on 04/04/2003 10:39:09
....2	103-2241	RES,2.21K OHM,1/4W,1%,METAL	3	R4, R6, R12Replaced 145-222 on 03/27/2003 13:54:18
....2	103-2744	RES,2.74K OHM,1/4W,1%,METAL	1	R51
....2	103-3324	RES,3.32K OHM,1/4W,1%,METAL	2	R1, R7
....2	103-4741	RES,4.75K OHM,1/4W,1%,METAL	3	R13, R24, R39Replaced 145-472 on 05/14/2003 09:24:22
....2	103-4753	RES,475 OHM,1/4W,1%,METAL	2	R5, R10
....2	103-9031	RES,909 OHM,1/4W,1%,METAL	2	R2, R8
....2	104-105	POTENTIOMETER, 1MEG OHM TOP ADJUST	1	R26
....2	145-101	RESISTOR, 100 OHM 1/4 WATT 1% METAL FILM MEPCO SFR25	1	R35
....2	145-101-C	RESISTOR, 100 OHM 1/4 WATT 5% CARBON COMP 30BJ250	2	R17, R49
....2	145-122-1	Resistor, 1.2k ohm 1/4 watt 1% CCF07 1.2K MF TR	1	R36
....2	145-153-C	Resistor, 15k ohm 1/4 watt 5% carbon comp 30BJ250	1	R25
....2	145-184-1	RESISTOR, 180K OHM 1/4 WATT 2% RL07S184G	2	R27, R28
....2	145-300	Resistor, 30 ohm 1/4 watt 5% metal film Mepco SFR	2	R43, R46
....2	145-363-1	Resistor, 36k ohm 1/4 watt 1% RL07S363G	2	R19, R23
....2	145-364-1	RESISTOR, 360K OHM 1/4 WATT 1% CARBON FILM	1	R45
....2	145-431	Resistor, 432 ohm 1/4 watt 1% metal film Mepco SFR25	1	R11
....2	145-470	Resistor, 47.5 ohm 1/4 watt 1% metal film Mepco SFR25	3	L3, R9, R40
....2	145-470-C	Resistor, 47 ohm 1/4 watt 5% carbon comp 30BJ250	1	R47
....2	177-5050	RES,TRMR,50K,10%,TOP ADJ 3299Y	1	R14
....2	210-2857	TRANSISTOR, 2N2857	2	Q1, Q2
....2	212-0310	TSTR,FET N CHAN RF J3100	3	Q3, Q4, Q6
....2	215-153	CAPACITOR, .015 UF 2.5% 100V POLYPRO	1	C36
....2	215-242	CAPACITOR, .0024 UF 2.5% 100V POLYPRO	1	C33
....2	215-301	CAPACITOR, 300 PF 2.5% 100V POLYPRO	1	C26



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	217-103	CAP,0.1UF 250VDC 5%,POLY FILM	8	C9, C12, C14, C28, C32, C41, C57, C59
....2	217-104	CAPACITOR, .01 UF 50V GMV DISC	11	C1, C2, C3, C4, C7, C8, C10, C15, C47, C50, C52
....2	219-102	CAPACITOR, ELECTROLYTIC 1000uF 16V	7	C13, C24, C25, C40, C61, C62, C63
....2	219-106	CAPACITOR, 10UF 50V RADIAL ELECTROLYTIC	1	C31
....2	219-221	CAPACITOR, ELECTROLYTIC 220uF 25V RADIAL	1	C11
....2	220-101	CAPACITOR, 100 MFD RADIAL 25V	1	C70
....2	221-5532-001	IC,NE-5532AN	2	IC1, IC2Replaced 405-532 on 05/21/2009 14:50:38
....2	255-030-1	CAPACITOR, 3 pF 5% NPO DISC	1	C35
....2	255-050	CAPACITOR, 5 pF 5% NPO DISC	1	C34
....2	255-161	CAPACITOR, 160 PF 300V 5% SIVLER MICA	1	C66
....2	255-270	CAPACITOR, 27 PF, 5%, NPO, DISC	1	C42
....2	255-390C	Capacitor, 39pF 5% 200V ceramic dipped C322C390J2G5CA	5	C23, C29, C30, C39, C65
....2	255-470C	CAP, 47pF 5% 200V CERAMIC DIPPED	2	C17, C38
....2	256-131	CAPACITOR, 130 pF 5% 50V NPO DISC	1	C16
....2	256-680C	Cap., 68pF 5% 200V ceramic dipped Kemet C317C680J2G5CA	1	C68
....2	268-203	CAPACITOR, .02 UF 50V Z5U DISC	8	C5, C6, C21, C22, C44, C49, C51, C53
....2	270-010	Capacitor,monolithic chip, 1pF 50V 5% Kemet C1206C109C5GACTR	1	C45
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	1	C60
....2	270-220	Cap, monolithic chip, 22 pf 50v 5% KEMET C1206C220J5GACTR	1	C69
....2	270-270	Capacitor, monolithic chip 27 pf 50v 5% Kemet C1206C270J5GAC	1	C67
....2	290-521	CAP, VARIABLE, 5-25 pf	3	C43, C46, C48
....2	290-522	CAP, VARIABLE, 3-10 PF	2	C55, C58
....2	290-525	Capacitor, variable trimmer 9-50 pF Xicon #24AA024	2	C18, C64
....2	299-470	CAP, TANTALUM, 4.7 UF 16V	1	C19
....2	330-012	Inductor, 15 uH Coilcraft 90-27	4	L1, L2, L8, L9
....2	330-021	INDUCTOR, 3.3uH AXIAL LEAD CHOKE	1	R42
....2	350-030	INDUCTOR, 3.0 - 7 UH W/SHIELD CAN #47271-023	1	L4
....2	350-040	INDUCTOR, 6 1/2 TURN BLUE	3	L5, L6, L7
....2	350-123	Detector, SNY-074-1919A (235SU1)	1	T1
....2	350-124	MIXER, SBL-1	1	X1
....2	360-033	FILTER, CERAMIC 10.7 MHZ	2	CF1, CF2
....2	401-235	INTEGRATED CIRCUIT, SANYO LA1235	1	IC5
....2	402-604	IC, LOW NOISEOP-AMP, DUAL FET-INPUT	2	IC3, IC4
....2	412-494	DIODE, GERMANIUM 1N270 (note)	2	D1, D2
....2	417-1604	SKT,16-PIN,DIP	1	1C5



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	430-211	TRANSISTOR, N-CHANNEL DUAL GATE MOSFET, MFE211	1	Q5
....2	550-084	CONNECTOR,PHONO JACK,PCB MOUNT	3	J1, J3, J4
....2	550-123	Connector, 10 pin header (cut from 550-162)	1	P1
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.417	
....2	550-136	Connector, 6 pin Molex header (cut from 550-162)	1	P2
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.25	
....2	550-193	CONNECTOR, S.FL2-R-SMT SURFACE MOUNT	2	J2, J5
....2	800-293B	PC Board, IF Amp/FM Detector	1	PCB
..1	913-2133	SR-20M/C ACCESSORY TERMINAL BUS BD (SBCM)	1	
....2	412-1600	BARR STP,16 POS,BEAU	1	J2
....2	417-1513	RCPT,15 PIN D, FEMALE	1	J1
....2	513-2133	PCB, MACH, SR-20M/C ACC TERM BUS BD	1	
..1	913-2135	ASSY,PCB,SR20C AUDIO PROCESSING BD.(SBCM)	1	
....2	006-1006	CAP,47 uF,Electrolytic,63V,SMD (NOTE)	14	C11, C17, C18, C19, C98, C38, C46, C72, C73, C74, C75, C76, C94, C95
....2	006-1045	CAP,LYTIC,1.0uF,50V,20%,SMD	2	C12, C23
....2	006-2285-500	CAP,ELECTRO,220UF,20%,50V,SMD	7	C97, C10, C21, C24, C44, C45, C99
....2	007-1024-100	CAP,CER,1000PF,1%,100V,1206,SMD	4	C8, C51, C81, C90
....2	007-1034-001	CAP,CER,.01UF,10%,50V,0603,SMD	10	C20, C26, C27, C42, C47, C48, C50, C63, C64, C65
....2	007-1310-050	CAP,CER,130 PF,5%,50V,0805,SMD	1	C61
....2	007-1503-050	CAP,1500PF,0805,5%,50V	1	C9
....2	007-1512-500	CAP,CER,150pF,50V,2%,SMD	4	C14, C56, C60, C92
....2	007-1610-050	CAP,CER,160 PF,5%,50V,0805,SMD	1	C83
....2	007-1803-050	CAP,1800PF,0805,5%,50V	1	C91
....2	007-2202-051	CAP,CER,22PF,5%,50V,0603,SMD	2	C34, C40
....2	007-2224-500	CAP,CER,.0022uF,50V,10%,SMD	1	C28
....2	007-2412	CAP,CER,240pF,50V,2%,SMD	1	C35
....2	007-2702-500	CAP,CER,27pF,50V,2%,SMD	3	C31, C54, C78
....2	007-2714-500	CAP,CER,270pF,50V,10%,SMD	6	C29, C30, C32, C33, C37, C55
....2	007-3313	CAP,CER,330pF,50V,5%,SMD	1	C13
....2	007-3610-050	CAP,CER,360 PF,5%,50V,0805,SMD	2	C80, C82
....2	007-3913-049	CAP,CER,39PF,5%,50V,0603,SMD	5	C59, C66, C67, C69, C87
....2	007-3923-100	CAP,CER,3900PF,5%,100V,1206,SMD	1	C43
....2	007-4703-050	CAP,CER,47 PFD,5%,50V,0603,SMD	2	C68, C70
....2	007-4713-050	CAP,CER,470 PFD,5%,50V,1206,SMD	2	C22, C25
....2	007-5603-050	CAP,5600PF,0805,5%,50V	1	C4
....2	007-6213-500	CAP,CER,620pF,50V,5%,SMD	1	C100
....2	007-6802	CAP,CER,680PF,50V,2%,SMD	3	C36, C39, C41

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	007-6803-050	CAP,6800PF,0805,5%,50V	1	C6
....2	007-6812-001	CAP,CER,68PF,5%,50V,0603,SMD	2	C71, C85
....2	007-7500-050	CAP,CER,75 PF,5%,50V,0805,SMD	2	C53, C58
....2	102-0100	RES,CHIP,10.0 OHMS,1/10W,1%,SMD	4	R54, R62, R63, R106
....2	102-1001	RES,CHIP,1.00K OHMS,1/10W,1%,SMD	3	R6, R93, R116
....2	102-1002	RES,CHIP,10.0K OHMS,1/10W,1%,SMD	15	R50, R55, R70, R71, R73, R75, R76, R79, R80, R81, R83, R86, R87, R98, R104
....2	102-1003	RES,CHIP,100K OHMS,1/10W,1%,SMD	15	R11, R12, R17, R18, R25, R29, R30, R33, R37, R66, R67, R90, R91, R102, R103
....2	102-1004	RES,CHIP,1.00M OHMS,1/10W,1%,SMD	2	R114, R115
....2	102-1212	RES,CHIP,12.1K OHMS,1/10W,1%,SMD	1	R84
....2	102-1214	RES,CHIP,1.21K OHM,1/10W,1%	3	R35, R39, R42
....2	102-1553	RES,CHIP,15.0K OHMS,1/10W,1%,SMD	1	R48
....2	102-1825	RES,CHIP,18.2 K OHM,1/10W,1%	7	R43, R44, R45, R49, R78, R99, R100
....2	102-2001	RES,CHIP,2.00K OHMS,1/10W,1%,SMD	11	R2, R9, R10, R13, R14, R15, R16, R19, R20, R34, R38
....2	102-2212	RES,CHIP,22.1K OHMS,1/10W,1%,SMD	5	R28, R32, R36, R64, R65
....2	102-2214	RES,CHIP,2.21K OHM,1/10W,1%	1	R74
....2	102-2353	RES,CHIP,23.7K OHMS,1/10W,1%,SMD	1	R21
....2	102-3321	RES,CHIP,3.32K OHMS,1/10W,1%,SMD	1	R31
....2	102-3322	RES,CHIP,33.2 K,1/10W,1%,SMD	3	R41, R47, R52
....2	102-4711	RES,CHIP,475 OHMS,1/10W,1%,SMD	5	R58, R59, R60, R61, R108
....2	102-4731	RES,475K OHM,1/10W,1%,SMD	1	R56
....2	102-4751	RES,CHIP,4.75K OHMS,1/10W,1%,SMD	6	R1, R3, R5, R7, R72, R107
....2	102-4755	RES,CHIP,47.5K OHM,1/10W,1%	2	R26, R27
....2	102-5622	RES,5.62K OHM,1%,1/10W,SMD	4	R46, R51, R53, R57
....2	102-6811	RES,CHIP,6.81K,1/10W,1%,SMD	3	R77, R82, R23
....2	102-8251	RES,8.25K OHMS,1/10W,1%,SMD	1	R101
....2	102-8252	RES,82.5K OHM,1/10W,1%	1	R112
....2	102-8872	RES,88.7 OHM,1/10W,1%	1	R109
....2	102-9094	RES,CHIP,9.09K OHM,1/10W,1%	1	R111
....2	198-0502	TRMR,5K,TOP ADJUST,SMD	1	R8
....2	198-1054	TRMR,10K OHMS,TOP ADJ,SMD (N)	2	R113, R22
....2	198-2004	TRMR,20K OHMS,TOP ADJ,SMD	1	R4
....2	198-2024	TRMR,2K OHMS,TOP ADJUST,10 TURN,SMD	1	R110
....2	219-102	CAPACITOR, ELECTROLYTIC 1000uF 16V	5	C5, C7, C52, C57, C88
....2	224-1877	IC,HDPHONE AMP,DUAL,LM1877M-9,14-PIN,SMD	1	IC1
....2	224-2604	IC,OP-AMP,DUAL FET,LOW DISTORTION,SMT	6	IC6, IC7, IC8, IC9, IC10, IC11
....2	290-525	Capacitor, variable trimmer 9-50 pF Xicon #24AA024	1	C96



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	330-024	Inductor, 10uH SMT DN12103JTR-ND DELEVAN 5%	1	L1
....2	340-0004	SW,JUMPER PROGRAMMABLE	5	P3A, P3B, P4, P9A, P9B
....2	401-275	IC,SMT,OP-AMP,LOW NOISE,HIGH AUDIO BW	4	IC2, IC3, IC4, IC5
....2	412-494	DIODE, GERMANIUM 1N270 (note)	2	D1, D2
....2	513-2135	ASSY,MACH,SR20C AUDIO PROCESSING	1	
....2	550-123	Connector, 10 pin header (cut from 550-162)	2	J1, J2
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.417	
....2	550-191	Conn,2 dual pin header(cut from 550-316 Molex 10-89-1801)	2	J4, J9
.....3	550-316	HEADER, BREAKAWAY 40x2, 0.1 SPACING"	0.05	
....2	550-197	Header, Breakaway 4x2,0.1 Spacing(Cut from 550-316)"	1	J3
.....3	550-316	HEADER, BREAKAWAY 40x2, 0.1 SPACING"	0.1	
..1	943-2132	ASSY,WIRE HARNESS,SR-20C (SBCM)	1	
....2	402-0051	TY-RAP, W/FLAG	18	
....2	410-1489	LUG,TERM #6 SPADE #16-22	5	
....2	417-0096	PLUG,POLARIZING	4	
....2	417-0131	CONN,16 PIN 609-1630 ANSLEY	1	
....2	417-0142	PIN,.050 DIA 26-22 745254-3	10	
....2	417-1500	PLUG,15 PIN	1	
....2	417-2026	CONN, POLARIZED WIREMOUNT SOCKET, .100 PITCH"	1	
....2	417-2116	CONN,POLARIZED,WIRE,.1 IN,16-PIN	1	
....2	417-5500	CONNECTOR, PHONE PLUG, SWITCHCRAFT 3501MX	3	
....2	418-0034	PLUG,BNC DUAL CRIMP 1-227079-6	1	
....2	418-0609	CONN,25 PIN RIBBON CABLE	1	
....2	418-0615	CONN,15-PIN D-TYPE,RIBBON CABLE	1	
....2	418-2600	CONN,26-PIN,RIBBON	1	
....2	500-128	Eyelet, GS4-4 brass	3	
....2	512-020	TERMINAL,NICHIFU TMDN #125-250-03FA TERMINAL	3	
....2	550-122	CONNECTOR, 10 PIN MOLEX HOUSING 09- 50-8100	4	
....2	550-135	Connector, 6 pin Molex housing 09-50-8060	3	
....2	550-327	Connector, Crimp Terminal Pin Molex 08-52- 0112	41	
....2	580-033-1	Coax RG-188A/U Teflon 95% Shield M4256 TFE Tape Wrap	1.19	
....2	580-088	Shielded Wire, 16-C-22-SPJ White/Red 1 Cond. 22/19x34 pvc	17.06	
....2	600-0016	CBL,FLAT,16-COND,28GA	1.062	
....2	600-0026	CBL,FLAT,26-COND,28GA	1.5	
....2	601-1800	WIRE,AWG18 19/30 BLK	1.25	
....2	601-2209	WIRE,AWG22,19/34 WHT	52.42	
..1	953-2131-002	ASSY,SR-20C FRONT PANEL (SBCM)	1	
....2	193-0500	POT,500 OHMS,PCB MOUNT,LINEAR,HD AUDIO	1	r87



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	310-0078	METER,MULTI,2 IN, SR-20C	1	M1
....2	323-2124	LED INDICATOR,GRN,RECTANGULAR	4	D1, D4, D5, D7
....2	323-3124	IND,LED,YEL	1	D6
....2	417-0311	JACK,SWCRFT #N-112B 3COND.	1	J14
....2	471-5357	PANEL,FRONT,SR20C	1	
....2	500-210	Screw,SEMS 4-40x1/4 Phil Pan Head MS Blk Zinc(external lock)	8	
....2	510-005	Polytube, Manhattan#AF155A-20-yel	0.5	
....2	510-212	CONTROL KNOBS, #45KNO23	2	
....2	913-2131-002	SR-20C,FRONT PANEL PCB (SBCM)	1	
.....3	006-1085	CAP,ELECTRO,100 UF,10%,35V,SMD	4	C59, C62, C66, C69
.....3	007-1022	CAP,CER,100pF,50V,2%,SMD	1	C72
.....3	007-1024	CAP,CER,.001uF,50V,10%,SMD	2	C64, C71
.....3	007-1044	CAP,CER,0.1uF,50V,10%,SMD note	42	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C57, C77, C78, C79, C80, C81, C84, C87, C89, C92, C94, C96, C98, C102, C104, C107, C110
.....3	007-1054	CAP,CER,1uF,50V,10%,SMD	4	C58, C61, C65, C68
.....3	007-1512	CAP,CER,15pF,50V,2%,SMD	7	C50, C51, C52, C83, C91, C100, C101
.....3	007-1512-500	CAP,CER,150pF,50V,2%,SMD	9	C49, C53, C54, C55, C56, C86, C106, C109, C112
.....3	007-3923	CAP,CER,390pF,100V,5%,SMD	2	C63, C70
.....3	007-6213-500	CAP,CER,620pF,50V,5%,SMD	1	C48
.....3	070-1054	CAP,TANT,1uF,35V,10%,SMD	28	C28, C29, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C82, C85, C88, C90, C93, C95, C97, C99, C103, C105, C108, C111
.....3	070-2265-L25	CAP,TANT,22 MFD,20%,25V, E CASE,LOW ESR,SMD	5	C33, C60, C67, C73, C74
.....3	101-1003	RES,CHIP,100.0 K OHM,1%,1/8W,1206,SMD	2	R66, R99
.....3	102-0000	RES,CHIP,0 OHM,0805,SMD	2	R40, R69
.....3	102-1000	RES,CHIP,100 OHMS,1/10W,1%,SMD	3	R57, R83, R113
.....3	102-1001	RES,CHIP,1.00K OHMS,1/10W,1%,SMD	24	R33, R34, R35, R36, R37, R38, R50, R51, R67, R68, R71, R72, R73, R76, R78, R80, R81, R82, R104, R106, R108, R111, R115, R116
.....3	102-1002	RES,CHIP,10.0K OHMS,1/10W,1%,SMD	4	R91, R92, R97, R117



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
.....3	102-1003	RES,CHIP,100K OHMS,1/10W,1%,SMD	2	R41, R70
.....3	102-1102	RES,CHIP,11.0K OHMS,1/10W,1%,SMD	2	R77, R114
.....3	102-1212	RES,CHIP,12.1K OHMS,1/10W,1%,SMD	1	R94
.....3	102-1582	RES,CHIP,15.8 K, 1/10 W, 1%	1	R95
.....3	102-1780	RES,CHIP,178 OHMS,1/10W,1%,SMD	5	R39, R42, R43, R44, R45
.....3	102-2002	RES,CHIP,20.0K OHMS,1/10W,1%,SMD	2	R86, R112
.....3	102-2323	RES,23.2K OHMS,1/10W,1%,SMD	2	R79, R103
.....3	102-2431	RES,CHIP,2.43K OHMS,1/10W,1%,SMD	2	R74, R107
.....3	102-3011	RES,CHIP,3.01K OHMS,1/10W,1%,SMD	1	R64
.....3	102-3012	RES,CHIP,30.1K,1/10W,1%,SMD	2	R93, R102
.....3	102-4532	RES,CHIP,45.3K OHMS,1/10W,1%,SMD	3	R84, R88, R105
.....3	102-4711	RES,CHIP,475 OHMS,1/10W,1%,SMD	5	R46, R47, R48, R49, R52
.....3	102-4751	RES,CHIP,4.75K OHMS,1/10W,1%,SMD	40	R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R59, R60, R61, R62, R63, R118, R119, R120
.....3	102-5041	RES,4.99K OHM,1/10W,1%	2	R89, R96
.....3	102-5231	RES,5.23K OHM,1/10W,1%	2	R75, R109
.....3	102-6041	RES,6.04K OHMS,1/10W,1%,SMD	1	R58
.....3	102-6811	RES,CHIP,6.81K,1/10W,1%,SMD	1	R101
.....3	102-8164	RES,CHIP,8.66K OHM, 1/10W, 1% ,CR21-8661F-T	1	R90
.....3	102-9095	RES,90.9K OHM,1/10W,1%,SMD	2	R85, R110
.....3	102-9311	RES,9.31K OHMS,1/10W,1%,SMD	1	R100
.....3	185-162K	RES,162K OHM,1%,0.25W,1206	1	R98
.....3	185-68.1	Resistor, SMT, size 1206, 68.1 ohms, Dale CRCW1206-68.1	4	R53, R54, R55, R56
.....3	197-1034	TRMR,10K OHMS,SIDE ADJ,5 TURN,SMD	1	R65
.....3	204-0130	SCHOTTKY BARRIER RECTIFIER 1 AMP 30V CASE 403A SMD	2	D9, D12
.....3	204-0340	DIODE,RECTIFIER,SCHOTTKY,MBRS340T3, 403-03 CASE,SMD	1	D14
.....3	204-0914	DIODE,SWITCHING,MMBD914LT1,SMD	2	D10, D13
.....3	224-0333	SWITCH,QUAD,ADG333ABRS,20-PIN SSOP,SMD	4	U22, U23, U29, U30
.....3	224-5206	DIG POT,6 CH,10K,AD5206BRU10,24-PIN TSSOP,SMD	1	U21
.....3	227-1576	VR, LT1576IS8, SWITCHER, 1.5A, SMD	2	U13, U14
.....3	270-0066	REL,DPDT,12VDC,DIP	1	K1
.....3	270-101	Cap., monolithic chip, 100 pf 50v 5% Kemet C1206C101J5GAC	1	C75
.....3	270-682	CAPACITOR, SMT, 1206, 6800 PF, 5%	1	C76
.....3	340-0169	SWITCH,ROCKER,PCB MOUNTING,SMALL BLACK RECTANGULAR CAP	4	S11, S12, S13, S15

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
.....3	350-197	INDUCTOR, SMT, POWER, 1uH	2	L2, L4
.....3	350-201	INDUCTOR, SMT, 1812, 82NH	1	L6
.....3	360-0125	IND, 68 UH, 1.5A, SMD	2	L1, L3
.....3	366-0010-001	IND,10UH,1.5A	1	L5
.....3	400-106	IC, Inverter, Open-drain Gate	4	U8, U9, U10, U11
.....3	400-196	IC, SMT, 1.5A STEP-UP REGULATOR	1	U24
.....3	401-164	IC, SMT, 8-Bit Ser In, Par Out SR Phillips 74HC164D	3	U5, U6, U25
.....3	401-165	IC, 8-Bit Ser/Par In, Ser Out SR Phillips 74HC165D	5	U1, U2, U3, U4, U20
.....3	401-275	IC,SMT,OP-AMP,LOW NOISE,HIGH AUDIO BW	9	U15, U16, U17, U18, U19, U27, U28, U31, U32
.....3	401-374	IC, OCTAL D FLIP-FLOP W 3-ST OUT	3	U7, U12, U26
.....3	411-914	DIODE, SMD 1N4148	1	D15
.....3	413-1206	CHIP,TEST POINT,1206,SMD	19	TP1, TP2, TP3, TP4, TP5, TP6, TP8, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21
.....3	417-0182	CONN,HDR,26 PIN,LATCHED	1	J2
.....3	417-0200	CONN,HEADER 20 PIN	0.2	J11
.....3	418-120	DIODE, SMT, 1A, SCHOTTKY RECTIFIER	1	D16
.....3	418-1601	CONN,MALE,16-PIN,LATCH,PCB MT	2	J1, J4
.....3	418-1601-001	CONN,MALE,16-PIN,LONG LATCH,PCB MT	1	J13
.....3	418-2602-001	CONN,HEADER,26 PIN,LATCH/EJECT,PCB	1	J3
.....3	418-451	Diode, SMT, Zener, 5.1V Motorola BZX84C5V1LT1	1	D11
.....3	426-4008	STOFF,PEM 4-40 KFSE-440-12	2	
.....3	439-041	TRANSISTOR, SMT, GENERAL PURPOSE, NPN	6	Q1, Q4, Q5, Q6, Q7, Q9
.....3	510-196	SUBMINIATURE LAMP, LUMEX IFL-LX2162- 16T	2	B1, B2
.....3	513-2131	PCB,BLANK,SR-20C/SR20M FRONT PANEL	1	
.....3	530-059	SWITCH, ROTARY	1	S2
.....3	530-064	SWITCH, MINIATURE TACT, PCB	1	S3
.....3	530-086	Switch, Dip, 4 Position, Right Angle, Apem DA04T	1	S1
.....3	530-091	Switch,Rotary Dip,SMT,BCD-10 Position Grayhill 94HAB10W	9	S16, S17, S18, S19, S20, S21, S22, S23, S24
....2	943-2130-001	ASSY,WIRE HARNESS,HEADPHONE,MARTI REC,FRONT PANEL (SBCM)	1	
.....3	402-0051	TY-RAP, W/FLAG	1	
.....3	417-0138	HSNG,MOD IV 4 POS 87499-7 AMP	1	
.....3	417-8766	CONTACT,CRIMP,MOD-IV 87809-1	3	
.....3	580-050	Wire, UL1061 22/7 OS-1 White/Red	0.25	
.....3	580-053	Wire, UL1061 22/7 OTC White/Black	0.25	
.....3	601-2209	WIRE,AWG22,19/34 WHT	0.25	
..1	973-0101	KIT,ACCESSORY,SR20M/SR20C	1	
....2	550-030	CONNECTOR, D-SUB 15 PIN FEMALE	1	



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	550-180	Connector, locking hood Keltron HD-15-10	1	
....2	580-116	Power Cord, Black Detachable Power Dynamics	1	
....2	973-9998	KIT,BIND+MAN,SR20M/SR20C	1	
.....3	597-8105	INSTRUCTION MANUAL, SR 20C/SR 20M STL RECEIVER	1	
.....3	598-0013	BINDER,MARTI,1 IN,BLUE,W CD POCKET	1	



13 SR-20M BILL OF MATERIAL

This section provides parts lists for the SR-20M. The parts lists provide descriptions and part numbers of electrical components, assemblies, and selected mechanical parts required for maintenance. Each parts list entry in this section is indexed by reference designators appearing on the applicable schematic diagrams.

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	SR20M-xxx-125	SR-20M,xxx-xxx MHZ,STL REC,125 KHZ REC BW,110/220V		
..1	339-0008	FILTER,RFI,3A 250VAC 50/60HZ	1	
..1	400-0600	STRIP,QUIET SHIELD,6.00x.197	1	
..1	402-0005	PRESS CLIP,NYLON W/ADHESIVE BACK	3	
..1	403-0001	FOOT,RUBBER-COMPACT CASE	4	
..1	420-0817	ASSY,FEMALE SCREWLOCK 205817-1	4	
..1	420-2105	SCREW,2-56X.312,S.S. PH SC	2	
..1	420-3706	SCREW,M3 X 6,PHILLIPS PAN HEAD,SS	2	
..1	420-4105	SCREW,4-40X.312,S.S. PH	2	
..1	421-0102	10-32 KEP NUT	1	
..1	421-4008	4-40 KEP NUT	2	
..1	421-8028	NUT,JAM,1/2-28 UNEF-2B	1	
..1	422-6106	SCREW,SEMS 6-32 X 3/8 PAN PH. ST."	5	
..1	423-9002	WASH,INT TOOTH,1/2	1	
..1	469-0021	FINGER STOCK,LAIRD 97-550,24 LONG"	1.195	
..1	469-0022	FINGER STOCK,LAIRD 97-654,12 LONG"	0.1	
..1	471-5347	ENCLOSURE,CONVERTER,MARTI SR SERIES RECEIVERS (NOTE)	1	
..1	471-5353	PANEL,REAR,SR20C/SR20M	1	
..1	471-5354	COVER,SR20C/SR20M	1	
..1	471-5355	CHASSIS,SR20C/SR20M	1	
..1	471-5385	FILLER,REAR,SRPT-30	1	
..1	500-187	Screw, #6 x 1/4 phillips pan head S/M type A black zinc	8	
..1	500-188	Screw, 4-40 x 3/8 phillips,flat head,black oxide"	2	
..1	500-210	Screw,SEMS 4-40x1/4 Phil Pan Head MS Blk Zinc(external lock)	63	
..1	540-0018	POWER SUPPLY, 40 WATT, 12 VOLT	1	
..1	550-015	Connector, UG-625B/U BNC receptacle Amphenol 31-236 *NOTE*	3	
..1	586-101	Cable Assy, Input Filter Bd STL10/R10/R15C/STL15C (SBCM)	1	
....2	550-126	Connector, crimp terminal pin Molex 08-50-0187	3	
....2	550-183	Connector, 3 pin Molex housing 09-50-8030	1	
....2	580-053	Wire, UL1061 22/7 OTC White/Black	0.4	
....2	580-062	Wire, UL1061 22/7 OTC Yellow/Slate	0.4	
....2	580-064	Wire, UL1061 22/7 OTC Yellow/Orange	0.4	
..1	594-0503	LABEL, DANGER-HAZARDOUS VOLTAGE	2	
..1	594-0505	LABEL, WARNING-ONLY AUTHORIZED PERSONNEL	1	



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
..1	700-226-3	Bracket, STL-10/Rec. Rack	2	
..1	800-193AD	SR30/SR40A/SR20M/SR20C I/O PCB (SBCM)	1	
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	13	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C15, C16
....2	270-220	Cap, monolithic chip, 22 pf 50v 5% KEMET C1206C220J5GACTR	3	C12, C13, C14
....2	310-014	TRANSFORMER, AUDIO, MIDCOM 671-9041 TECATE VFT 950-0394	1	T1
....2	330-018	INDUCTOR, 10 uH, 10%	14	L1, L2, L3, L4, L5, L7, L8, L9, L11, L12, L13, L14, L15, L16
....2	330-019	INDUCTOR, 2.5 TURN, HIGH FREQUENCY SUPPRESSION	2	L6, L10
....2	340-0004	SW,JUMPER PROGRAMMABLE	5	JP1, JP1, JP2, JP1, JP1
....2	500-162	Screw, 4-40 x 7/16 phillips pan head MS zinc plated"	2	
....2	550-123	Connector, 10 pin header (cut from 550-162)	1	P1
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.417	
....2	550-136	Connector, 6 pin Molex header (cut from 550- 162)	2	P2, P3
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.25	
....2	550-170	Connector, D-Sub 15 pin angle	1	J4
....2	550-184	Connector, 1 dual pin header (cut from 550- 316)	1	JP2
.....3	550-316	HEADER, BREAKAWAY 40x2, 0.1 SPACING"	0.025	
....2	550-185	Connector, 5 dual pin header (cut from 550- 316) (note)	1	JP1
.....3	550-316	HEADER, BREAKAWAY 40x2, 0.1 SPACING"	0.125	
....2	550-186	Connector, 3 pin Molex header (cut from 550- 162)	1	P4
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.125	
....2	800-193B	PC Board, I/O Filter STL-10 R-10	1	PCB
..1	800-208AE	IF AMPLIFIER - NARROW BAND (EXPORT)	1	
....2	360-032	FILTER, CERAMIC, 10.7MHZ	2	CF1, CF2
....2	800-208A	IF AMPLIFIER, AR/CR, GENERIC (SBCM)	1	
.....3	100-1041	RES,1K OHM,1/4W,1%	1	R5
.....3	100-1051	RES,10K OHM,1/4W,1%	2	R19, R20
.....3	100-1531	RES,150 OHM,1/4W,1%	2	R1, R2
.....3	103-2241	RES,2.21K OHM,1/4W,1%,METAL	3	R6, R8, R15
.....3	103-3324	RES,3.32K OHM,1/4W,1%,METAL	2	R3, R9
.....3	103-4741	RES,4.75K OHM,1/4W,1%,METAL	1	R16
.....3	103-4753	RES,475 OHM,1/4W,1%,METAL	2	R7, R12
.....3	145-431	Resistor, 432 ohm 1/4 watt 1% metal film Mepco SFR25	3	R4, R10, R14

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
.....3	145-470	Resistor, 47.5 ohm 1/4 watt 1% metal film Mepco SFR25	3	R11, R13, R17
.....3	177-5050	RES,TRMR,50K,10%,TOP ADJ 3299Y	1	R18
.....3	217-103	CAP,0.1UF 250VDC 5%,POLY FILM	3	C9, C12, C14
.....3	217-104	CAPACITOR, .01 UF 50V GMV DISC	10	C1, C2, C3, C4, C5, C6, C7, C8, C10, C16
.....3	219-220	CAPACITOR, ELECTROLYTIC 22uF RADIAL 35V	1	C13
.....3	219-221	CAPACITOR, ELECTROLYTIC 220uF 25V RADIAL	1	C11
.....3	255-390C	Capacitor, 39pF 5% 200V ceramic dipped C322C390J2G5CA	1	C15
.....3	255-470C	CAP, 47pF 5% 200V CERAMIC DIPPED	1	C18
.....3	256-131	CAPACITOR, 130 pF 5% 50V NPO DISC	1	C17
.....3	290-521	CAP, VARIABLE, 5-25 pf	1	C19
.....3	299-470	CAP, TANTALUM, 4.7 UF 16V	1	C20
.....3	350-030	INDUCTOR, 3.0 - 7 UH W/SHIELD CAN #47271-023	1	L1
.....3	350-123	Detector, SNY-074-1919A (235SU1)	1	T1
.....3	401-235	INTEGRATED CIRCUIT, SANYO LA1235	1	IC1
.....3	417-1604	SKT,16-PIN,DIP	1	1C1
.....3	440-245-1	TRANSISTOR, 2N2857	2	Q1, Q2
.....3	550-084	CONNECTOR,PHONO JACK,PCB MOUNT	1	J1
.....3	550-138	Connector, 8 pin Molex header (cut from 550-162)	1	P1
.....4	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.333	
.....3	800-208B	PC Board, IF 10.7 MHz R Receiver	1	PCB
..1	800-275AE	R-10 Filter Board, Export	1	
....2	100-1531	RES,150 OHM,1/4W,1%	2	R22, R24
....2	103-2241	RES,2.21K OHM,1/4W,1%,METAL	4	
....2	103-3324	RES,3.32K OHM,1/4W,1%,METAL	4	R6, R12, R18, R23
....2	103-4753	RES,475 OHM,1/4W,1%,METAL	7	R2, R7, R8, R13, R14, R19, R20
....2	145-300	Resistor, 30 ohm 1/4 watt 5% metal film Mepco SFR	3	R4, R10, R16
....2	145-431	Resistor, 432 ohm 1/4 watt 1% metal film Mepco SFR25	3	R5, R11, R17
....2	145-680-C	Resistor, 68 ohm 1/4 watt 5% carbon comp 30BJ250	1	R1
....2	268-203	CAPACITOR, .02 UF 50V Z5U DISC	12	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12
....2	330-012	Inductor, 15 uH Coilcraft 90-27	1	L1
....2	360-1074	FILTER, CERAMIC 10.7MHZ WITH ATTENUATION	3	FL1, FL2, FL3
....2	420-4104	SCREW,4-40X.250,S.S. PH	4	
....2	440-245-1	TRANSISTOR, 2N2857	4	Q1, Q2, Q3, Q4



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	500-055	Lockwasher, #4 internal tooth small pattern zinc plated	4	
....2	510-066	Equipment Label, 2.5 x .937" Brady #10C8600890"	1	
....2	513-034	STANDOFF, 1/4HEX x 1.0"LONG, 4-40"	2	
....2	550-084	CONNECTOR, PHONO JACK, PCB MOUNT	2	
....2	550-165	Connector, 4 pin Molex header (cut from 550-162)	1	
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.167	
....2	700-226-31	Filter Board Shield, Rec.	1	
....2	800-275B	PC Board, Ceramic Filter Board Receiver	1	PCB
..1	913-2133	SR-20M/C ACCESSORY TERMINAL BUS BD (SBCM)	1	
....2	412-1600	BARR STP, 16 POS, BEAU	1	J2
....2	417-1513	RCPT, 15 PIN D, FEMALE	1	J1
....2	513-2133	PCB, MACH, SR-20M/C ACC TERM BUS BD	1	
..1	913-2137	ASSY, PCB, SR20M AUDIO BD. (SBCM) (NOTE)	1	
....2	006-1006	CAP, 47 uF, Electrolytic, 63V, SMD (NOTE)	6	C2, C18, C27, C28, C29, C39
....2	006-2285-500	CAP, ELECTRO, 220UF, 20%, 50V, SMD	7	C3, C14, C15, C30, C35, C36, C37
....2	007-1045	CAP, PPS, 0.1UF, 50V, 1%, 1913, SMD	1	C13
....2	007-1054-002	CAP, CER, 1000PF, +80, -20%, 50V, 0603, SMD	1	C4
....2	007-1512-500	CAP, CER, 150pF, 50V, 2%, SMD	2	C20, C23
....2	007-2202-051	CAP, CER, 22PF, 5%, 50V, 0603, SMD	1	C8
....2	007-2203-050	CAP, 2200PF, 0805, 5%, 50V	1	C5
....2	007-2224-500	CAP, CER, .0022uF, 50V, 10%, SMD	2	C17, C22
....2	007-3313	CAP, CER, 330pF, 50V, 5%, SMD	1	C19
....2	007-3923-100	CAP, CER, 3900PF, 5%, 100V, 1206, SMD	1	C16
....2	007-4723	CAP, CER, 470pF, 100V, 5%, SMD	2	C33, C34
....2	007-6802	CAP, CER, 680PF, 50V, 2%, SMD	2	C7, C9
....2	102-1003	RES, CHIP, 100K OHMS, 1/10W, 1%, SMD	5	R1, R20, R26, R28, R30
....2	102-1214	RES, CHIP, 1.21K OHM, 1/10W, 1%	1	R24
....2	102-1821	RES, CHIP, 1.82K, 1/10W, 1%, SMD	1	R23
....2	102-1825	RES, CHIP, 18.2 K OHM, 1/10W, 1%	2	R17, R18
....2	102-2212	RES, CHIP, 22.1K OHMS, 1/10W, 1%, SMD	6	R3, R12, R13, R16, R21, R27
....2	102-3322	RES, CHIP, 33.2 K, 1/10W, 1%, SMD	1	R11
....2	102-4731	RES, 475K OHM, 1/10W, 1%, SMD	1	R6
....2	102-4750	RES, CHIP, 475 OHMS, 1/10W, 1%, SMD	2	R9, R10
....2	102-4755	RES, CHIP, 47.5K OHM, 1/10W, 1%	2	R14, R15
....2	102-4991	RES, CHIP, 49.9 OHMS, 1/10W, 1%, SMD	1	R5
....2	102-5622	RES, 5.62K OHM, 1%, 1/10W, SMD	1	R7
....2	102-6811	RES, CHIP, 6.81K, 1/10W, 1%, SMD	1	R2
....2	102-8252	RES, 82.5K OHM, 1/10W, 1%	1	R34
....2	102-9094	RES, CHIP, 9.09K OHM, 1/10W, 1%	2	R19, R35
....2	198-0502	TRMR, 5K, TOP ADJUST, SMD	1	R4
....2	198-1054	TRMR, 10K OHMS, TOP ADJ, SMD (N)	1	R36



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	198-2024	TRMR,2K OHMS,TOP ADJUST,10 TURN,SMD	1	R37
....2	224-1877	IC,HDPHONE AMP,DUAL,LM1877M-9,14-PIN,SMD	1	IC3
....2	401-275	IC,SMT,OP-AMP,LOW NOISE,HIGH AUDIO BW	2	IC1, IC2
....2	412-494	DIODE, GERMANIUM 1N270 (note)	2	D1, D2
....2	513-2137	PCB,MACH,SR20M AUDIO BD.	1	PCB
....2	530-053	Switch, slide Alco SLSA-220-1 New Part#5-1437577-6	2	S1, S2
....2	550-138	Connector, 8 pin Molex header (cut from 550-162)	2	J1, J2
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.333	
..1	943-2131	ASSY,WIRE HARNESS,SR-20M (SBCM)	1	
....2	402-0051	TY-RAP, W/FLAG	14	
....2	410-1489	LUG,TERM #6 SPADE #16-22	5	
....2	417-0096	PLUG,POLARIZING	4	
....2	417-0131	CONN,16 PIN 609-1630 ANSLEY	1	
....2	417-0142	PIN,.050 DIA 26-22 745254-3	9	
....2	417-1500	PLUG,15 PIN	1	
....2	417-2026	CONN, POLARIZED WIREMOUNT SOCKET, .100 PITCH"	1	
....2	417-2116	CONN,POLARIZED,WIRE,.1 IN,16-PIN	1	
....2	417-5500	CONNECTOR, PHONE PLUG, SWITCHCRAFT 3501MX	3	
....2	418-0034	PLUG,BNC DUAL CRIMP 1-227079-6	1	
....2	418-0609	CONN,25 PIN RIBBON CABLE	1	
....2	418-0615	CONN,15-PIN D-TYPE,RIBBON CABLE	1	
....2	418-2600	CONN,26-PIN,RIBBON	1	
....2	500-128	Eyelet, GS4-4 brass	3	
....2	512-020	TERMINAL,NICHIFU TMDN #125-250-03FA TERMINAL	3	
....2	550-122	CONNECTOR, 10 PIN MOLEX HOUSING 09-50-8100	1	
....2	550-135	Connector, 6 pin Molex housing 09-50-8060	2	
....2	550-137	Connector, 8 pin Molex housing 09-50-8080	3	
....2	550-159	Connector, 4 pin Molex housing 09-50-8040	1	
....2	550-327	Connector, Crimp Terminal Pin Molex 08-52-0112	39	
....2	580-033-1	Coax RG-188A/U Teflon 95% Shield M4256 TFE Tape Wrap	1.19	
....2	580-088	Shielded Wire, 16-C-22-SPJ White/Red 1 Cond. 22/19x34 pvc	13	
....2	600-0016	CBL,FLAT,16-COND,28GA	1.062	
....2	600-0026	CBL,FLAT,26-COND,28GA	1.5	
....2	601-1800	WIRE,AWG18 19/30 BLK	1.25	
....2	601-2209	WIRE,AWG22,19/34 WHT	49.1	
..1	953-2131-001	ASSY,SR-20M FRONT PANEL (SBCM)	1	
....2	193-0500	POT,500 OHMS,PCB MOUNT,LINEAR,HD AUDIO	1	R87
....2	310-0079	METER,MULTI,2 IN,SR-20M	1	M1
....2	323-2124	LED INDICATOR,GRN,RECTANGULAR	4	D1, D4, D5, D7



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	323-3124	IND,LED,YEL	1	D6
....2	417-0311	JACK,SWCRFT #N-112B 3COND.	1	J14
....2	471-5356	PANEL,FRONT,SR20M	1	
....2	500-210	Screw,SEMS 4-40x1/4 Phil Pan Head MS Blk Zinc(external lock)	8	
....2	510-005	Polytube, Manhattan#AF155A-20-yel	0.5	
....2	510-212	CONTROL KNOBS, #45KNO23	2	
....2	913-2131-001	SR-20M,FRONT PANEL PCB (SBCM)	1	
.....3	006-1085	CAP,ELECTRO,100 UF,10%,35V,SMD	4	C59, C62, C66, C69
.....3	007-1022	CAP,CER,100pF,50V,2%,SMD	1	C72
.....3	007-1024	CAP,CER,.001uF,50V,10%,SMD	2	C64, C71
.....3	007-1044	CAP,CER,0.1uF,50V,10%,SMD note	19	C1, C10, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C57, C77, C78
.....3	007-1054	CAP,CER,1uF,50V,10%,SMD	4	C58, C61, C65, C68
.....3	007-1512	CAP,CER,15pF,50V,2%,SMD	3	C50, C51, C52
.....3	007-1512-500	CAP,CER,150pF,50V,2%,SMD	5	C49, C53, C54, C55, C56
.....3	007-3923	CAP,CER,390pF,100V,5%,SMD	2	C63, C70
.....3	007-6213-500	CAP,CER,620pF,50V,5%,SMD	1	C48
.....3	070-1054	CAP,TANT,1uF,35V,10%,SMD	16	C28, C29, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47
.....3	070-2265-L25	CAP,TANT,22 MFD,20%,25V, E CASE,LOW ESR,SMD	5	C33, C60, C67, C73, C74
.....3	101-1003	RES,CHIP,100.0 K OHM,1%,1/8W,1206,SMD	2	R66, R99
.....3	102-0000	RES,CHIP,0 OHM,0805,SMD	1	R69
.....3	102-1000	RES,CHIP,100 OHMS,1/10W,1%,SMD	2	R57, R83
.....3	102-1001	RES,CHIP,1.00K OHMS,1/10W,1%,SMD	11	R38, R67, R68, R71, R72, R73, R76, R78, R80, R81, R82
.....3	102-1002	RES,CHIP,10.0K OHMS,1/10W,1%,SMD	4	R91, R92, R97, R117
.....3	102-1003	RES,CHIP,100K OHMS,1/10W,1%,SMD	1	R70
.....3	102-1102	RES,CHIP,11.0K OHMS,1/10W,1%,SMD	1	R77
.....3	102-1212	RES,CHIP,12.1K OHMS,1/10W,1%,SMD	1	R94
.....3	102-1582	RES,CHIP,15.8 K, 1/10 W, 1%	1	R95
.....3	102-1780	RES,CHIP,178 OHMS,1/10W,1%,SMD	5	R39, R42, R43, R44, R45
.....3	102-2002	RES,CHIP,20.0K OHMS,1/10W,1%,SMD	1	R86
.....3	102-2323	RES,23.2K OHMS,1/10W,1%,SMD	1	R79
.....3	102-2431	RES,CHIP,2.43K OHMS,1/10W,1%,SMD	1	R74



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
.....3	102-3011	RES,CHIP,3.01K OHMS,1/10W,1%,SMD	1	R64
.....3	102-3012	RES,CHIP,30.1K,1/10W,1%,SMD	2	R93, R102
.....3	102-4532	RES,CHIP,45.3K OHMS,1/10W,1%,SMD	2	R84, R88
.....3	102-4711	RES,CHIP,475 OHMS,1/10W,1%,SMD	5	R46, R47, R48, R49, R52
.....3	102-5041	RES,4.99K OHM,1/10W,1%	2	R89, R96
.....3	102-5231	RES,5.23K OHM,1/10W,1%	1	R75
.....3	102-6041	RES,6.04K OHMS,1/10W,1%,SMD	1	R58
.....3	102-6811	RES,CHIP,6.81K,1/10W,1%,SMD	1	R101
.....3	102-8164	RES, CHIP, 8.66K OHM, 1/10W, 1% ,CR21-8661F-T	1	R90
.....3	102-9095	RES,90.9K OHM,1/10W,1%,SMD	1	R85
.....3	102-9311	RES,9.31K OHMS,1/10W,1%,SMD	1	R100
.....3	185-162K	RES,162K OHM,1%,0.25W,1206	1	R98
.....3	185-68.1	Resistor, SMT, size 1206, 68.1 ohms, Dale CRCW1206-68.1	4	R53, R54, R55, R56
.....3	197-1034	TRMR,10K OHMS,SIDE ADJ,5 TURN,SMD	1	R65
.....3	204-0130	SCHOTTKY BARRIER RECTIFIER 1 AMP 30V CASE 403A SMD	2	D9, D12
.....3	204-0340	DIODE,RECTIFIER,SCHOTTKY,MBRS340T3, 403-03 CASE,SMD	1	D14
.....3	204-0914	DIODE,SWITCHING,MMBD914LT1,SMD	2	D10, D13
.....3	224-0333	SWITCH,QUAD,ADG333ABRS,20-PIN SSOP,SMD	2	U22, U23
.....3	224-5206	DIG POT,6 CH,10K,AD5206BRU10,24-PIN TSSOP,SMD	1	U21
.....3	227-1576	VR, LT1576IS8, SWITCHER, 1.5A, SMD	2	U13, U14
.....3	270-0066	REL,DPDT,12VDC,DIP	1	K1
.....3	270-101	Cap., monolithic chip, 100 pf 50v 5% Kemet C1206C101J5GAC	1	C75
.....3	270-682	CAPACITOR, SMT, 1206, 6800 PF, 5%	1	C76
.....3	340-0169	SWITCH,ROCKER,PCB MOUNTING,SMALL BLACK RECTANGULAR CAP	3	S11, S12, S13
.....3	350-197	INDUCTOR, SMT, POWER, 1uH	2	L2, L4
.....3	350-201	INDUCTOR, SMT, 1812, 82NH	1	L6
.....3	360-0125	IND, 68 UH, 1.5A, SMD	2	L1, L3
.....3	366-0010-001	IND,10UH,1.5A	1	L5
.....3	400-196	IC, SMT, 1.5A STEP-UP REGULATOR	1	U24
.....3	401-164	IC, SMT, 8-Bit Ser In, Par Out SR Phillips 74HC164D	2	U5, U6
.....3	401-275	IC,SMT,OP-AMP,LOW NOISE,HIGH AUDIO BW	5	U15, U16, U17, U18, U19
.....3	401-374	IC, OCTAL D FLIP-FLOP W 3-ST OUT	2	U7, U12
.....3	411-914	DIODE, SMD 1N4148	1	D15
.....3	413-1206	CHIP,TEST POINT,1206,SMD	17	TP1, TP2, TP3, TP4, TP5, TP6, TP8, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP21



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
.....3	417-0182	CONN,HDR,26 PIN,LATCHED	1	J2
.....3	417-0200	CONN,HEADER 20 PIN	0.2	J11
.....3	418-120	DIODE, SMT, 1A, SCHOTTKY RECTIFIER	1	D16
.....3	418-1601	CONN,MALE,16-PIN,LATCH,PCB MT	2	J1, J4
.....3	418-1601-001	CONN,MALE,16-PIN,LONG LATCH,PCB MT	1	J13
.....3	418-2602-001	CONN,HEADER,26 PIN,LATCH/EJECT,PCB	1	J3
.....3	418-451	Diode, SMT, Zener, 5.1V Motorola BZX84C5V1LT1	1	D11
.....3	426-4008	STOFF,PEM 4-40 KFSE-440-12	2	
.....3	439-041	TRANSISTOR, SMT, GENERAL PURPOSE, NPN	6	Q1, Q4, Q5, Q6, Q7, Q9
.....3	510-196	SUBMINIATURE LAMP, LUMEX IFL-LX2162- 16T	2	B1, B2
.....3	513-2131	PCB,BLANK,SR-20C/SR20M FRONT PANEL	1	
.....3	530-059	SWITCH, ROTARY	1	S2
....2	943-2130-001	ASSY,WIRE HARNESS,HEADPHONE,MARTI REC,FRONT PANEL (SBCM)	1	
.....3	402-0051	TY-RAP, W/FLAG	1	
.....3	417-0138	HSNG,MOD IV 4 POS 87499-7 AMP	1	
.....3	417-8766	CONTACT,CRIMP,MOD-IV 87809-1	3	
.....3	580-050	Wire, UL1061 22/7 OS-1 White/Red	0.25	
.....3	580-053	Wire, UL1061 22/7 OTC White/Black	0.25	
.....3	601-2209	WIRE,AWG22,19/34 WHT	0.25	
..1	973-0101	KIT,ACCESSORY,SR20M/SR20C	1	
....2	550-030	CONNECTOR, D-SUB 15 PIN FEMALE	1	
....2	550-180	Connector, locking hood Keltron HD-15-10	1	
....2	580-116	Power Cord, Black Detachable Power Dynamics	1	
....2	973-9998	KIT,BIND+MAN,SR20M/SR20C	1	
.....3	597-8105	INSTRUCTION MANUAL, SR 20C/SR 20M STL RECEIVER	1	
.....3	598-0013	BINDER,MARTI,1 IN,BLUE,W CD POCKET	1	



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
0	SR20M-xxx-200	SR-20M,xxx-xxx MHZ,STL REC,200 KHZ REC BW,110/220V		
..1	339-0008	FILTER,RFI,3A 250VAC 50/60HZ	1	
..1	400-0600	STRIP,QUIET SHIELD,6.00x.197	1	
..1	402-0005	PRESS CLIP,NYLON W/ADHESIVE BACK	3	
..1	403-0001	FOOT,RUBBER-COMPACT CASE	4	
..1	420-0817	ASSY,FEMALE SCREWLOCK 205817-1	4	
..1	420-2105	SCREW,2-56X.312,S.S. PH SC	2	
..1	420-3706	SCREW,M3 X 6,PHILLIPS PAN HEAD,SS	2	
..1	420-4105	SCREW,4-40X.312,S.S. PH	2	
..1	421-0102	10-32 KEP NUT	1	
..1	421-4008	4-40 KEP NUT	2	
..1	421-8028	NUT,JAM,1/2-28 UNEF-2B	1	
..1	422-6106	SCREW,SEMS 6-32 X 3/8 PAN PH. ST."	5	
..1	423-9002	WASH,INT TOOTH,1/2	1	
..1	469-0021	FINGER STOCK,LAIRD 97-550,24 LONG"	1.195	
..1	469-0022	FINGER STOCK,LAIRD 97-654,12 LONG"	0.1	
..1	471-5347	ENCLOSURE,CONVERTER,MARTI SR SERIES RECEIVERS (NOTE)	1	
..1	471-5353	PANEL,REAR,SR20C/SR20M	1	
..1	471-5354	COVER,SR20C/SR20M	1	
..1	471-5355	CHASSIS,SR20C/SR20M	1	
..1	471-5385	FILLER,REAR,SRPT-30	1	
..1	500-187	Screw, #6 x 1/4 phillips pan head S/M type A black zinc	8	
..1	500-188	Screw, 4-40 x 3/8 phillips,flat head,black oxide"	2	
..1	500-210	Screw,SEMS 4-40x1/4 Phil Pan Head MS Blk Zinc(external lock)	63	
..1	540-0018	POWER SUPPLY, 40 WATT, 12 VOLT	1	
..1	550-015	Connector, UG-625B/U BNC receptacle Amphenol 31-236 *NOTE*	3	
..1	586-101	Cable Assy, Input Filter Bd STL10/R10/R15C/STL15C (SBCM)	1	
....2	550-126	Connector, crimp terminal pin Molex 08-50-0187	3	
....2	550-183	Connector, 3 pin Molex housing 09-50-8030	1	
....2	580-053	Wire, UL1061 22/7 OTC White/Black	0.4	
....2	580-062	Wire, UL1061 22/7 OTC Yellow/Slate	0.4	
....2	580-064	Wire, UL1061 22/7 OTC Yellow/Orange	0.4	
..1	594-0503	LABEL, DANGER-HAZARDOUS VOLTAGE	2	
..1	594-0505	LABEL, WARNING-ONLY AUTHORIZED PERSONNEL	1	
..1	700-226-3	Bracket, STL-10/Rec. Rack	2	
..1	800-193AD	SR30/SR40A/SR20M/SR20C I/O PCB (SBCM)	1	
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	13	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C15, C16
....2	270-220	Cap, monolithic chip, 22 pf 50v 5% KEMET C1206C220J5GACTR	3	C12, C13, C14
....2	310-014	TRANSFORMER, AUDIO, MIDCOM 671-9041 TECATE VFT 950-0394	1	T1



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	330-018	INDUCTOR, 10 uH, 10%	14	L1, L2, L3, L4, L5, L7, L8, L9, L11, L12, L13, L14, L15, L16
....2	330-019	INDUCTOR, 2.5 TURN, HIGH FREQUENCY SUPPRESSION	2	L6, L10
....2	340-0004	SW,JUMPER PROGRAMMABLE	5	JP1, JP1, JP2, JP1, JP1
....2	500-162	Screw, 4-40 x 7/16 phillips pan head MS zinc plated"	2	
....2	550-123	Connector, 10 pin header (cut from 550-162)	1	P1
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.417	
....2	550-136	Connector, 6 pin Molex header (cut from 550-162)	2	P2, P3
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.25	
....2	550-170	Connector, D-Sub 15 pin angle	1	J4
....2	550-184	Connector, 1 dual pin header (cut from 550-316)	1	JP2
.....3	550-316	HEADER, BREAKAWAY 40x2, 0.1 SPACING"	0.025	
....2	550-185	Connector, 5 dual pin header (cut from 550-316) (note)	1	JP1
.....3	550-316	HEADER, BREAKAWAY 40x2, 0.1 SPACING"	0.125	
....2	550-186	Connector, 3 pin Molex header (cut from 550-162)	1	P4
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.125	
....2	800-193B	PC Board, I/O Filter STL-10 R-10	1	PCB
..1	800-207-200	FILTER, ASSEMBLY 200 KHZ	1	
....2	255-241	Capacitor, 240 pf 500v 5% silver mica CD10FD241J03	2	C3B, C4
....2	256-131	CAPACITOR, 130 pF 5% 50V NPO DISC	1	C1
....2	256-301	CAPACITOR, 300 pF 5% NPO DISC	1	C2B
....2	350-025	INDUCTOR, 1.5 - 3 UH WITH SHIELD CAN #47271-021	2	L1, L2
....2	360-016-1	FILTER, LC 200 KHz	1	FL1
....2	421-6008	6-32 KEP NUT	2	
....2	550-084	CONNECTOR,PHONO JACK,PCB MOUNT	2	J1, J2
....2	580-005	Buss Wire, #22AWG Solid Tinned Copper	0.04	
....2	800-207B	PC Board, IF Filter R Receiver	1	PCB
..1	800-208AD	IF Amplifier wide band (domestic)	1	
....2	360-033	FILTER, CERAMIC 10.7 MHZ	2	CF1, CF2
....2	800-208A	IF AMPLIFIER, AR/CR, GENERIC (SBCM)	1	
.....3	100-1041	RES,1K OHM,1/4W,1%	1	R5
.....3	100-1051	RES,10K OHM,1/4W,1%	2	R19, R20
.....3	100-1531	RES,150 OHM,1/4W,1%	2	R1, R2
.....3	103-2241	RES,2.21K OHM,1/4W,1%,METAL	3	R6, R8, R15
.....3	103-3324	RES,3.32K OHM,1/4W,1%,METAL	2	R3, R9
.....3	103-4741	RES,4.75K OHM,1/4W,1%,METAL	1	R16
.....3	103-4753	RES,475 OHM,1/4W,1%,METAL	2	R7, R12
.....3	145-431	Resistor, 432 ohm 1/4 watt 1% metal film Mepco SFR25	3	R4, R10, R14

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
.....3	145-470	Resistor, 47.5 ohm 1/4 watt 1% metal film Mepco SFR25	3	R11, R13, R17
.....3	177-5050	RES,TRMR,50K,10%,TOP ADJ 3299Y	1	R18
.....3	217-103	CAP,0.1UF 250VDC 5%,POLY FILM	3	C9, C12, C14
.....3	217-104	CAPACITOR, .01 UF 50V GMV DISC	10	C1, C2, C3, C4, C5, C6, C7, C8, C10, C16
.....3	219-220	CAPACITOR, ELECTROLYTIC 22uF RADIAL 35V	1	C13
.....3	219-221	CAPACITOR, ELECTROLYTIC 220uF 25V RADIAL	1	C11
.....3	255-390C	Capacitor, 39pF 5% 200V ceramic dipped C322C390J2G5CA	1	C15
.....3	255-470C	CAP, 47pF 5% 200V CERAMIC DIPPED	1	C18
.....3	256-131	CAPACITOR, 130 pF 5% 50V NPO DISC	1	C17
.....3	290-521	CAP, VARIABLE, 5-25 pf	1	C19
.....3	299-470	CAP, TANTALUM, 4.7 UF 16V	1	C20
.....3	350-030	INDUCTOR, 3.0 - 7 UH W/SHIELD CAN #47271-023	1	L1
.....3	350-123	Detector, SNY-074-1919A (235SU1)	1	T1
.....3	401-235	INTEGRATED CIRCUIT, SANYO LA1235	1	IC1
.....3	417-1604	SKT,16-PIN,DIP	1	1C1
.....3	440-245-1	TRANSISTOR, 2N2857	2	Q1, Q2
.....3	550-084	CONNECTOR,PHONO JACK,PCB MOUNT	1	J1
.....3	550-138	Connector, 8 pin Molex header (cut from 550- 162)	1	P1
.....4	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.333	
.....3	800-208B	PC Board, IF 10.7 MHz R Receiver	1	PCB
..1	913-2133	SR-20M/C ACCESSORY TERMINAL BUS BD (SBCM)	1	
....2	412-1600	BARR STP,16 POS,BEAU	1	J2
....2	417-1513	RCPT,15 PIN D, FEMALE	1	J1
....2	513-2133	PCB, MACH, SR-20M/C ACC TERM BUS BD	1	
..1	913-2137	ASSY,PCB,SR20M AUDIO BD. (SBCM) (NOTE)	1	
....2	006-1006	CAP,47 uF,Electrolytic,63V,SMD (NOTE)	6	C2, C18, C27, C28, C29, C39
....2	006-2285-500	CAP,ELECTRO,220UF,20%,50V,SMD	7	C3, C14, C15, C30, C35, C36, C37
....2	007-1045	CAP,PPS,0.1UF,50V,1%,1913,SMD	1	C13
....2	007-1054-002	CAP,CER,1000PF,+80,-20%,50V,0603,SMD	1	C4
....2	007-1512-500	CAP,CER,150pF,50V,2%,SMD	2	C20, C23
....2	007-2202-051	CAP,CER,22PF,5%,50V,0603,SMD	1	C8
....2	007-2203-050	CAP,2200PF,0805,5%,50V	1	C5
....2	007-2224-500	CAP,CER,.0022uF,50V,10%,SMD	2	C17, C22
....2	007-3313	CAP,CER,330pF,50V,5%,SMD	1	C19
....2	007-3923-100	CAP,CER,3900PF,5%,100V,1206,SMD	1	C16
....2	007-4723	CAP,CER,470pF,100V,5%,SMD	2	C33, C34
....2	007-6802	CAP,CER,680PF,50V,2%,SMD	2	C7, C9
....2	102-1003	RES,CHIP,100K OHMS,1/10W,1%,SMD	5	R1, R20, R26, R28, R30



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	102-1214	RES,CHIP,1.21K OHM,1/10W,1%	1	R24
....2	102-1821	RES,CHIP,1.82K,1/10W,1%,SMD	1	R23
....2	102-1825	RES,CHIP,18.2 K OHM,1/10W,1%	2	R17, R18
....2	102-2212	RES,CHIP,22.1K OHMS,1/10W,1%,SMD	6	R3, R12, R13, R16, R21, R27
....2	102-3322	RES,CHIP,33.2 K,1/10W,1%,SMD	1	R11
....2	102-4731	RES,475K OHM,1/10W,1%,SMD	1	R6
....2	102-4750	RES,CHIP,475 OHMS,1/10W,1%,SMD	2	R9, R10
....2	102-4755	RES,CHIP,47.5K OHM,1/10W,1%	2	R14, R15
....2	102-4991	RES,CHIP,49.9 OHMS,1/10W,1%,SMD	1	R5
....2	102-5622	RES,5.62K OHM,1%,1/10W,SMD	1	R7
....2	102-6811	RES,CHIP,6.81K,1/10W,1%,SMD	1	R2
....2	102-8252	RES,82.5K OHM,1/10W,1%	1	R34
....2	102-9094	RES,CHIP,9.09K OHM,1/10W,1%	2	R19, R35
....2	198-0502	TRMR,5K, TOP ADJUST,SMD	1	R4
....2	198-1054	TRMR,10K OHMS, TOP ADJ,SMD (N)	1	R36
....2	198-2024	TRMR,2K OHMS, TOP ADJUST,10 TURN,SMD	1	R37
....2	224-1877	IC,HDPHONE AMP,DUAL,LM1877M-9,14-PIN,SMD	1	IC3
....2	401-275	IC,SMT,OP-AMP,LOW NOISE,HIGH AUDIO BW	2	IC1, IC2
....2	412-494	DIODE, GERMANIUM 1N270 (note)	2	D1, D2
....2	513-2137	PCB,MACH,SR20M AUDIO BD.	1	PCB
....2	530-053	Switch, slide Alco SLSA-220-1 New Part#5-1437577-6	2	S1, S2
....2	550-138	Connector, 8 pin Molex header (cut from 550-162)	2	J1, J2
.....3	550-162	Connector, 24 pin break-away (straight) Molex 26-48-6248	0.333	
..1	943-2131	ASSY,WIRE HARNESS,SR-20M (SBCM)	1	
....2	402-0051	TY-RAP, W/FLAG	14	
....2	410-1489	LUG,TERM #6 SPADE #16-22	5	
....2	417-0096	PLUG,POLARIZING	4	
....2	417-0131	CONN,16 PIN 609-1630 ANSLEY	1	
....2	417-0142	PIN,.050 DIA 26-22 745254-3	9	
....2	417-1500	PLUG,15 PIN	1	
....2	417-2026	CONN, POLARIZED WIREMOUNT SOCKET, .100 PITCH"	1	
....2	417-2116	CONN,POLARIZED,WIRE,.1 IN,16-PIN	1	
....2	417-5500	CONNECTOR, PHONE PLUG, SWITCHCRAFT 3501MX	3	
....2	418-0034	PLUG,BNC DUAL CRIMP 1-227079-6	1	
....2	418-0609	CONN,25 PIN RIBBON CABLE	1	
....2	418-0615	CONN,15-PIN D-TYPE,RIBBON CABLE	1	
....2	418-2600	CONN,26-PIN,RIBBON	1	
....2	500-128	Eyelet, GS4-4 brass	3	
....2	512-020	TERMINAL,NICHIFU TMDN #125-250-03FA TERMINAL	3	
....2	550-122	CONNECTOR, 10 PIN MOLEX HOUSING 09-50-8100	1	
....2	550-135	Connector, 6 pin Molex housing 09-50-8060	2	
....2	550-137	Connector, 8 pin Molex housing 09-50-8080	3	

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	550-159	Connector, 4 pin Molex housing 09-50-8040	1	
....2	550-327	Connector, Crimp Terminal Pin Molex 08-52-0112	39	
....2	580-033-1	Coax RG-188A/U Teflon 95% Shield M4256 TFE Tape Wrap	1.19	
....2	580-088	Shielded Wire, 16-C-22-SPJ White/Red 1 Cond. 22/19x34 pvc	13	
....2	600-0016	CBL,FLAT,16-COND,28GA	1.062	
....2	600-0026	CBL,FLAT,26-COND,28GA	1.5	
....2	601-1800	WIRE,AWG18 19/30 BLK	1.25	
....2	601-2209	WIRE,AWG22,19/34 WHT	49.1	
..1	953-2131-001	ASSY,SR-20M FRONT PANEL (SBCM)	1	
....2	193-0500	POT,500 OHMS,PCB MOUNT,LINER,HD AUDIO	1	R87
....2	310-0079	METER,MULTI,2 IN,SR-20M	1	M1
....2	323-2124	LED INDICATOR,GRN,RECTANGULAR	4	D1, D4, D5, D7
....2	323-3124	IND,LED,YEL	1	D6
....2	417-0311	JACK,SWCRFT #N-112B 3COND.	1	J14
....2	471-5356	PANEL,FRONT,SR20M	1	
....2	500-210	Screw,SEMS 4-40x1/4 Phil Pan Head MS Blk Zinc(external lock)	8	
....2	510-005	Polytube, Manhatten#AF155A-20-yel	0.5	
....2	510-212	CONTROL KNOBS, #45KNO23	2	
....2	913-2131-001	SR-20M,FRONT PANEL PCB (SBCM)	1	
.....3	006-1085	CAP,ELECTRO,100 UF,10%,35V,SMD	4	C59, C62, C66, C69
.....3	007-1022	CAP,CER,100pF,50V,2%,SMD	1	C72
.....3	007-1024	CAP,CER,.001uF,50V,10%,SMD	2	C64, C71
.....3	007-1044	CAP,CER,0.1uF,50V,10%,SMD note	19	C1, C10, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C57, C77, C78
.....3	007-1054	CAP,CER,1uF,50V,10%,SMD	4	C58, C61, C65, C68
.....3	007-1512	CAP,CER,15pF,50V,2%,SMD	3	C50, C51, C52
.....3	007-1512-500	CAP,CER,150pF,50V,2%,SMD	5	C49, C53, C54, C55, C56
.....3	007-3923	CAP,CER,390pF,100V,5%,SMD	2	C63, C70
.....3	007-6213-500	CAP,CER,620pF,50V,5%,SMD	1	C48
.....3	070-1054	CAP,TANT,1uF,35V,10%,SMD	16	C28, C29, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47
.....3	070-2265-L25	CAP,TANT,22 MFD,20%,25V, E CASE,LOW ESR,SMD	5	C33, C60, C67, C73, C74
.....3	101-1003	RES,CHIP,100.0 K OHM,1%,1/8W,1206,SMD	2	R66, R99
.....3	102-0000	RES,CHIP,0 OHM,0805,SMD	1	R69
.....3	102-1000	RES,CHIP,100 OHMS,1/10W,1%,SMD	2	R57, R83
.....3	102-1001	RES,CHIP,1.00K OHMS,1/10W,1%,SMD	11	R38, R67, R68, R71, R72, R73, R76, R78, R80, R81, R82
.....3	102-1002	RES,CHIP,10.0K OHMS,1/10W,1%,SMD	4	R91, R92, R97, R117
.....3	102-1003	RES,CHIP,100K OHMS,1/10W,1%,SMD	1	R70



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
.....3	102-1102	RES,CHIP,11.0K OHMS,1/10W,1%,SMD	1	R77
.....3	102-1212	RES,CHIP,12.1K OHMS,1/10W,1%,SMD	1	R94
.....3	102-1582	RES,CHIP,15.8 K, 1/10 W, 1%	1	R95
.....3	102-1780	RES,CHIP,178 OHMS,1/10W,1%,SMD	5	R39, R42, R43, R44, R45
.....3	102-2002	RES,CHIP,20.0K OHMS,1/10W,1%,SMD	1	R86
.....3	102-2323	RES,23.2K OHMS,1/10W,1%,SMD	1	R79
.....3	102-2431	RES,CHIP,2.43K OHMS,1/10W,1%,SMD	1	R74
.....3	102-3011	RES,CHIP,3.01K OHMS,1/10W,1%,SMD	1	R64
.....3	102-3012	RES,CHIP,30.1K,1/10W,1%,SMD	2	R93, R102
.....3	102-4532	RES,CHIP,45.3K OHMS,1/10W,1%,SMD	2	R84, R88
.....3	102-4711	RES,CHIP,475 OHMS,1/10W,1%,SMD	5	R46, R47, R48, R49, R52
.....3	102-5041	RES,4.99K OHM,1/10W,1%	2	R89, R96
.....3	102-5231	RES,5.23K OHM,1/10W,1%	1	R75
.....3	102-6041	RES,6.04K OHMS,1/10W,1%,SMD	1	R58
.....3	102-6811	RES,CHIP,6.81K,1/10W,1%,SMD	1	R101
.....3	102-8164	RES,CHIP,8.66K OHM,1/10W,1%,CR21-8661F-T	1	R90
.....3	102-9095	RES,90.9K OHM,1/10W,1%,SMD	1	R85
.....3	102-9311	RES,9.31K OHMS,1/10W,1%,SMD	1	R100
.....3	185-162K	RES,162K OHM,1%,0.25W,1206	1	R98
.....3	185-68.1	Resistor, SMT, size 1206, 68.1 ohms, Dale CRCW1206-68.1	4	R53, R54, R55, R56
.....3	197-1034	TRMR,10K OHMS,SIDE ADJ,5 TURN,SMD	1	R65
.....3	204-0130	SCHOTTKY BARRIER RECTIFIER 1 AMP 30V CASE 403A SMD	2	D9, D12
.....3	204-0340	DIODE,RECTIFIER,SCHOTTKY,MBRS340T3,403-03 CASE,SMD	1	D14
.....3	204-0914	DIODE,SWITCHING,MMBD914LT1,SMD	2	D10, D13
.....3	224-0333	SWITCH,QUAD,ADG333ABRS,20-PIN SSOP,SMD	2	U22, U23
.....3	224-5206	DIG POT,6 CH,10K,AD5206BRU10,24-PIN TSSOP,SMD	1	U21
.....3	227-1576	VR, LT1576IS8, SWITCHER, 1.5A, SMD	2	U13, U14
.....3	270-0066	REL,DPDT,12VDC,DIP	1	K1
.....3	270-101	Cap., monolithic chip, 100 pf 50v 5% Kemet C1206C101J5GAC	1	C75
.....3	270-682	CAPACITOR, SMT, 1206, 6800 PF, 5%	1	C76
.....3	340-0169	SWITCH,ROCKER,PCB MOUNTING,SMALL BLACK RECTANGULAR CAP	3	S11, S12, S13
.....3	350-197	INDUCTOR, SMT, POWER, 1uH	2	L2, L4
.....3	350-201	INDUCTOR, SMT, 1812, 82NH	1	L6
.....3	360-0125	IND, 68 UH, 1.5A, SMD	2	L1, L3
.....3	366-0010-001	IND,10UH,1.5A	1	L5
.....3	400-196	IC, SMT, 1.5A STEP-UP REGULATOR	1	U24
.....3	401-164	IC, SMT, 8-Bit Ser In, Par Out SR Phillips 74HC164D	2	U5, U6
.....3	401-275	IC,SMT,OP-AMP,LOW NOISE,HIGH AUDIO BW	5	U15, U16, U17, U18, U19
.....3	401-374	IC, OCTAL D FLIP-FLOP W 3-ST OUT	2	U7, U12
.....3	411-914	DIODE, SMD 1N4148	1	D15

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
.....3	413-1206	CHIP,TEST POINT,1206,SMD	17	TP1, TP2, TP3, TP4, TP5, TP6, TP8, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP21
.....3	417-0182	CONN,HDR,26 PIN,LATCHED	1	J2
.....3	417-0200	CONN,HEADER 20 PIN	0.2	J11
.....3	418-120	DIODE, SMT, 1A, SCHOTTKY RECTIFIER	1	D16
.....3	418-1601	CONN,MALE,16-PIN,LATCH,PCB MT	2	J1, J4
.....3	418-1601-001	CONN,MALE,16-PIN,LONG LATCH,PCB MT	1	J13
.....3	418-2602-001	CONN,HEADER,26 PIN,LATCH/EJECT,PCB	1	J3
.....3	418-451	Diode, SMT, Zener, 5.1V Motorola BZX84C5V1LT1	1	D11
.....3	426-4008	STOFF,PEM 4-40 KFSE-440-12	2	
.....3	439-041	TRANSISTOR, SMT, GENERAL PURPOSE, NPN	6	Q1, Q4, Q5, Q6, Q7, Q9
.....3	510-196	SUBMINIATURE LAMP, LUMEX IFL-LX2162-16T	2	B1, B2
.....3	513-2131	PCB,BLANK,SR-20C/SR20M FRONT PANEL	1	
.....3	530-059	SWITCH, ROTARY	1	S2
....2	943-2130-001	ASSY,WIRE HARNESS,HEADPHONE,MARTI REC,FRONT PANEL (SBCM)	1	
.....3	402-0051	TY-RAP, W/FLAG	1	
.....3	417-0138	HSNG,MOD IV 4 POS 87499-7 AMP	1	
.....3	417-8766	CONTACT,CRIMP,MOD-IV 87809-1	3	
.....3	580-050	Wire, UL1061 22/7 OS-1 White/Red	0.25	
.....3	580-053	Wire, UL1061 22/7 OTC White/Black	0.25	
.....3	601-2209	WIRE,AWG22,19/34 WHT	0.25	
..1	973-0101	KIT,ACCESSORY,SR20M/SR20C	1	
....2	550-030	CONNECTOR, D-SUB 15 PIN FEMALE	1	
....2	550-180	Connector, locking hood Keltron HD-15-10	1	
....2	580-116	Power Cord, Black Detachable Power Dynamics	1	
....2	973-9998	KIT,BIND+MAN,SR20M/SR20C	1	
.....3	597-8105	INSTRUCTION MANUAL, SR 20C/SR 20M STL RECEIVER	1	
.....3	598-0013	BINDER,MARTI,1 IN,BLUE,W CD POCKET	1	



14 WIDEBAND CONVERTERS

This section provides parts lists for the SR-20C and SR-20M Wide Band Converters. The parts lists provide descriptions and part numbers of electrical components, assemblies, and selected mechanical parts required for maintenance. Each parts list entry in this section is indexed by reference designators appearing on the applicable schematic diagrams.

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	913-2132-150	ASSY,DUAL WIDE-BAND CONVERTER,150 MHZ (NOTE)		
..1	270-120	CAP, SMT, 12PF, 100V	3	C61, C62, C63
..1	350-200	INDUCTOR, SMT, 1812, 56NH	2	L11, L12
..1	350-202	IND, SMT, 1812, 39 NH	2	L10, L13
..1	360-0140	FILTER, HELICAL BANDPASS, F=140M	2	FL2, FL3
..1	360-0175	FILTER, HELICAL BANDPASS, F=175M	2	FL6, FL7
..1	361-0145	FILTER, HELICAL BANDPASS, F=145M	2	FL4, FL5
..1	361-0160	FILTER, HELICAL BANDPASS, F=160M	1	FL1
..1	361-0162	FILTER, HELICAL BANDPASS, F=162M	2	FL8, FL9
..1	400-246	IC, VCO, 195-245 MHZ	1	U31
..1	407-0503	EMI SHIELD,MARTI CONVERTER INPUT	1	
..1	427-0061	CONNECTOR, N, PCB, STRAIGHT, PNL MTG	1	J4
..1	913-2132	ASSY,PCB,DUAL WIDE-BAND CONVERTER (SBCM)	1	
....2	006-1085	CAP,ELECTRO,100 UF,10%,35V,SMD	9	C94, C95, C88, C105, C130, C124, C125, C89, C156
....2	006-4775-350	CAP,ELECTRO,47UF,20%,35V,SMD	1	C134
....2	007-0470-006	CAP,470pF,50v,10%,0603	2	C137, C121
....2	007-1022	CAP,CER,100pF,50V,2%,SMD	3	C120, C117, C118
....2	007-1024	CAP,CER,.001uF,50V,10%,SMD	1	C115
....2	007-1044	CAP,CER,0.1uF,50V,10%,SMD note	14	C1, C4, C5, C6, C7, C8, C13, C14, C15, C16, C17, C111, C119, C34
....2	007-1813-050	CAP,CER,180 PFD,5%,50V,1206,SMD	1	C102
....2	007-3300	CAP,CER,3.3PF,50V,.25pF,SMD	1	C116
....2	007-3312	CAP,CER,33pF,50V,2%,SMD	4	C2, C3, C110, C114
....2	007-4700-500	CAP,CER,4.7pF,50V,.25pF,SMD	1	C113
....2	011-7.3728	Crystal,SMT,7.3728 MHz, 50ppm, Epson MA-506-7.3728M-C2	1	X1
....2	012-280-1	TCXO, SMT, 12.800 MHZ, 1PPM	1	U29



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
...2	070-1054	CAP,TANT,1uF,35V,10%,SMD	36	C18, C9, C10, C23, C24, C25, C31, C32, C29, C47, C50, C51, C53, C54, C57, C58, C70, C71, C66, C67, C78, C79, C73, C74, C87, C145, C96, C98, C93, C131, C126, C128, C90, C123, C42, C154
...2	070-1064	CAP,TANT,10uF,35V,20%,SMD	1	C138
...2	070-1084	CAP,TANT,100uF,16V,10%,SMD	1	C112
...2	070-2204	CAP,TANT,22uF,25V,10%,SMD	2	C11, C12
...2	070-2265-L25	CAP,TANT,22 MFD,20%,25V, E CASE,LOW ESR,SMD	2	C139, C140
...2	070-6854	TANT CAP, 6.8 UF, 16V, SIZE C	1	C108
...2	101-0100	RES,THICK FILM,100,1/8W,SMD	2	R13, R14
...2	102-1000	RES,CHIP,100 OHMS,1/10W,1%,SMD	8	R19, R178, R179, R181, R185, R188, R189, R162
...2	102-1001	RES,CHIP,1.00K OHMS,1/10W,1%,SMD	16	R2, R163, R149, R164, R165, R192, R177, R183, R187, R70, R61, R160, R55, R56, R57, R58
...2	102-1002	RES,CHIP,10.0K OHMS,1/10W,1%,SMD	15	R18, R26, R27, R199, R148, R176, R193, R60, R63, R171, R64, R156, R157, R54, R202
...2	102-1003	RES,CHIP,100K OHMS,1/10W,1%,SMD	5	R170, R158, R159, R168, R169
...2	102-1004	RES,CHIP,1.00M OHMS,1/10W,1%,SMD	1	R53
...2	102-1102	RES,CHIP,11.0K OHMS,1/10W,1%,SMD	1	R201
...2	102-1103	Res Chip 110K 1/10W 1%,SMD	1	R198
...2	102-1400	RES,CHIP,1.4K OHMS,1/10W,1%,SMD	1	R28
...2	102-1500	RES,CHIP,150 OHMS,1/10W,1%,SMD	37	R32, R33, R34, R35, R44, R45, R46, R47, R75, R76, R77, R78, R85, R86, R87, R88, R95, R96, R97, R98, R116, R117, R118, R119, R108, R109, R110, R111, R137, R138, R139, R140, R123, R124, R125, R126, R175
...2	102-1582	RES,CHIP,15.8 K, 1/10 W, 1%	1	R21
...2	102-1623	Res,Chip 162K 1/10W 1% SMD	1	R196
...2	102-1744	RES,1.74K OHM,1/10W,1%	1	R190
...2	102-1802	Res Chip 18.2 ohm 1/10W 1% SMD	6	R99, R100, R101, R127, R128, R129
...2	102-2000	RES,CHIP,200 OHM,1/10 W,1% SMD	1	R184



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	102-2001	RES,CHIP,2.00K OHMS,1/10W,1%,SMD	1	R22
....2	102-2201	RES,CHIP,22.1 OHM,1/10W,1%	3	R79, R80, R71
....2	102-2214	RES,CHIP,2.21K OHM,1/10W,1%	1	R23
....2	102-2490	RES,CHIP,24.9 OHM,1/10W,1%	4	R102, R103, R130, R132
....2	102-2491	RES,CHIP,2.49K,1/10W,1%,SMD	1	R67
....2	102-2741	RES,CHIP,2.74K OHMS,1/10W,1%,SMD	14	R37, R43, R74, R84, R94, R115, R107, R136, R122, R144, R146, R30, R20, R204
....2	102-3010	RES,CHIP,301 OHMS,1/10W,1%,SMD	1	R66
....2	102-3011	RES,CHIP,3.01K OHMS,1/10W,1%,SMD	2	R24, R29
....2	102-3321	RES,CHIP,3.32K OHMS,1/10W,1%,SMD	2	R3, R69
....2	102-3832	RES,CHIP,38.3 KOHMS,1/10W,1%,SMD	1	R203
....2	102-3901	RES,CHIP,3.9K OHMS,1/10W,1%,SMD	1	R65
....2	102-3902	Res,Chip 39.2 ohms 1/10W 1% SMD	2	R104, R131
....2	102-3925	RES,CHIP,39.2 K OHM,1/10 W,1%	1	R197
....2	102-4221	RES,CHIP,4.22K,1/10W,1%,SMD	18	R36, R38, R41, R42, R72, R73, R82, R83, R92, R93, R113, R114, R120, R121, R105, R106, R134, R135
....2	102-4302	Res,Chip 43.2 ohms 1/10W 1% SMD	1	R81
....2	102-4421	RES,CHIP,4.42K OHMS,1/10W,1%,SMD	1	R25
....2	102-4750	RES,CHIP,475 OHMS,1/10W,1%,SMD	2	R150, R191
....2	102-4751	RES,CHIP,4.75K OHMS,1/10W,1%,SMD	32	R1, R4, R5, R6, R7, R8, R9, R10, R11, R12, R15, R16, R17, R141, R151, R142, R152, R194, R195, R39, R40, R166, R167, R172, R173, R143, R59, R161, R48, R50, R51, R52
....2	102-4990	RES,499 OHM,1/10W,1%	1	R68
....2	102-4991	RES,CHIP,49.9 OHMS,1/10W,1%,SMD	1	R180
....2	102-5112	RES,CHIP,51.1 OHM,1/10W,1%	2	R112, R133
....2	102-5143	RES,5.1K OHMS,1/10W,1%,SMD	6	R145, R147, R182, R186, R31, R205
....2	102-6040	RES,604 OHM,1/10W,1%	1	R174
....2	102-6341	RES,CHIP,6.34K,1/10W,1%,SMD	2	R154, R155
....2	102-6811	RES,CHIP,6.81K,1/10W,1%,SMD	1	R200
....2	102-7680	RES,CHIP,768 OHMS,1/10W,1%,SMD	1	R62
....2	198-2024	TRMR,2K OHMS, TOP ADJUST,10 TURN,SMD	1	R153
....2	204-0914	DIODE,SWITCHING,MMBD914LT1,SMD	4	D2, D3, D4, D5
....2	204-3102	DIODE,MMBV3102LT1,SMD	1	D7
....2	204-5000	VOLTAGE,REFERENCE,5.0V,SMD	1	D1
....2	210-0093	TRANSISTOR,BFR93A,SOT-23,SMD	2	Q23, Q24
....2	216-0064	TSTR SMT Darlington PNP	1	Q26
....2	216-0310	TSTR,MMBFU310LT1,SMD	1	Q22



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	220-1020	IC, RF Switch SP4T Absorptive	2	U12, U17
....2	220-4052-002	IC,4052 DUAL 4-CH MUX,SMD	1	U5
....2	220-4521	IC Digital Attenuator o-31 db	1	U11
....2	220-4527	Freq Mixer 50-1000 MHz +17 DBM LO	2	U18, U22
....2	220-4611	IC, DIG ATTEN, 0-31 DB, 0.5 DB STEPS	1	U15
....2	220-8065	IC, HIGH SPEED FET OP-AMP	1	U33
....2	220-9832	IC, 25 MHZ DDS	1	U30
....2	221-0006	RF Amp GALI-4 SMD Wideband 50 Ohm	9	U10, U13, U19, U20, U21, U23, U24, U25, U26
....2	221-4110	RF PLL FREQUENCY SYNTHESIZER	1	U28
....2	221-4111	IC PLL SYN DM Prescalers 1.2GHz	1	U27
....2	224-0333	SWITCH,QUAD,ADG333ABRS,20-PIN SSOP,SMD	1	U16
....2	224-0809	IC,MCU RESET,MAX809L,4.63V,SOT-23,SMD	1	U2
....2	270-101	Cap., monolithic chip, 100 pf 50v 5% Kemet C1206C101J5GAC	1	C141
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	37	C20, C21, C22, C27, C30, C36, C41, C45, C48, C49, C52, C55, C56, C59, C60, C65, C68, C69, C72, C75, C76, C77, C80, C81, C92, C97, C136, C143, C144, C84, C85, C127, C122, C64, C38, C39, C37
....2	270-103	Cap, Monolithic chip 10000pF 10% XR7 Kemet C1206C103J5RACTR	12	C26, C28, C46, C82, C99, C83, C129, C133, C146, C148, C40, C101
....2	270-104	Capacitor, Monolithic Chip 100000pF 1% C1206C104J5RAC Kemet	12	C86, C135, C91, C107, C132, C147, C149, C100, C150, C152, C153, C155
....2	270-682	CAPACITOR, SMT, 1206, 6800 PF, 5%	1	C142
....2	298-106	Cap., Tantalum, SMT, Size B, 10uF, 16V,Kemet T491B106K016AS	2	C106, C103
....2	298-157	Capacitor,Tantalum,SMT,size X,150uF,16V Kemet T491X157K016AS	3	C44, C109, C43
....2	330-024	Inductor, 10uH SMT DN12103JTR-ND DELEVAN 5%	16	L3, L8, L9, L30, L31, L16, L17, L18, L20, L21, L19, L22, L25, L26, L2, L5
....2	350-201	INDUCTOR, SMT, 1812, 82NH	1	L29
....2	360-0600	FILTER, HELICAL BANDPASS, F=60.0M	2	FL10, FL11
....2	360-0707	FILTER, HELICAL BANDPASS, F=70.7M	1	FL12
....2	366-0010-001	IND,10UH,1.5A	2	L27, L28
....2	366-0246	Inductor SMT 246 NH 5%,Maxi Spring	1	L23
....2	366-0680	IND,CER,680NH,5%,SMD	4	L1, L4, L14, L15
....2	366-2700	IND,1008LS 2.7UH,10%,SMD	1	L24
....2	400-196	IC, SMT, 1.5A STEP-UP REGULATOR	1	U37
....2	400-295	IC,OP-AMP, GENERAL PURPOSE, OP295GS	2	U14, U34



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	401-164	IC, SMT, 8-Bit Ser In, Par Out SR Phillips 74HC164D	2	U6, U7
....2	401-275	IC,SMT,OP-AMP,LOW NOISE,HIGH AUDIO BW	4	U3, U4, U32, U36
....2	401-317	IC, SMT, Regulator,Adjustable, 1.5 Amps,National LM317AEMP	1	U38
....2	401-374	IC, OCTAL D FLIP-FLOP W 3-ST OUT	2	U8, U9
....2	407-0502	EMI SHIELD,MODIFIED 59-CBSAFN-1.0x1.75x.50	1	
....2	413-1206	CHIP,TEST POINT,1206,SMD	3	TP1, TP2, TP3
....2	415-840	Diode, Zener, SMT, 13V, Vishay BZX84C13TR	2	D6, D8
....2	417-0090	KEYING PLUG 206509-1 AMP	4	
....2	417-0265	CONN,BNC,JACK,THREADED,PC EDGE MOUNT,LOW PROFILE	1	J5
....2	417-8915	CONN, 15 PIN, D, FEMALE, R.A. FILTERED	2	J1, J3
....2	417-8925	CONN, 25 PIN,D, FEMALE, R.A. FILTERED	1	J2
....2	418-120	DIODE, SMT, 1A, SCHOTTKY RECTIFIER	1	D9
....2	418-447	Diode, SMT, Zener, 4.7V, Motorola BZX84C4V7LT1	4	D10, D11, D12, D13
....2	420-141	Transistor, SMT, Darlington, NPN, Motorola MMBTA14LT1	15	Q1, Q2, Q4, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q25, Q27
....2	431-4400	SOCKET,44-PIN,PLCC,SMD note	1	
....2	439-041	TRANSISTOR, SMT, GENERAL PURPOSE, NPN	2	Q21, Q3
....2	513-2132	PCB,BLANK,DUAL WIDE BAND CONVERTER	1	
....2	973-2132-U1	KIT,SOFTWARE,SR30/SR40A/SR20C/SR20M, U1	1	U1
.....3	224-8535-001	IC,MCU,ATMEGA8535,44-PIN PLCC,SMD	1	U1

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
0	913-2132-240	ASSY,DUAL WIDE-BAND CONVERTER,240 MHZ (NOTE)		
..1	270-608-1	CAP, SMT, 6.8 PF, 100V	3	C61, C62, C63
..1	350-203	IND, SMT, 1812, 33 NH	2	L11, L12
..1	350-205	IND, SMT, 1812, 22 NH	2	L10, L13
..1	360-0221	FILTER, HELICAL BANDPASS, F=221M	2	FL2, FL3
..1	360-0234	FILTER, HELICAL BANDPASS, F=234M	2	FL4, FL5
..1	360-0240	FILTER, HELICAL BANDPASS, F=240M	1	FL1
..1	360-0246	FILTER, HELICAL BANDPASS, F=246M	2	FL8, FL9
..1	360-0259	FILTER, HELICAL BANDPASS, F=259M	2	FL6, FL7
..1	400-325	IC, VCO, 275-325 MHZ	1	U31
..1	407-0503	EMI SHIELD,MARTI CONVERTER INPUT	1	
..1	427-0061	CONNECTOR, N, PCB, STRAIGHT, PNL MTG	1	J4
..1	913-2132	ASSY,PCB,DUAL WIDE-BAND CONVERTER (SBCM)	1	
....2	006-1085	CAP,ELECTRO,100 UF,10%,35V,SMD	9	C94, C95, C88, C105, C130, C124, C125, C89, C156
....2	006-4775-350	CAP,ELECTRO,47UF,20%,35V,SMD	1	C134
....2	007-0470-006	CAP,470pF,50v,10%,0603	2	C137, C121
....2	007-1022	CAP,CER,100pF,50V,2%,SMD	3	C120, C117, C118
....2	007-1024	CAP,CER,.001uF,50V,10%,SMD	1	C115
....2	007-1044	CAP,CER,0.1uF,50V,10%,SMD note	14	C1, C4, C5, C6, C7, C8, C13, C14, C15, C16, C17, C111, C119, C34
....2	007-1813-050	CAP,CER,180 PFD,5%,50V,1206,SMD	1	C102
....2	007-3300	CAP,CER,3.3PF,50V,.25pF,SMD	1	C116
....2	007-3312	CAP,CER,33pF,50V,2%,SMD	4	C2, C3, C110, C114
....2	007-4700-500	CAP,CER,4.7pF,50V,.25pF,SMD	1	C113
....2	011-7.3728	Crystal,SMT,7.3728 MHz, 50ppm, Epson MA-506-7.3728M-C2	1	X1
....2	012-280-1	TCXO, SMT, 12.800 MHZ, 1PPM	1	U29
....2	070-1054	CAP,TANT,1uF,35V,10%,SMD	36	C18, C9, C10, C23, C24, C25, C31, C32, C29, C47, C50, C51, C53, C54, C57, C58, C70, C71, C66, C67, C78, C79, C73, C74, C87, C145, C96, C98, C93, C131, C126, C128, C90, C123, C42, C154
....2	070-1064	CAP,TANT,10uF,35V,20%,SMD	1	C138
....2	070-1084	CAP,TANT,100uF,16V,10%,SMD	1	C112
....2	070-2204	CAP,TANT,22uF,25V,10%,SMD	2	C11, C12
....2	070-2265-L25	CAP,TANT,22 MFD,20%,25V, E CASE,LOW ESR,SMD	2	C139, C140
....2	070-6854	TANT CAP, 6.8 UF, 16V, SIZE C	1	C108
....2	101-0100	RES,THICK FILM,100,1/8W,SMD	2	R13, R14



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	102-1000	RES,CHIP,100 OHMS,1/10W,1%,SMD	8	R19, R178, R179, R181, R185, R188, R189, R162
....2	102-1001	RES,CHIP,1.00K OHMS,1/10W,1%,SMD	16	R2, R163, R149, R164, R165, R192, R177, R183, R187, R70, R61, R160, R55, R56, R57, R58
....2	102-1002	RES,CHIP,10.0K OHMS,1/10W,1%,SMD	15	R18, R26, R27, R199, R148, R176, R193, R60, R63, R171, R64, R156, R157, R54, R202
....2	102-1003	RES,CHIP,100K OHMS,1/10W,1%,SMD	5	R170, R158, R159, R168, R169
....2	102-1004	RES,CHIP,1.00M OHMS,1/10W,1%,SMD	1	R53
....2	102-1102	RES,CHIP,11.0K OHMS,1/10W,1%,SMD	1	R201
....2	102-1103	Res Chip 110K 1/10W 1%,SMD	1	R198
....2	102-1400	RES,CHIP,1.4K OHMS,1/10W,1%,SMD	1	R28
....2	102-1500	RES,CHIP,150 OHMS,1/10W,1%,SMD	37	R32, R33, R34, R35, R44, R45, R46, R47, R75, R76, R77, R78, R85, R86, R87, R88, R95, R96, R97, R98, R116, R117, R118, R119, R108, R109, R110, R111, R137, R138, R139, R140, R123, R124, R125, R126, R175
....2	102-1582	RES,CHIP,15.8 K, 1/10 W, 1%	1	R21
....2	102-1623	Res,Chip 162K 1/10W 1% SMD	1	R196
....2	102-1744	RES,1.74K OHM,1/10W,1%	1	R190
....2	102-1802	Res Chip 18.2 ohm 1/10W 1% SMD	6	R99, R100, R101, R127, R128, R129
....2	102-2000	RES,CHIP,200 OHM,1/10 W,1% SMD	1	R184
....2	102-2001	RES,CHIP,2.00K OHMS,1/10W,1%,SMD	1	R22
....2	102-2201	RES,CHIP,22.1 OHM,1/10W,1%	3	R79, R80, R71
....2	102-2214	RES,CHIP,2.21K OHM,1/10W,1%	1	R23
....2	102-2490	RES,CHIP,24.9 OHM,1/10W,1%	4	R102, R103, R130, R132
....2	102-2491	RES,CHIP,2.49K,1/10W,1%,SMD	1	R67
....2	102-2741	RES,CHIP,2.74K OHMS,1/10W,1%,SMD	14	R37, R43, R74, R84, R94, R115, R107, R136, R122, R144, R146, R30, R20, R204
....2	102-3010	RES, CHIP, 301 OHMS, 1/10W, 1%, SMD	1	R66
....2	102-3011	RES,CHIP,3.01K OHMS,1/10W,1%,SMD	2	R24, R29
....2	102-3321	RES,CHIP,3.32K OHMS,1/10W,1%,SMD	2	R3, R69
....2	102-3832	RES, CHIP, 38.3 KOHMS, 1/10W, 1%, SMD	1	R203
....2	102-3901	RES,CHIP,3.9K OHMS,1/10W,1%,SMD	1	R65
....2	102-3902	Res, Chip 39.2 ohms 1/10W 1% SMD	2	R104, R131

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	102-3925	RES,CHIP,39.2 K OHM,1/10 W,1%	1	R197
....2	102-4221	RES,CHIP,4.22K,1/10W,1%,SMD	18	R36, R38, R41, R42, R72, R73, R82, R83, R92, R93, R113, R114, R120, R121, R105, R106, R134, R135
....2	102-4302	Res,Chip 43.2 ohms 1/10W 1% SMD	1	R81
....2	102-4421	RES,CHIP,4.42K OHMS,1/10W,1%,SMD	1	R25
....2	102-4750	RES,CHIP,475 OHMS,1/10W,1%,SMD	2	R150, R191
....2	102-4751	RES,CHIP,4.75K OHMS,1/10W,1%,SMD	32	R1, R4, R5, R6, R7, R8, R9, R10, R11, R12, R15, R16, R17, R141, R151, R142, R152, R194, R195, R39, R40, R166, R167, R172, R173, R143, R59, R161, R48, R50, R51, R52
....2	102-4990	RES,499 OHM,1/10W,1%	1	R68
....2	102-4991	RES,CHIP,49.9 OHMS,1/10W,1%,SMD	1	R180
....2	102-5112	RES,CHIP,51.1 OHM,1/10W,1%	2	R112, R133
....2	102-5143	RES,5.1K OHMS,1/10W,1%,SMD	6	R145, R147, R182, R186, R31, R205
....2	102-6040	RES,604 OHM,1/10W,1%	1	R174
....2	102-6341	RES,CHIP,6.34K,1/10W,1%,SMD	2	R154, R155
....2	102-6811	RES,CHIP,6.81K,1/10W,1%,SMD	1	R200
....2	102-7680	RES,CHIP,768 OHMS,1/10W,1%,SMD	1	R62
....2	198-2024	TRMR,2K OHMS,TOP ADJUST,10 TURN,SMD	1	R153
....2	204-0914	DIODE,SWITCHING,MMBD914LT1,SMD	4	D2, D3, D4, D5
....2	204-3102	DIODE,MMBV3102LT1,SMD	1	D7
....2	204-5000	VOLTAGE,REFERENCE,5.0V,SMD	1	D1
....2	210-0093	TRANSISTOR,BFR93A,SOT-23,SMD	2	Q23, Q24
....2	216-0064	TSTR SMT Darlington PNP	1	Q26
....2	216-0310	TSTR,MMBFU310LT1,SMD	1	Q22
....2	220-1020	IC, RF Switch SP4T Absorptive	2	U12, U17
....2	220-4052-002	IC,4052 DUAL 4-CH MUX,SMD	1	U5
....2	220-4521	IC Digital Attenuator 0-31 db	1	U11
....2	220-4527	Freq Mixer 50-1000 MHz +17 DBM LO	2	U18, U22
....2	220-4611	IC, DIG ATTEN, 0-31 DB, 0.5 DB STEPS	1	U15
....2	220-8065	IC, HIGH SPEED FET OP-AMP	1	U33
....2	220-9832	IC, 25 MHZ DDS	1	U30
....2	221-0006	RF Amp GALI-4 SMD Wideband 50 Ohm	9	U10, U13, U19, U20, U21, U23, U24, U25, U26
....2	221-4110	RF PLL FREQUENCY SYNTHESIZER	1	U28
....2	221-4111	IC PLL SYN DM Prescalers 1.2GHz	1	U27
....2	224-0333	SWITCH,QUAD,ADG333ABRS,20-PIN SSOP,SMD	1	U16
....2	224-0809	IC,MCU RESET,MAX809L,4.63V,SOT-23,SMD	1	U2
....2	270-101	Cap., monolithic chip, 100 pf 50v 5% Kemet C1206C101J5GAC	1	C141



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	37	C20, C21, C22, C27, C30, C36, C41, C45, C48, C49, C52, C55, C56, C59, C60, C65, C68, C69, C72, C75, C76, C77, C80, C81, C92, C97, C136, C143, C144, C84, C85, C127, C122, C64, C38, C39, C37
....2	270-103	Cap, Monolithic chip 10000pF 10% XR7 Kemet C1206C103J5RACTR	12	C26, C28, C46, C82, C99, C83, C129, C133, C146, C148, C40, C101
....2	270-104	Capacitor, Monolithic Chip 100000pF 1% C1206C104J5RAC Kemet	12	C86, C135, C91, C107, C132, C147, C149, C100, C150, C152, C153, C155
....2	270-682	CAPACITOR, SMT, 1206, 6800 PF, 5%	1	C142
....2	298-106	Cap., Tantalum, SMT, Size B, 10uF, 16V,Kemet T491B106K016AS	2	C106, C103
....2	298-157	Capacitor,Tantalum,SMT,size X,150uF,16V Kemet T491X157K016AS	3	C44, C109, C43
....2	330-024	Inductor, 10uH SMT DN12103JTR-ND DELEVAN 5%	16	L3, L8, L9, L30, L31, L16, L17, L18, L20, L21, L19, L22, L25, L26, L2, L5
....2	350-201	INDUCTOR, SMT, 1812, 82NH	1	L29
....2	360-0600	FILTER, HELICAL BANDPASS, F=60.0M	2	FL10, FL11
....2	360-0707	FILTER, HELICAL BANDPASS, F=70.7M	1	FL12
....2	366-0010-001	IND,10UH,1.5A	2	L27, L28
....2	366-0246	Inductor SMT 246 NH 5%,Maxi Spring	1	L23
....2	366-0680	IND,CER,680NH,5%,SMD	4	L1, L4, L14, L15
....2	366-2700	IND,1008LS 2.7UH,10%,SMD	1	L24
....2	400-196	IC, SMT, 1.5A STEP-UP REGULATOR	1	U37
....2	400-295	IC,OP-AMP, GENERAL PURPOSE, OP295GS	2	U14, U34
....2	401-164	IC, SMT, 8-Bit Ser In, Par Out SR Phillips 74HC164D	2	U6, U7
....2	401-275	IC,SMT,OP-AMP,LOW NOISE,HIGH AUDIO BW	4	U3, U4, U32, U36
....2	401-317	IC, SMT, Regulator,Adjustable, 1.5 Amps,National LM317AEMP	1	U38
....2	401-374	IC, OCTAL D FLIP-FLOP W 3-ST OUT	2	U8, U9
....2	407-0502	EMI SHIELD,MODIFIED 59-CBSAFN- 1.0x1.75x.50	1	
....2	413-1206	CHIP,TEST POINT,1206,SMD	3	TP1, TP2, TP3
....2	415-840	Diode, Zener, SMT, 13V, Vishay BZX84C13TR	2	D6, D8
....2	417-0090	KEYING PLUG 206509-1 AMP	4	
....2	417-0265	CONN,BNC,JACK,THREADED,PC EDGE MOUNT,LOW PROFILE	1	J5
....2	417-8915	CONN, 15 PIN, D, FEMALE, R.A. FILTERED	2	J1, J3
....2	417-8925	CONN, 25 PIN,D, FEMALE, R.A. FILTERED	1	J2
....2	418-120	DIODE, SMT, 1A, SCHOTTKY RECTIFIER	1	D9

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	418-447	Diode, SMT, Zener, 4.7V, Motorola BZX84C4V7LT1	4	D10, D11, D12, D13
....2	420-141	Transistor, SMT, Darlington, NPN, Motorola MMBTA14LT1	15	Q1, Q2, Q4, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q25, Q27
....2	431-4400	SOCKET,44-PIN,PLCC,SMD note	1	
....2	439-041	TRANSISTOR, SMT, GENERAL PURPOSE, NPN	2	Q21, Q3
....2	513-2132	PCB,BLANK,DUAL WIDE BAND CONVERTER	1	
....2	973-2132-U1	KIT,SOFTWARE,SR30/SR40A/SR20C/SR20M, U1	1	U1
.....3	224-8535-001	IC,MCU,ATMEGA8535,44-PIN PLCC,SMD	1	U1



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
0	913-2132-330	ASSY,DUAL WIDE-BAND CONVERTER,330 MHZ (NOTE)		
..1	270-407-1	Capacitor,SMT,size 1206,4.7pF,COG,100V Kemet C1206C479C1GAC	3	C61, C62, C63
..1	350-192	INDUCTOR, 12.5nH, SMT, 1206	2	L10, L13
..1	350-194	INDUCTOR, 18.5nH, SMT, 1206	2	L11, L12
..1	360-0306	FILTER, HELICAL BANDPASS, F=306M	2	FL2, FL3
..1	360-0319	FILTER, HELICAL BANDPASS, F=319M	2	FL4, FL5
..1	360-0325	FILTER, HELICAL BANDPASS, F=325M	1	FL1
..1	360-0331	FILTER, HELICAL BANDPASS, F=331M	2	FL8, FL9
..1	360-0344	FILTER, HELICAL BANDPASS, F=344M	2	FL6, FL7
..1	400-410	IC, VCO, 360-410 MHZ	1	U31
..1	407-0503	EMI SHIELD,MARTI CONVERTER INPUT	1	
..1	427-0061	CONNECTOR, N, PCB, STRAIGHT, PNL MTG	1	J4
..1	913-2132	ASSY,PCB,DUAL WIDE-BAND CONVERTER (SBCM)	1	
....2	006-1085	CAP,ELECTRO,100 UF,10%,35V,SMD	9	C94, C95, C88, C105, C130, C124, C125, C89, C156
....2	006-4775-350	CAP,ELECTRO,47UF,20%,35V,SMD	1	C134
....2	007-0470-006	CAP,470pF,50v,10%,0603	2	C137, C121
....2	007-1022	CAP,CER,100pF,50V,2%,SMD	3	C120, C117, C118
....2	007-1024	CAP,CER,.001uF,50V,10%,SMD	1	C115
....2	007-1044	CAP,CER,0.1uF,50V,10%,SMD note	14	C1, C4, C5, C6, C7, C8, C13, C14, C15, C16, C17, C111, C119, C34
....2	007-1813-050	CAP,CER,180 PFD,5%,50V,1206,SMD	1	C102
....2	007-3300	CAP,CER,3.3PF,50V,.25pF,SMD	1	C116
....2	007-3312	CAP,CER,33pF,50V,2%,SMD	4	C2, C3, C110, C114
....2	007-4700-500	CAP,CER,4.7pF,50V,.25pF,SMD	1	C113
....2	011-7.3728	Crystal,SMT,7.3728 MHz, 50ppm, Epson MA-506-7.3728M-C2	1	X1
....2	012-280-1	TCXO, SMT, 12.800 MHZ, 1PPM	1	U29
....2	070-1054	CAP,TANT,1uF,35V,10%,SMD	36	C18, C9, C10, C23, C24, C25, C31, C32, C29, C47, C50, C51, C53, C54, C57, C58, C70, C71, C66, C67, C78, C79, C73, C74, C87, C145, C96, C98, C93, C131, C126, C128, C90, C123, C42, C154
....2	070-1064	CAP,TANT,10uF,35V,20%,SMD	1	C138
....2	070-1084	CAP,TANT,100uF,16V,10%,SMD	1	C112
....2	070-2204	CAP,TANT,22uF,25V,10%,SMD	2	C11, C12
....2	070-2265-L25	CAP,TANT,22 MFD,20%,25V, E CASE,LOW ESR,SMD	2	C139, C140
....2	070-6854	TANT CAP, 6.8 UF, 16V, SIZE C	1	C108
....2	101-0100	RES,THICK FILM,100,1/8W,SMD	2	R13, R14

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	102-1000	RES,CHIP,100 OHMS,1/10W,1%,SMD	8	R19, R178, R179, R181, R185, R188, R189, R162
....2	102-1001	RES,CHIP,1.00K OHMS,1/10W,1%,SMD	16	R2, R163, R149, R164, R165, R192, R177, R183, R187, R70, R61, R160, R55, R56, R57, R58
....2	102-1002	RES,CHIP,10.0K OHMS,1/10W,1%,SMD	15	R18, R26, R27, R199, R148, R176, R193, R60, R63, R171, R64, R156, R157, R54, R202
....2	102-1003	RES,CHIP,100K OHMS,1/10W,1%,SMD	5	R170, R158, R159, R168, R169
....2	102-1004	RES,CHIP,1.00M OHMS,1/10W,1%,SMD	1	R53
....2	102-1102	RES,CHIP,11.0K OHMS,1/10W,1%,SMD	1	R201
....2	102-1103	Res Chip 110K 1/10W 1%,SMD	1	R198
....2	102-1400	RES,CHIP,1.4K OHMS,1/10W,1%,SMD	1	R28
....2	102-1500	RES,CHIP,150 OHMS,1/10W,1%,SMD	37	R32, R33, R34, R35, R44, R45, R46, R47, R75, R76, R77, R78, R85, R86, R87, R88, R95, R96, R97, R98, R116, R117, R118, R119, R108, R109, R110, R111, R137, R138, R139, R140, R123, R124, R125, R126, R175
....2	102-1582	RES,CHIP,15.8 K, 1/10 W, 1%	1	R21
....2	102-1623	Res,Chip 162K 1/10W 1% SMD	1	R196
....2	102-1744	RES,1.74K OHM,1/10W,1%	1	R190
....2	102-1802	Res Chip 18.2 ohm 1/10W 1% SMD	6	R99, R100, R101, R127, R128, R129
....2	102-2000	RES,CHIP,200 OHM,1/10 W,1% SMD	1	R184
....2	102-2001	RES,CHIP,2.00K OHMS,1/10W,1%,SMD	1	R22
....2	102-2201	RES,CHIP,22.1 OHM,1/10W,1%	3	R79, R80, R71
....2	102-2214	RES,CHIP,2.21K OHM,1/10W,1%	1	R23
....2	102-2490	RES,CHIP,24.9 OHM,1/10W,1%	4	R102, R103, R130, R132
....2	102-2491	RES,CHIP,2.49K,1/10W,1%,SMD	1	R67
....2	102-2741	RES,CHIP,2.74K OHMS,1/10W,1%,SMD	14	R37, R43, R74, R84, R94, R115, R107, R136, R122, R144, R146, R30, R20, R204
....2	102-3010	RES, CHIP, 301 OHMS, 1/10W, 1%, SMD	1	R66
....2	102-3011	RES,CHIP,3.01K OHMS,1/10W,1%,SMD	2	R24, R29
....2	102-3321	RES,CHIP,3.32K OHMS,1/10W,1%,SMD	2	R3, R69
....2	102-3832	RES, CHIP, 38.3 KOHMS, 1/10W, 1%, SMD	1	R203
....2	102-3901	RES,CHIP,3.9K OHMS,1/10W,1%,SMD	1	R65
....2	102-3902	Res, Chip 39.2 ohms 1/10W 1% SMD	2	R104, R131



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	102-3925	RES,CHIP,39.2 K OHM,1/10 W,1%	1	R197
....2	102-4221	RES,CHIP,4.22K,1/10W,1%,SMD	18	R36, R38, R41, R42, R72, R73, R82, R83, R92, R93, R113, R114, R120, R121, R105, R106, R134, R135
....2	102-4302	Res,Chip 43.2 ohms 1/10W 1% SMD	1	R81
....2	102-4421	RES,CHIP,4.42K OHMS,1/10W,1%,SMD	1	R25
....2	102-4750	RES,CHIP,475 OHMS,1/10W,1%,SMD	2	R150, R191
....2	102-4751	RES,CHIP,4.75K OHMS,1/10W,1%,SMD	32	R1, R4, R5, R6, R7, R8, R9, R10, R11, R12, R15, R16, R17, R141, R151, R142, R152, R194, R195, R39, R40, R166, R167, R172, R173, R143, R59, R161, R48, R50, R51, R52
....2	102-4990	RES,499 OHM,1/10W,1%	1	R68
....2	102-4991	RES,CHIP,49.9 OHMS,1/10W,1%,SMD	1	R180
....2	102-5112	RES,CHIP,51.1 OHM,1/10W,1%	2	R112, R133
....2	102-5143	RES,5.1K OHMS,1/10W,1%,SMD	6	R145, R147, R182, R186, R31, R205
....2	102-6040	RES,604 OHM,1/10W,1%	1	R174
....2	102-6341	RES,CHIP,6.34K,1/10W,1%,SMD	2	R154, R155
....2	102-6811	RES,CHIP,6.81K,1/10W,1%,SMD	1	R200
....2	102-7680	RES,CHIP,768 OHMS,1/10W,1%,SMD	1	R62
....2	198-2024	TRMR,2K OHMS,TOP ADJUST,10 TURN,SMD	1	R153
....2	204-0914	DIODE,SWITCHING,MMBD914LT1,SMD	4	D2, D3, D4, D5
....2	204-3102	DIODE,MMBV3102LT1,SMD	1	D7
....2	204-5000	VOLTAGE,REFERENCE,5.0V,SMD	1	D1
....2	210-0093	TRANSISTOR,BFR93A,SOT-23,SMD	2	Q23, Q24
....2	216-0064	TSTR SMT Darlington PNP	1	Q26
....2	216-0310	TSTR,MMBFU310LT1,SMD	1	Q22
....2	220-1020	IC, RF Switch SP4T Absorptive	2	U12, U17
....2	220-4052-002	IC,4052 DUAL 4-CH MUX,SMD	1	U5
....2	220-4521	IC Digital Attenuator 0-31 db	1	U11
....2	220-4527	Freq Mixer 50-1000 MHz +17 DBM LO	2	U18, U22
....2	220-4611	IC, DIG ATTEN, 0-31 DB, 0.5 DB STEPS	1	U15
....2	220-8065	IC, HIGH SPEED FET OP-AMP	1	U33
....2	220-9832	IC, 25 MHZ DDS	1	U30
....2	221-0006	RF Amp GALI-4 SMD Wideband 50 Ohm	9	U10, U13, U19, U20, U21, U23, U24, U25, U26
....2	221-4110	RF PLL FREQUENCY SYNTHESIZER	1	U28
....2	221-4111	IC PLL SYN DM Prescalers 1.2GHz	1	U27
....2	224-0333	SWITCH,QUAD,ADG333ABRS,20-PIN SSOP,SMD	1	U16
....2	224-0809	IC,MCU RESET,MAX809L,4.63V,SOT-23,SMD	1	U2
....2	270-101	Cap., monolithic chip, 100 pf 50v 5% Kemet C1206C101J5GAC	1	C141

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	37	C20, C21, C22, C27, C30, C36, C41, C45, C48, C49, C52, C55, C56, C59, C60, C65, C68, C69, C72, C75, C76, C77, C80, C81, C92, C97, C136, C143, C144, C84, C85, C127, C122, C64, C38, C39, C37
....2	270-103	Cap, Monolithic chip 10000pF 10% XR7 Kemet C1206C103J5RACTR	12	C26, C28, C46, C82, C99, C83, C129, C133, C146, C148, C40, C101
....2	270-104	Capacitor, Monolithic Chip 100000pF 1% C1206C104J5RAC Kemet	12	C86, C135, C91, C107, C132, C147, C149, C100, C150, C152, C153, C155
....2	270-682	CAPACITOR, SMT, 1206, 6800 PF, 5%	1	C142
....2	298-106	Cap., Tantalum, SMT, Size B, 10uF, 16V,Kemet T491B106K016AS	2	C106, C103
....2	298-157	Capacitor,Tantalum,SMT,size X,150uF,16V Kemet T491X157K016AS	3	C44, C109, C43
....2	330-024	Inductor, 10uH SMT DN12103JTR-ND DELEVAN 5%	16	L3, L8, L9, L30, L31, L16, L17, L18, L20, L21, L19, L22, L25, L26, L2, L5
....2	350-201	INDUCTOR, SMT, 1812, 82NH	1	L29
....2	360-0600	FILTER, HELICAL BANDPASS, F=60.0M	2	FL10, FL11
....2	360-0707	FILTER, HELICAL BANDPASS, F=70.7M	1	FL12
....2	366-0010-001	IND,10UH,1.5A	2	L27, L28
....2	366-0246	Inductor SMT 246 NH 5%,Maxi Spring	1	L23
....2	366-0680	IND,CER,680NH,5%,SMD	4	L1, L4, L14, L15
....2	366-2700	IND,1008LS 2.7UH,10%,SMD	1	L24
....2	400-196	IC, SMT, 1.5A STEP-UP REGULATOR	1	U37
....2	400-295	IC,OP-AMP, GENERAL PURPOSE, OP295GS	2	U14, U34
....2	401-164	IC, SMT, 8-Bit Ser In, Par Out SR Phillips 74HC164D	2	U6, U7
....2	401-275	IC,SMT,OP-AMP,LOW NOISE,HIGH AUDIO BW	4	U3, U4, U32, U36
....2	401-317	IC, SMT, Regulator,Adjustable, 1.5 Amps,National LM317AEMP	1	U38
....2	401-374	IC, OCTAL D FLIP-FLOP W 3-ST OUT	2	U8, U9
....2	407-0502	EMI SHIELD,MODIFIED 59-CBSAFN- 1.0x1.75x.50	1	
....2	413-1206	CHIP,TEST POINT,1206,SMD	3	TP1, TP2, TP3
....2	415-840	Diode, Zener, SMT, 13V, Vishay BZX84C13TR	2	D6, D8
....2	417-0090	KEYING PLUG 206509-1 AMP	4	
....2	417-0265	CONN,BNC,JACK,THREADED,PC EDGE MOUNT,LOW PROFILE	1	J5
....2	417-8915	CONN, 15 PIN, D, FEMALE, R.A. FILTERED	2	J1, J3
....2	417-8925	CONN, 25 PIN,D, FEMALE, R.A. FILTERED	1	J2
....2	418-120	DIODE, SMT, 1A, SCHOTTKY RECTIFIER	1	D9



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	418-447	Diode, SMT, Zener, 4.7V, Motorola BZX84C4V7LT1	4	D10, D11, D12, D13
....2	420-141	Transistor, SMT, Darlington, NPN, Motorola MMBTA14LT1	15	Q1, Q2, Q4, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q25, Q27
....2	431-4400	SOCKET,44-PIN,PLCC,SMD note	1	
....2	439-041	TRANSISTOR, SMT, GENERAL PURPOSE, NPN	2	Q21, Q3
....2	513-2132	PCB,BLANK,DUAL WIDE BAND CONVERTER	1	
....2	973-2132-U1	KIT,SOFTWARE,SR30/SR40A/SR20C/SR20M, U1	1	U1
.....3	224-8535-001	IC,MCU,ATMEGA8535,44-PIN PLCC,SMD	1	U1



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
0	913-2132-450	ASSY,DUAL WIDE-BAND CONVERTER,450 MHZ (NOTE)		
..1	270-407-1	Capacitor,SMT,size 1206,4.7pF,COG,100V Kemet C1206C479C1GAC	3	C61, C62, C63
..1	350-192	INDUCTOR, 12.5nH, SMT, 1206	2	L10, L13
..1	350-194	INDUCTOR, 18.5nH, SMT, 1206	2	L11, L12
..1	360-0436	FILTER, HELICAL BANDPASS, F=436M	2	FL2, FL3
..1	360-0449	FILTER, HELICAL BANDPASS, F=449M	2	FL4, FL5
..1	360-0455	FILTER, HELICAL BANDPASS, F=455M	1	FL1
..1	360-0461	FILTER, HELICAL BANDPASS, F=461M	2	FL8, FL9
..1	360-0474	FILTER, HELICAL BANDPASS, F=474M	2	FL6, FL7
..1	400-420	IC, VCO, 370-420 MHZ	1	U31
..1	407-0503	EMI SHIELD,MARTI CONVERTER INPUT	1	
..1	427-0061	CONNECTOR, N, PCB, STRAIGHT, PNL MTG	1	J4
..1	913-2132	ASSY,PCB,DUAL WIDE-BAND CONVERTER (SBCM)	1	
....2	006-1085	CAP,ELECTRO,100 UF,10%,35V,SMD	9	C94, C95, C88, C105, C130, C124, C125, C89, C156
....2	006-4775-350	CAP,ELECTRO,47UF,20%,35V,SMD	1	C134
....2	007-0470-006	CAP,470pF,50v,10%,0603	2	C137, C121
....2	007-1022	CAP,CER,100pF,50V,2%,SMD	3	C120, C117, C118
....2	007-1024	CAP,CER,.001uF,50V,10%,SMD	1	C115
....2	007-1044	CAP,CER,0.1uF,50V,10%,SMD note	14	C1, C4, C5, C6, C7, C8, C13, C14, C15, C16, C17, C111, C119, C34
....2	007-1813-050	CAP,CER,180 PFD,5%,50V,1206,SMD	1	C102
....2	007-3300	CAP,CER,3.3PF,50V,.25pF,SMD	1	C116
....2	007-3312	CAP,CER,33pF,50V,2%,SMD	4	C2, C3, C110, C114
....2	007-4700-500	CAP,CER,4.7pF,50V,.25pF,SMD	1	C113
....2	011-7.3728	Crystal,SMT,7.3728 MHz, 50ppm, Epson MA-506-7.3728M-C2	1	X1
....2	012-280-1	TCXO, SMT, 12.800 MHZ, 1PPM	1	U29
....2	070-1054	CAP,TANT,1uF,35V,10%,SMD	36	C18, C9, C10, C23, C24, C25, C31, C32, C29, C47, C50, C51, C53, C54, C57, C58, C70, C71, C66, C67, C78, C79, C73, C74, C87, C145, C96, C98, C93, C131, C126, C128, C90, C123, C42, C154
....2	070-1064	CAP,TANT,10uF,35V,20%,SMD	1	C138
....2	070-1084	CAP,TANT,100uF,16V,10%,SMD	1	C112
....2	070-2204	CAP,TANT,22uF,25V,10%,SMD	2	C11, C12
....2	070-2265-L25	CAP,TANT,22 MFD,20%,25V, E CASE,LOW ESR,SMD	2	C139, C140
....2	070-6854	TANT CAP, 6.8 UF, 16V, SIZE C	1	C108
....2	101-0100	RES,THICK FILM,100,1/8W,SMD	2	R13, R14



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	102-1000	RES,CHIP,100 OHMS,1/10W,1%,SMD	8	R19, R178, R179, R181, R185, R188, R189, R162
....2	102-1001	RES,CHIP,1.00K OHMS,1/10W,1%,SMD	16	R2, R163, R149, R164, R165, R192, R177, R183, R187, R70, R61, R160, R55, R56, R57, R58
....2	102-1002	RES,CHIP,10.0K OHMS,1/10W,1%,SMD	15	R18, R26, R27, R199, R148, R176, R193, R60, R63, R171, R64, R156, R157, R54, R202
....2	102-1003	RES,CHIP,100K OHMS,1/10W,1%,SMD	5	R170, R158, R159, R168, R169
....2	102-1004	RES,CHIP,1.00M OHMS,1/10W,1%,SMD	1	R53
....2	102-1102	RES,CHIP,11.0K OHMS,1/10W,1%,SMD	1	R201
....2	102-1103	Res Chip 110K 1/10W 1%,SMD	1	R198
....2	102-1400	RES,CHIP,1.4K OHMS,1/10W,1%,SMD	1	R28
....2	102-1500	RES,CHIP,150 OHMS,1/10W,1%,SMD	37	R32, R33, R34, R35, R44, R45, R46, R47, R75, R76, R77, R78, R85, R86, R87, R88, R95, R96, R97, R98, R116, R117, R118, R119, R108, R109, R110, R111, R137, R138, R139, R140, R123, R124, R125, R126, R175
....2	102-1582	RES,CHIP,15.8 K, 1/10 W, 1%	1	R21
....2	102-1623	Res,Chip 162K 1/10W 1% SMD	1	R196
....2	102-1744	RES,1.74K OHM,1/10W,1%	1	R190
....2	102-1802	Res Chip 18.2 ohm 1/10W 1% SMD	6	R99, R100, R101, R127, R128, R129
....2	102-2000	RES,CHIP,200 OHM,1/10 W,1% SMD	1	R184
....2	102-2001	RES,CHIP,2.00K OHMS,1/10W,1%,SMD	1	R22
....2	102-2201	RES,CHIP,22.1 OHM,1/10W,1%	3	R79, R80, R71
....2	102-2214	RES,CHIP,2.21K OHM,1/10W,1%	1	R23
....2	102-2490	RES,CHIP,24.9 OHM,1/10W,1%	4	R102, R103, R130, R132
....2	102-2491	RES,CHIP,2.49K,1/10W,1%,SMD	1	R67
....2	102-2741	RES,CHIP,2.74K OHMS,1/10W,1%,SMD	14	R37, R43, R74, R84, R94, R115, R107, R136, R122, R144, R146, R30, R20, R204
....2	102-3010	RES, CHIP, 301 OHMS, 1/10W, 1%, SMD	1	R66
....2	102-3011	RES,CHIP,3.01K OHMS,1/10W,1%,SMD	2	R24, R29
....2	102-3321	RES,CHIP,3.32K OHMS,1/10W,1%,SMD	2	R3, R69
....2	102-3832	RES, CHIP, 38.3 KOHMS, 1/10W, 1%, SMD	1	R203
....2	102-3901	RES,CHIP,3.9K OHMS,1/10W,1%,SMD	1	R65
....2	102-3902	Res, Chip 39.2 ohms 1/10W 1% SMD	2	R104, R131

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	102-3925	RES,CHIP,39.2 K OHM,1/10 W,1%	1	R197
....2	102-4221	RES,CHIP,4.22K,1/10W,1%,SMD	18	R36, R38, R41, R42, R72, R73, R82, R83, R92, R93, R113, R114, R120, R121, R105, R106, R134, R135
....2	102-4302	Res,Chip 43.2 ohms 1/10W 1% SMD	1	R81
....2	102-4421	RES,CHIP,4.42K OHMS,1/10W,1%,SMD	1	R25
....2	102-4750	RES,CHIP,475 OHMS,1/10W,1%,SMD	2	R150, R191
....2	102-4751	RES,CHIP,4.75K OHMS,1/10W,1%,SMD	32	R1, R4, R5, R6, R7, R8, R9, R10, R11, R12, R15, R16, R17, R141, R151, R142, R152, R194, R195, R39, R40, R166, R167, R172, R173, R143, R59, R161, R48, R50, R51, R52
....2	102-4990	RES,499 OHM,1/10W,1%	1	R68
....2	102-4991	RES,CHIP,49.9 OHMS,1/10W,1%,SMD	1	R180
....2	102-5112	RES,CHIP,51.1 OHM,1/10W,1%	2	R112, R133
....2	102-5143	RES,5.1K OHMS,1/10W,1%,SMD	6	R145, R147, R182, R186, R31, R205
....2	102-6040	RES,604 OHM,1/10W,1%	1	R174
....2	102-6341	RES,CHIP,6.34K,1/10W,1%,SMD	2	R154, R155
....2	102-6811	RES,CHIP,6.81K,1/10W,1%,SMD	1	R200
....2	102-7680	RES,CHIP,768 OHMS,1/10W,1%,SMD	1	R62
....2	198-2024	TRMR,2K OHMS, TOP ADJUST, 10 TURN, SMD	1	R153
....2	204-0914	DIODE, SWITCHING, MMBD914LT1, SMD	4	D2, D3, D4, D5
....2	204-3102	DIODE, MMBV3102LT1, SMD	1	D7
....2	204-5000	VOLTAGE, REFERENCE, 5.0V, SMD	1	D1
....2	210-0093	TRANSISTOR, BFR93A, SOT-23, SMD	2	Q23, Q24
....2	216-0064	TSTR SMT Darlington PNP	1	Q26
....2	216-0310	TSTR, MMBFU310LT1, SMD	1	Q22
....2	220-1020	IC, RF Switch SP4T Absorptive	2	U12, U17
....2	220-4052-002	IC, 4052 DUAL 4-CH MUX, SMD	1	U5
....2	220-4521	IC Digital Attenuator 0-31 db	1	U11
....2	220-4527	Freq Mixer 50-1000 MHz +17 DBM LO	2	U18, U22
....2	220-4611	IC, DIG ATTEN, 0-31 DB, 0.5 DB STEPS	1	U15
....2	220-8065	IC, HIGH SPEED FET OP-AMP	1	U33
....2	220-9832	IC, 25 MHZ DDS	1	U30
....2	221-0006	RF Amp GALI-4 SMD Wideband 50 Ohm	9	U10, U13, U19, U20, U21, U23, U24, U25, U26
....2	221-4110	RF PLL FREQUENCY SYNTHESIZER	1	U28
....2	221-4111	IC PLL SYN DM Prescalers 1.2GHz	1	U27
....2	224-0333	SWITCH, QUAD, ADG333ABRS, 20-PIN SSOP, SMD	1	U16
....2	224-0809	IC, MCU RESET, MAX809L, 4.63V, SOT-23, SMD	1	U2
....2	270-101	Cap., monolithic chip, 100 pf 50v 5% Kemet C1206C101J5GAC	1	C141



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	37	C20, C21, C22, C27, C30, C36, C41, C45, C48, C49, C52, C55, C56, C59, C60, C65, C68, C69, C72, C75, C76, C77, C80, C81, C92, C97, C136, C143, C144, C84, C85, C127, C122, C64, C38, C39, C37
....2	270-103	Cap, Monolithic chip 10000pF 10% XR7 Kemet C1206C103J5RACTR	12	C26, C28, C46, C82, C99, C83, C129, C133, C146, C148, C40, C101
....2	270-104	Capacitor, Monolithic Chip 100000pF 1% C1206C104J5RAC Kemet	12	C86, C135, C91, C107, C132, C147, C149, C100, C150, C152, C153, C155
....2	270-682	CAPACITOR, SMT, 1206, 6800 PF, 5%	1	C142
....2	298-106	Cap., Tantalum, SMT, Size B, 10uF, 16V,Kemet T491B106K016AS	2	C106, C103
....2	298-157	Capacitor,Tantalum,SMT,size X,150uF,16V Kemet T491X157K016AS	3	C44, C109, C43
....2	330-024	Inductor, 10uH SMT DN12103JTR-ND DELEVAN 5%	16	L3, L8, L9, L30, L31, L16, L17, L18, L20, L21, L19, L22, L25, L26, L2, L5
....2	350-201	INDUCTOR, SMT, 1812, 82NH	1	L29
....2	360-0600	FILTER, HELICAL BANDPASS, F=60.0M	2	FL10, FL11
....2	360-0707	FILTER, HELICAL BANDPASS, F=70.7M	1	FL12
....2	366-0010-001	IND,10UH,1.5A	2	L27, L28
....2	366-0246	Inductor SMT 246 NH 5%,Maxi Spring	1	L23
....2	366-0680	IND,CER,680NH,5%,SMD	4	L1, L4, L14, L15
....2	366-2700	IND,1008LS 2.7UH,10%,SMD	1	L24
....2	400-196	IC, SMT, 1.5A STEP-UP REGULATOR	1	U37
....2	400-295	IC,OP-AMP, GENERAL PURPOSE, OP295GS	2	U14, U34
....2	401-164	IC, SMT, 8-Bit Ser In, Par Out SR Phillips 74HC164D	2	U6, U7
....2	401-275	IC,SMT,OP-AMP,LOW NOISE,HIGH AUDIO BW	4	U3, U4, U32, U36
....2	401-317	IC, SMT, Regulator,Adjustable, 1.5 Amps,National LM317AEMP	1	U38
....2	401-374	IC, OCTAL D FLIP-FLOP W 3-ST OUT	2	U8, U9
....2	407-0502	EMI SHIELD,MODIFIED 59-CBSAFN- 1.0x1.75x.50	1	
....2	413-1206	CHIP,TEST POINT,1206,SMD	3	TP1, TP2, TP3
....2	415-840	Diode, Zener, SMT, 13V, Vishay BZX84C13TR	2	D6, D8
....2	417-0090	KEYING PLUG 206509-1 AMP	4	
....2	417-0265	CONN,BNC,JACK,THREADED,PC EDGE MOUNT,LOW PROFILE	1	J5
....2	417-8915	CONN, 15 PIN, D, FEMALE, R.A. FILTERED	2	J1, J3
....2	417-8925	CONN, 25 PIN,D, FEMALE, R.A. FILTERED	1	J2
....2	418-120	DIODE, SMT, 1A, SCHOTTKY RECTIFIER	1	D9

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	418-447	Diode, SMT, Zener, 4.7V, Motorola BZX84C4V7LT1	4	D10, D11, D12, D13
....2	420-141	Transistor, SMT, Darlington, NPN, Motorola MMBTA14LT1	15	Q1, Q2, Q4, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q25, Q27
....2	431-4400	SOCKET,44-PIN,PLCC,SMD note	1	
....2	439-041	TRANSISTOR, SMT, GENERAL PURPOSE, NPN	2	Q21, Q3
....2	513-2132	PCB,BLANK,DUAL WIDE BAND CONVERTER	1	
....2	973-2132-U1	KIT,SOFTWARE,SR30/SR40A/SR20C/SR20M, U1	1	U1
.....3	224-8535-001	IC,MCU,ATMEGA8535,44-PIN PLCC,SMD	1	U1



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
0	913-2132-950	ASSY,DUAL WIDE-BAND CONVERTER,950 MHZ (NOTE)		
..1	102-0000	RES,CHIP,0 OHM,0805,SMD	2	R79, R80
..1	102-2201	RES,CHIP,22.1 OHM,1/10W,1%	-2	REMOVE R79, R80
..1	102-4302	Res,Chip 43.2 ohms 1/10W 1% SMD	-1	REMOVE R81
..1	270-202	Cap,monolithic chip 2.2pF 100V .25pf% Kemet C1206C229C1GACTR	3	C61, C62, C63
..1	350-198	INDUCTOR, SMT, 1206, 5NH	2	L10, L13
..1	350-199	INDUCTOR, SMT, 1206, 8nH	2	L11, L12
..1	360-0943	FILTER, HELICAL BANDPASS, F=943M	1	FL2
..1	360-0950	FILTER, HELICAL BANDPASS, F=950M	1	FL1
..1	360-0958	FILTER, HELICAL BANDPASS, F=958M	1	FL4
..1	400-905	IC, VCO, 875-905 MHZ	1	U31
..1	407-0503	EMI SHIELD,MARTI CONVERTER INPUT	1	
..1	427-0061	CONNECTOR, N, PCB, STRAIGHT, PNL MTG	1	J4
..1	913-2132	ASSY,PCB,DUAL WIDE-BAND CONVERTER (SBCM)	1	
....2	006-1085	CAP,ELECTRO,100 UF,10%,35V,SMD	9	C94, C95, C88, C105, C130, C124, C125, C89, C156
....2	006-4775-350	CAP,ELECTRO,47UF,20%,35V,SMD	1	C134
....2	007-0470-006	CAP,470pF,50v,10%,0603	2	C137, C121
....2	007-1022	CAP,CER,100pF,50V,2%,SMD	3	C120, C117, C118
....2	007-1024	CAP,CER,.001uF,50V,10%,SMD	1	C115
....2	007-1044	CAP,CER,0.1uF,50V,10%,SMD note	14	C1, C4, C5, C6, C7, C8, C13, C14, C15, C16, C17, C111, C119, C34
....2	007-1813-050	CAP,CER,180 PFD,5%,50V,1206,SMD	1	C102
....2	007-3300	CAP,CER,3.3PF,50V,.25pF,SMD	1	C116
....2	007-3312	CAP,CER,33pF,50V,2%,SMD	4	C2, C3, C110, C114
....2	007-4700-500	CAP,CER,4.7pF,50V,.25pF,SMD	1	C113
....2	011-7.3728	Crystal,SMT,7.3728 MHz, 50ppm, Epson MA-506-7.3728M-C2	1	X1
....2	012-280-1	TCXO, SMT, 12.800 MHZ, 1PPM	1	U29
....2	070-1054	CAP,TANT,1uF,35V,10%,SMD	36	C18, C9, C10, C23, C24, C25, C31, C32, C29, C47, C50, C51, C53, C54, C57, C58, C70, C71, C66, C67, C78, C79, C73, C74, C87, C145, C96, C98, C93, C131, C126, C128, C90, C123, C42, C154
....2	070-1064	CAP,TANT,10uF,35V,20%,SMD	1	C138
....2	070-1084	CAP,TANT,100uF,16V,10%,SMD	1	C112
....2	070-2204	CAP,TANT,22uF,25V,10%,SMD	2	C11, C12
....2	070-2265-L25	CAP,TANT,22 MFD,20%,25V, E CASE,LOW ESR,SMD	2	C139, C140
....2	070-6854	TANT CAP, 6.8 UF, 16V, SIZE C	1	C108
....2	101-0100	RES,THICK FILM,100,1/8W,SMD	2	R13, R14

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
...2	102-1000	RES,CHIP,100 OHMS,1/10W,1%,SMD	8	R19, R178, R179, R181, R185, R188, R189, R162
...2	102-1001	RES,CHIP,1.00K OHMS,1/10W,1%,SMD	16	R2, R163, R149, R164, R165, R192, R177, R183, R187, R70, R61, R160, R55, R56, R57, R58
...2	102-1002	RES,CHIP,10.0K OHMS,1/10W,1%,SMD	15	R18, R26, R27, R199, R148, R176, R193, R60, R63, R171, R64, R156, R157, R54, R202
...2	102-1003	RES,CHIP,100K OHMS,1/10W,1%,SMD	5	R170, R158, R159, R168, R169
...2	102-1004	RES,CHIP,1.00M OHMS,1/10W,1%,SMD	1	R53
...2	102-1102	RES,CHIP,11.0K OHMS,1/10W,1%,SMD	1	R201
...2	102-1103	Res Chip 110K 1/10W 1%,SMD	1	R198
...2	102-1400	RES,CHIP,1.4K OHMS,1/10W,1%,SMD	1	R28
...2	102-1500	RES,CHIP,150 OHMS,1/10W,1%,SMD	37	R32, R33, R34, R35, R44, R45, R46, R47, R75, R76, R77, R78, R85, R86, R87, R88, R95, R96, R97, R98, R116, R117, R118, R119, R108, R109, R110, R111, R137, R138, R139, R140, R123, R124, R125, R126, R175
...2	102-1582	RES,CHIP,15.8 K, 1/10 W, 1%	1	R21
...2	102-1623	Res,Chip 162K 1/10W 1% SMD	1	R196
...2	102-1744	RES,1.74K OHM,1/10W,1%	1	R190
...2	102-1802	Res Chip 18.2 ohm 1/10W 1% SMD	6	R99, R100, R101, R127, R128, R129
...2	102-2000	RES,CHIP,200 OHM,1/10 W,1% SMD	1	R184
...2	102-2001	RES,CHIP,2.00K OHMS,1/10W,1%,SMD	1	R22
...2	102-2201	RES,CHIP,22.1 OHM,1/10W,1%	3	R79, R80, R71
...2	102-2214	RES,CHIP,2.21K OHM,1/10W,1%	1	R23
...2	102-2490	RES,CHIP,24.9 OHM,1/10W,1%	4	R102, R103, R130, R132
...2	102-2491	RES,CHIP,2.49K,1/10W,1%,SMD	1	R67
...2	102-2741	RES,CHIP,2.74K OHMS,1/10W,1%,SMD	14	R37, R43, R74, R84, R94, R115, R107, R136, R122, R144, R146, R30, R20, R204
...2	102-3010	RES,CHIP,301 OHMS,1/10W,1%,SMD	1	R66
...2	102-3011	RES,CHIP,3.01K OHMS,1/10W,1%,SMD	2	R24, R29
...2	102-3321	RES,CHIP,3.32K OHMS,1/10W,1%,SMD	2	R3, R69
...2	102-3832	RES,CHIP,38.3 KOHMS,1/10W,1%,SMD	1	R203
...2	102-3901	RES,CHIP,3.9K OHMS,1/10W,1%,SMD	1	R65
...2	102-3902	Res, Chip 39.2 ohms 1/10W 1% SMD	2	R104, R131



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	102-3925	RES,CHIP,39.2 K OHM,1/10 W,1%	1	R197
....2	102-4221	RES,CHIP,4.22K,1/10W,1%,SMD	18	R36, R38, R41, R42, R72, R73, R82, R83, R92, R93, R113, R114, R120, R121, R105, R106, R134, R135
....2	102-4302	Res,Chip 43.2 ohms 1/10W 1% SMD	1	R81
....2	102-4421	RES,CHIP,4.42K OHMS,1/10W,1%,SMD	1	R25
....2	102-4750	RES,CHIP,475 OHMS,1/10W,1%,SMD	2	R150, R191
....2	102-4751	RES,CHIP,4.75K OHMS,1/10W,1%,SMD	32	R1, R4, R5, R6, R7, R8, R9, R10, R11, R12, R15, R16, R17, R141, R151, R142, R152, R194, R195, R39, R40, R166, R167, R172, R173, R143, R59, R161, R48, R50, R51, R52
....2	102-4990	RES,499 OHM,1/10W,1%	1	R68
....2	102-4991	RES,CHIP,49.9 OHMS,1/10W,1%,SMD	1	R180
....2	102-5112	RES,CHIP,51.1 OHM,1/10W,1%	2	R112, R133
....2	102-5143	RES,5.1K OHMS,1/10W,1%,SMD	6	R145, R147, R182, R186, R31, R205
....2	102-6040	RES,604 OHM,1/10W,1%	1	R174
....2	102-6341	RES,CHIP,6.34K,1/10W,1%,SMD	2	R154, R155
....2	102-6811	RES,CHIP,6.81K,1/10W,1%,SMD	1	R200
....2	102-7680	RES,CHIP,768 OHMS,1/10W,1%,SMD	1	R62
....2	198-2024	TRMR,2K OHMS,TOP ADJUST,10 TURN,SMD	1	R153
....2	204-0914	DIODE,SWITCHING,MMBD914LT1,SMD	4	D2, D3, D4, D5
....2	204-3102	DIODE,MMBV3102LT1,SMD	1	D7
....2	204-5000	VOLTAGE,REFERENCE,5.0V,SMD	1	D1
....2	210-0093	TRANSISTOR,BFR93A,SOT-23,SMD	2	Q23, Q24
....2	216-0064	TSTR SMT Darlington PNP	1	Q26
....2	216-0310	TSTR,MMBFU310LT1,SMD	1	Q22
....2	220-1020	IC, RF Switch SP4T Absorptive	2	U12, U17
....2	220-4052-002	IC,4052 DUAL 4-CH MUX,SMD	1	U5
....2	220-4521	IC Digital Attenuator 0-31 db	1	U11
....2	220-4527	Freq Mixer 50-1000 MHz +17 DBM LO	2	U18, U22
....2	220-4611	IC, DIG ATTEN, 0-31 DB, 0.5 DB STEPS	1	U15
....2	220-8065	IC, HIGH SPEED FET OP-AMP	1	U33
....2	220-9832	IC, 25 MHZ DDS	1	U30
....2	221-0006	RF Amp GALI-4 SMD Wideband 50 Ohm	9	U10, U13, U19, U20, U21, U23, U24, U25, U26
....2	221-4110	RF PLL FREQUENCY SYNTHESIZER	1	U28
....2	221-4111	IC PLL SYN DM Prescalers 1.2GHz	1	U27
....2	224-0333	SWITCH,QUAD,ADG333ABRS,20-PIN SSOP,SMD	1	U16
....2	224-0809	IC,MCU RESET,MAX809L,4.63V,SOT-23,SMD	1	U2
....2	270-101	Cap., monolithic chip, 100 pf 50v 5% Kemet C1206C101J5GAC	1	C141

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	270-102	Cap,monolithic,1000pf 50v 5%KemetC1206C102J5GACTR marked	37	C20, C21, C22, C27, C30, C36, C41, C45, C48, C49, C52, C55, C56, C59, C60, C65, C68, C69, C72, C75, C76, C77, C80, C81, C92, C97, C136, C143, C144, C84, C85, C127, C122, C64, C38, C39, C37
....2	270-103	Cap, Monolithic chip 10000pF 10% XR7 Kemet C1206C103J5RACTR	12	C26, C28, C46, C82, C99, C83, C129, C133, C146, C148, C40, C101
....2	270-104	Capacitor, Monolithic Chip 100000pF 1% C1206C104J5RAC Kemet	12	C86, C135, C91, C107, C132, C147, C149, C100, C150, C152, C153, C155
....2	270-682	CAPACITOR, SMT, 1206, 6800 PF, 5%	1	C142
....2	298-106	Cap., Tantalum, SMT, Size B, 10uF, 16V,Kemet T491B106K016AS	2	C106, C103
....2	298-157	Capacitor,Tantalum,SMT,size X,150uF,16V Kemet T491X157K016AS	3	C44, C109, C43
....2	330-024	Inductor, 10uH SMT DN12103JTR-ND DELEVAN 5%	16	L3, L8, L9, L30, L31, L16, L17, L18, L20, L21, L19, L22, L25, L26, L2, L5
....2	350-201	INDUCTOR, SMT, 1812, 82NH	1	L29
....2	360-0600	FILTER, HELICAL BANDPASS, F=60.0M	2	FL10, FL11
....2	360-0707	FILTER, HELICAL BANDPASS, F=70.7M	1	FL12
....2	366-0010-001	IND,10UH,1.5A	2	L27, L28
....2	366-0246	Inductor SMT 246 NH 5%,Maxi Spring	1	L23
....2	366-0680	IND,CER,680NH,5%,SMD	4	L1, L4, L14, L15
....2	366-2700	IND,1008LS 2.7UH,10%,SMD	1	L24
....2	400-196	IC, SMT, 1.5A STEP-UP REGULATOR	1	U37
....2	400-295	IC,OP-AMP, GENERAL PURPOSE, OP295GS	2	U14, U34
....2	401-164	IC, SMT, 8-Bit Ser In, Par Out SR Phillips 74HC164D	2	U6, U7
....2	401-275	IC,SMT,OP-AMP,LOW NOISE,HIGH AUDIO BW	4	U3, U4, U32, U36
....2	401-317	IC, SMT, Regulator,Adjustable, 1.5 Amps,National LM317AEMP	1	U38
....2	401-374	IC, OCTAL D FLIP-FLOP W 3-ST OUT	2	U8, U9
....2	407-0502	EMI SHIELD,MODIFIED 59-CBSAFN- 1.0x1.75x.50	1	
....2	413-1206	CHIP,TEST POINT,1206,SMD	3	TP1, TP2, TP3
....2	415-840	Diode, Zener, SMT, 13V, Vishay BZX84C13TR	2	D6, D8
....2	417-0090	KEYING PLUG 206509-1 AMP	4	
....2	417-0265	CONN,BNC,JACK,THREADED,PC EDGE MOUNT,LOW PROFILE	1	J5
....2	417-8915	CONN, 15 PIN, D, FEMALE, R.A. FILTERED	2	J1, J3
....2	417-8925	CONN, 25 PIN,D, FEMALE, R.A. FILTERED	1	J2
....2	418-120	DIODE, SMT, 1A, SCHOTTKY RECTIFIER	1	D9



BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	418-447	Diode, SMT, Zener, 4.7V, Motorola BZX84C4V7LT1	4	D10, D11, D12, D13
....2	420-141	Transistor, SMT, Darlington, NPN, Motorola MMBTA14LT1	15	Q1, Q2, Q4, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q25, Q27
....2	431-4400	SOCKET,44-PIN,PLCC,SMD note	1	
....2	439-041	TRANSISTOR, SMT, GENERAL PURPOSE, NPN	2	Q21, Q3
....2	513-2132	PCB,BLANK,DUAL WIDE BAND CONVERTER	1	
....2	973-2132-U1	KIT,SOFTWARE,SR30/SR40A/SR20C/SR20M, U1	1	U1
.....3	224-8535-001	IC,MCU,ATMEGA8535,44-PIN PLCC,SMD	1	U1
..1	943-2134	CABLE,RF,SR-20C/SR-20M,950 MHz	2	
....2	621-1359	CBL,COAX,RG316/U,50 OHM	0.08	



15 RF TECHNICAL SERVICES CONTACT INFORMATION

RF Technical Services -

Telephone: **(217) 224-9617**

E-Mail: rfservice@bdcast.com

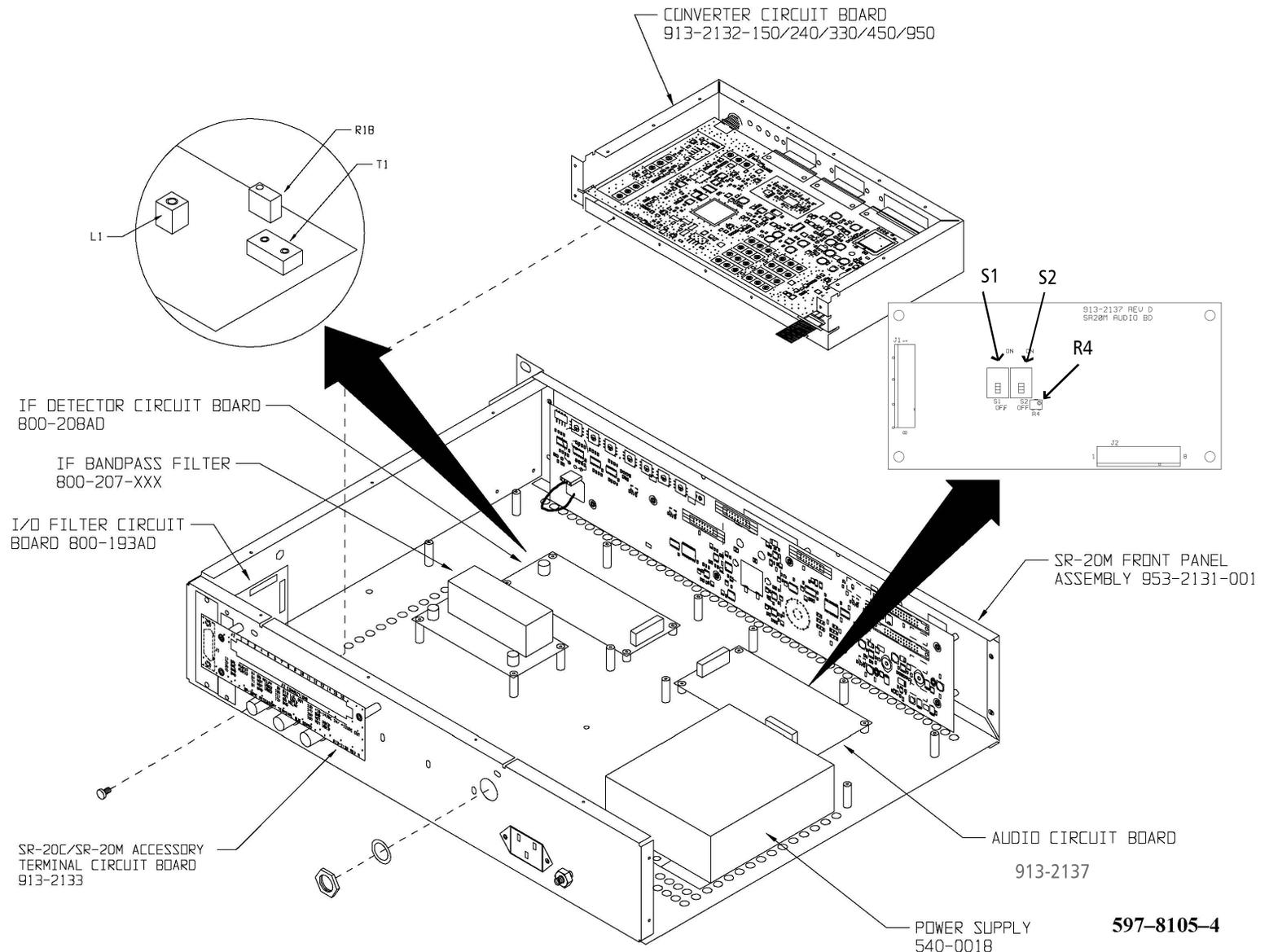
Fax: **(217) 224-6528**

web: www.bdcast.com



16 SCHEMATICS



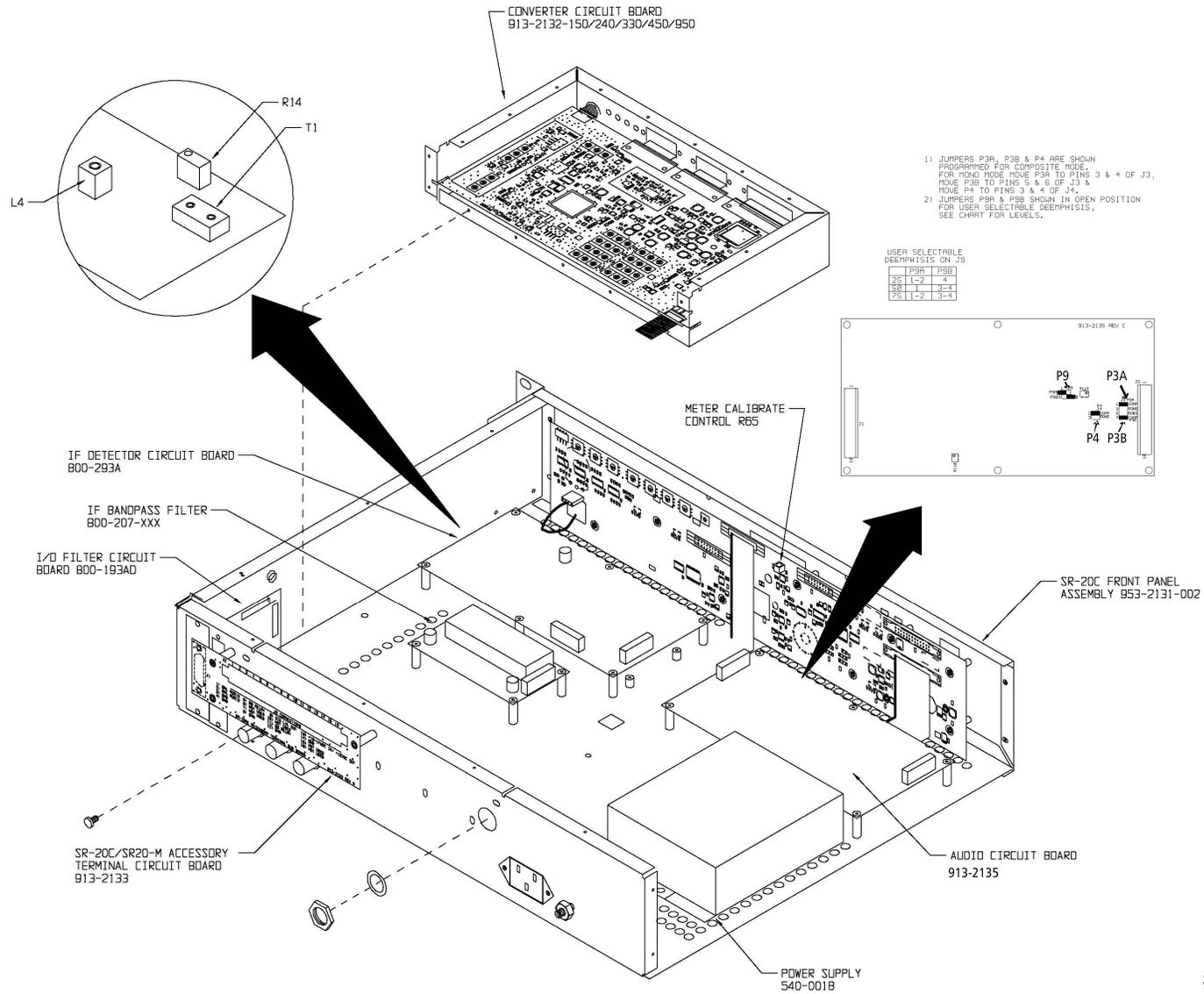


SR-20M ADJUSTMENT CONTROLS AND LOCATIONS

597-8105-4

POWER SUPPLY
540-0018

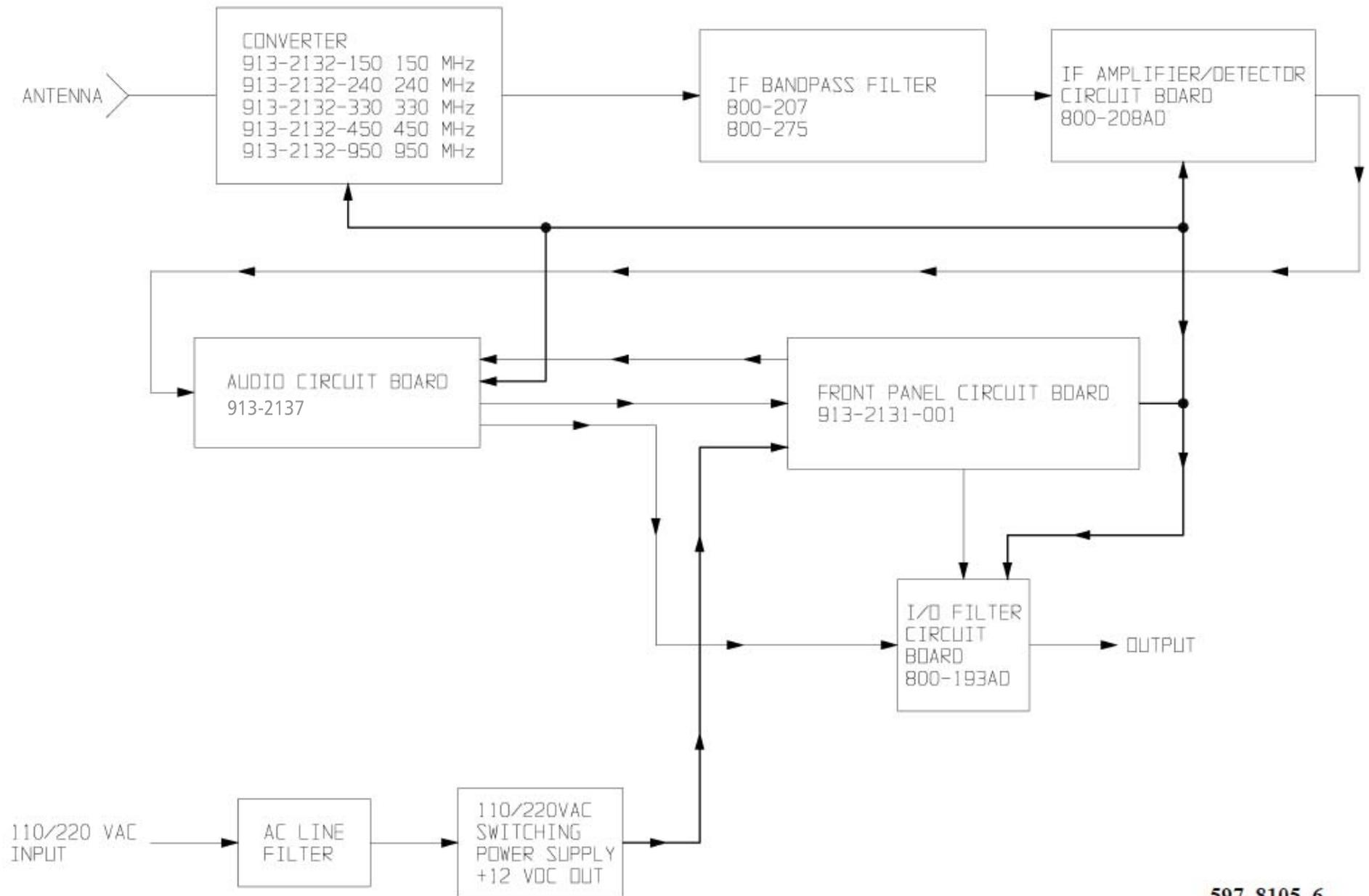
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SR-20C ADJUSTMENT CONTROLS AND LOCATIONS

597-8105-5

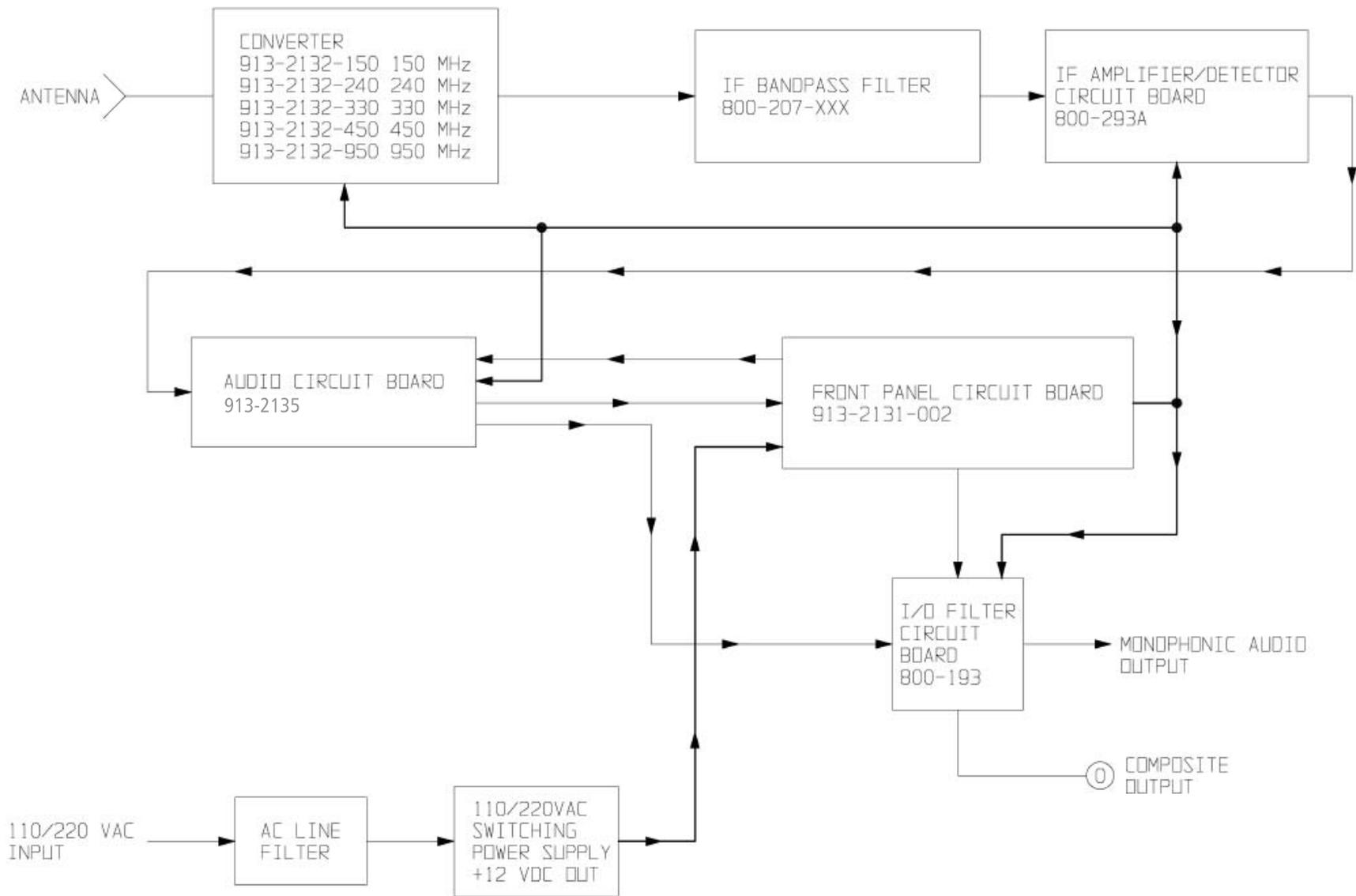
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SR-20M BLOCK DIAGRAM

597-8105-6

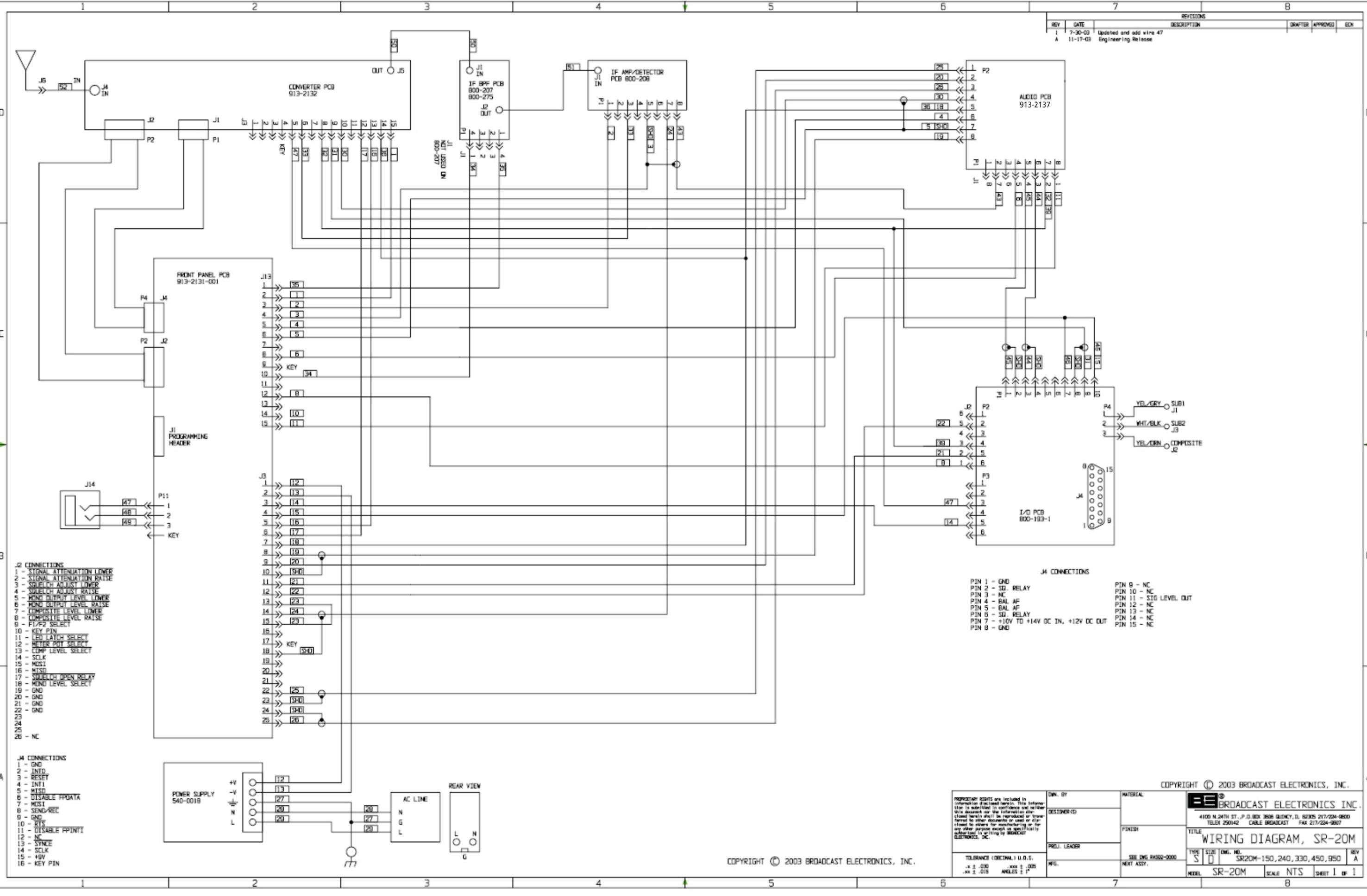
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SR-20C BLOCK DIAGRAM

597-8105-7

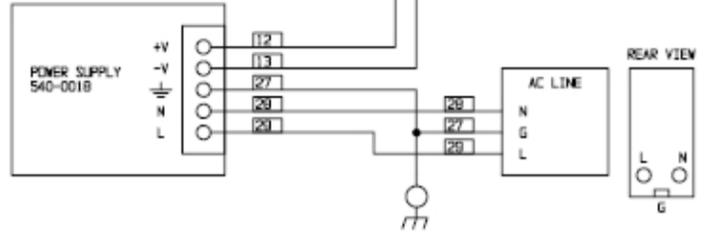
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	7-30-03	Updated and add wire 47			
A	11-17-03	Engineering Release			



- J2 CONNECTIONS**
- 1 - SIGNAL ATTENUATION LOWER
 - 2 - SIGNAL ATTENUATION RAISE
 - 3 - SQUELCH ADJUST LOWER
 - 4 - SQUELCH ADJUST RAISE
 - 5 - MONO OUTPUT LEVEL LOWER
 - 6 - MONO OUTPUT LEVEL RAISE
 - 7 - COMPOSITE LEVEL LOWER
 - 8 - COMPOSITE LEVEL RAISE
 - 9 - P1/P2 SELECT
 - 10 - KEY PIN
 - 11 - LED LATCH SELECT
 - 12 - METER POT SELECT
 - 13 - CLMP LEVEL SELECT
 - 14 - SCLK
 - 15 - MDS1
 - 16 - MDS2
 - 17 - SQUELCH OPEN RELAY
 - 18 - MONO LEVEL SELECT
 - 19 - GND
 - 20 - GND
 - 21 - GND
 - 22 - GND
 - 23 - GND
 - 24 - GND
 - 25 - NC

- J4 CONNECTIONS**
- 1 - GND
 - 2 - INTD
 - 3 - RESET
 - 4 - INT1
 - 5 - MDS2
 - 6 - DISABLE PPDATA
 - 7 - MDS1
 - 8 - SEND-REC
 - 9 - GND
 - 10 - RTS
 - 11 - DISABLE PPINT1
 - 12 - NC
 - 13 - SYNC
 - 14 - SCLK
 - 15 - +5V
 - 16 - KEY PIN

- J4 CONNECTIONS**
- PIN 1 - GND
 - PIN 2 - SD RELAY
 - PIN 3 - NC
 - PIN 4 - BAL AF
 - PIN 5 - BAL AF
 - PIN 6 - SD RELAY
 - PIN 7 - +10V TO +14V DC IN, +12V DC OUT
 - PIN 8 - GND
 - PIN 9 - NC
 - PIN 10 - NC
 - PIN 11 - SIG LEVEL OUT
 - PIN 12 - NC
 - PIN 13 - NC
 - PIN 14 - NC
 - PIN 15 - NC



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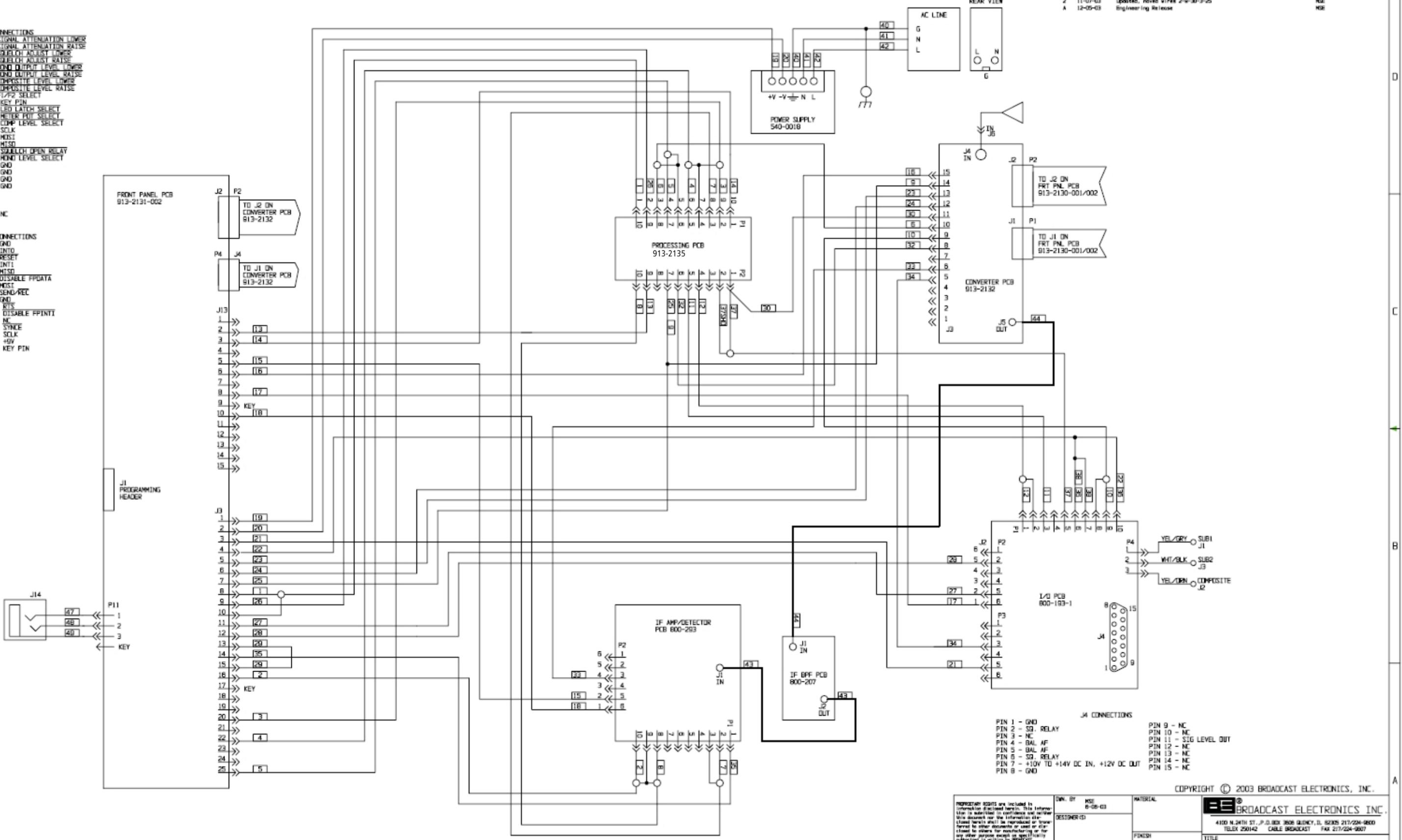
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	PROJ. LEADER	FINISH	
TOLERANCE (DECIMAL) U.S.S. .X ± .030 .XXX ± .005 .XX ± .015 ANGLES ± 1°	MFG.	SEE DWS #4502-0000 NEXT ASSY.	TYPE SIZE DWG. NO. S D SR20M-150,240,330,450,950
		MODEL SR-20M SCALE NTS SHEET 1 OF 1	REV A

REV	DATE	DESCRIPTION	DRAWN	APPROVED	ECN
1	7-30-03	Updated wires 33 & 34	NSE		
2	11-07-03	Updated, moved wires 2-9-30-3-25	NSE		
A	12-05-03	Engineering Release	NSE		

- J2 CONNECTIONS**
- 1 - SIGNAL ATTENUATION LOWER
 - 2 - SIGNAL ATTENUATION RAISE
 - 3 - SQUELCH ADJUST LOWER
 - 4 - SQUELCH ADJUST RAISE
 - 5 - MONO OUTPUT LEVEL LOWER
 - 6 - MONO OUTPUT LEVEL RAISE
 - 7 - COMPOSITE LEVEL LOWER
 - 8 - COMPOSITE LEVEL RAISE
 - 9 - F1/F2 SELECT
 - 10 - KEY PIN
 - 11 - LED LATCH SELECT
 - 12 - REVER POL SELECT
 - 13 - CDP LEVEL SELECT
 - 14 - SCLK
 - 15 - MOSI
 - 16 - MISO
 - 17 - SQUELCH OPEN RELAY
 - 18 - MONO LEVEL SELECT
 - 19 - GND
 - 20 - GND
 - 21 - GND
 - 22 - GND
 - 23
 - 24
 - 25
 - 26 - NC

- J4 CONNECTIONS**
- 1 - GND
 - 2 - INTD
 - 3 - RESET
 - 4 - INT1
 - 5 - MISO
 - 6 - DISABLE FPDATA
 - 7 - MOSI
 - 8 - SEND/REC
 - 9 - GND
 - 10 - RTS
 - 11 - DISABLE FPINT1
 - 12 - NC
 - 13 - SYNC
 - 14 - SCLK
 - 15 - +5V
 - 16 - KEY PIN

- J4 CONNECTIONS**
- PIN 1 - GND
 - PIN 2 - SQ. RELAY
 - PIN 3 - NC
 - PIN 4 - BAL AF
 - PIN 5 - BAL AF
 - PIN 6 - SQ. RELAY
 - PIN 7 - +10V TO +14V DC IN, +12V DC OUT
 - PIN 8 - GND
 - PIN 9 - NC
 - PIN 10 - NC
 - PIN 11 - SIG LEVEL OUT
 - PIN 12 - NC
 - PIN 13 - NC
 - PIN 14 - NC
 - PIN 15 - NC



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	DESIGNER(S):	FINISH:		TITLE: WIRING DIAGRAM, SR-20C	
	PROJ. LEADER:	SEE ENG. PARTS-0000		TYPE: S D	QTY: 1
	MFG.:	NEXT ASSY:		SCALE: NTS	SHEET 1 OF 1

- 1 GROUND
- 2 SQ RELAY
- 3 DECODE LVL
- 4 BAL AUDIO
- 5 BAL AUDIO
- 6 SQ RELAY
- 7 VDC IN
- 8 GROUND
- 9 +18 VDC
- 10 RY N/C TO GND
- 11 SIG LVL OUT
- 12 DECODE RELAY
- 13 DECODE RELAY
- 14 NOT USED
- 15 MUTE

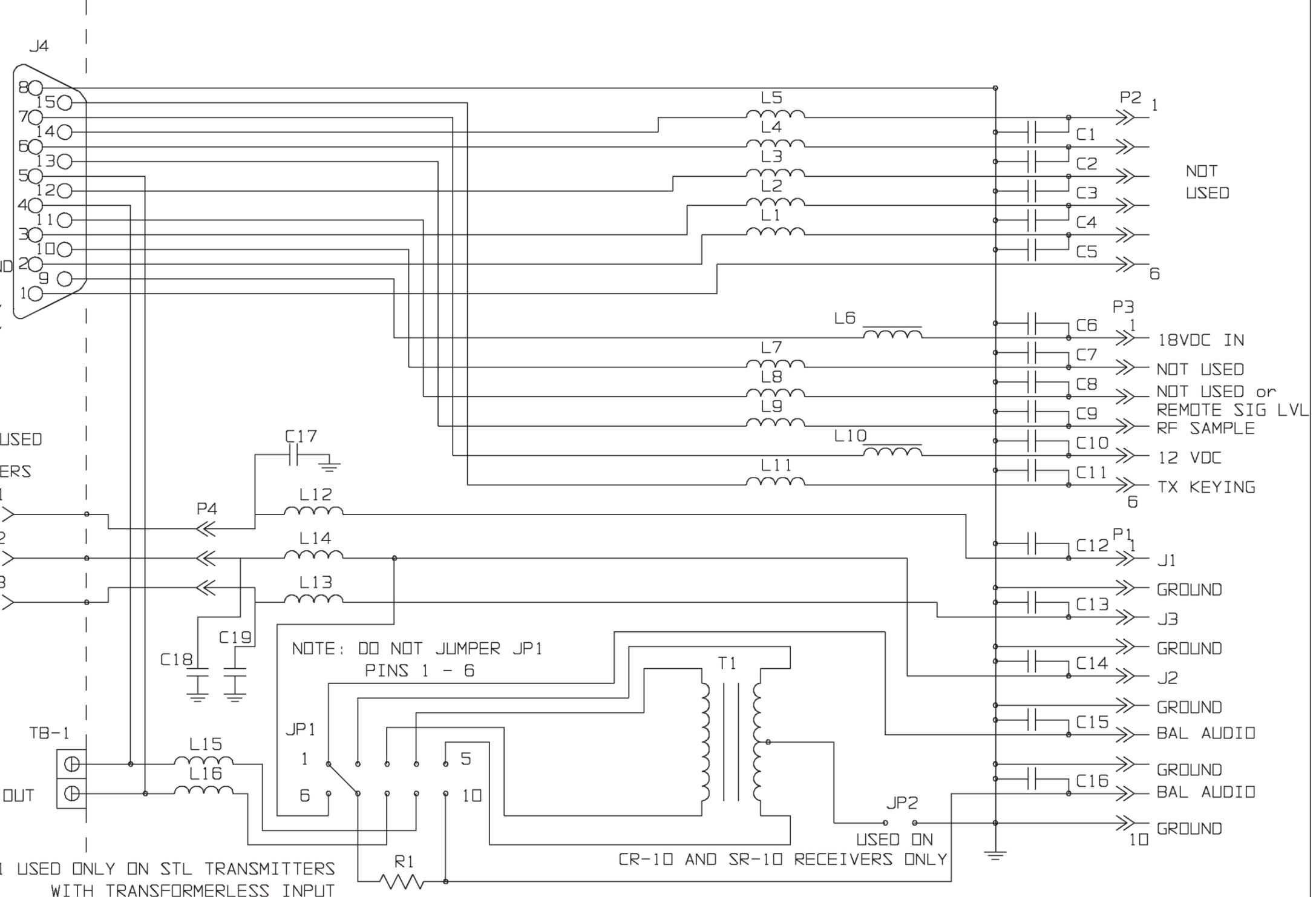
J1 - J3 NOT USED
ON CR-10 AND
SR-10 RECEIVERS

600 OHM
BALANCED
MONO AUDIO OUT
+8 dBm

R1 USED ONLY ON STL TRANSMITTERS
WITH TRANSFORMERLESS INPUT

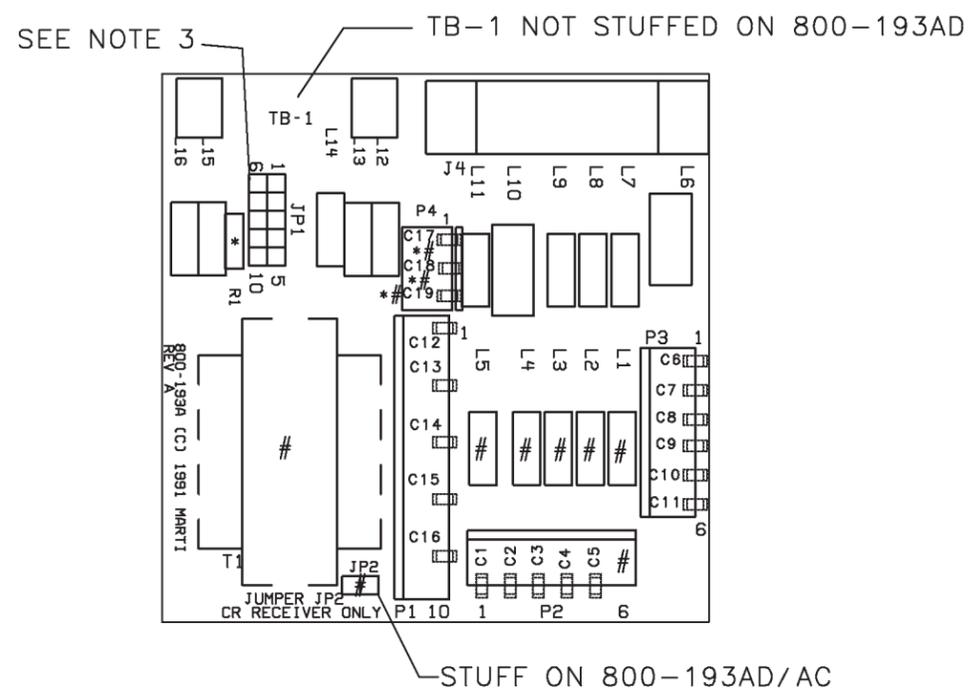
NOTE: DO NOT JUMPER JP1
PINS 1 - 6

USED ON
CR-10 AND SR-10 RECEIVERS ONLY



<p>MARTI ELECTRONICS CLEBURNE, TX 76033-0661</p>	<p>DRAWING NO. COPYRIGHT 800-193 5-26-00</p>	<p>TITLE INPUT/OUTPUT BOARD</p>
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REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	9-9-03	ADDED 800-193AD ASSEMBLY AND NOTES	KT		11028

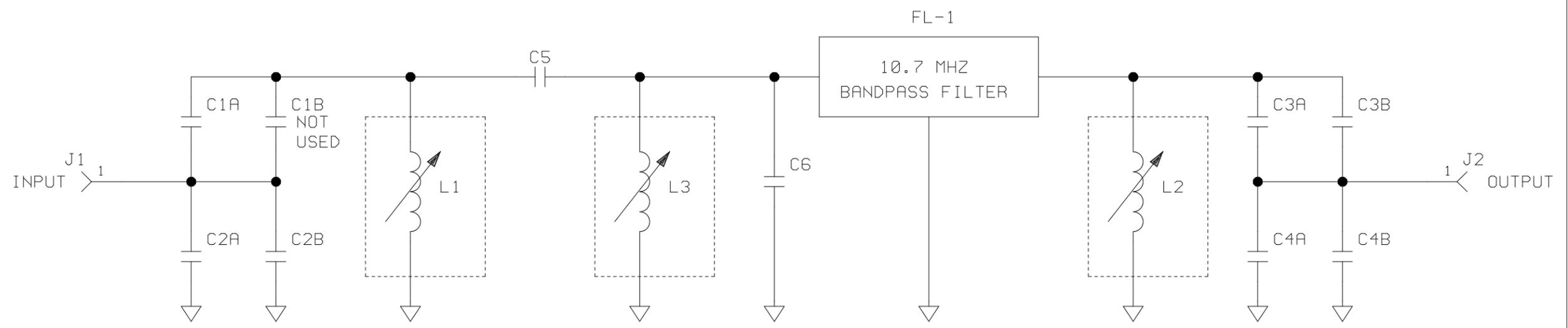


- NOTES:
- 1) * INDICATES PARTS NOT STUFFED ON 800-193AC/AD (C17,C18,C19,R1)
 - 2) # INDICATES PARTS NOT STUFFED ON 800-193AS (C17,C18,C19,L1,L2,L3,L4,L5, JP2,P2,T1)
 - 3) JUMPERS ON JP1 ARE AS FOLLOWS:
FOR 800-193AC/AD 2-7,3-8,4-9 & 5-10
FOR 800-193AS 7-8 & 9-10

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	DESIGNER(S)	FINISH				TITLE INPUT FILTER BOARD	
	PROJ. LEADER	MFG.	NEXT ASSY.	TYPE	SIZE	DWG No.	REV
	TOLERANCE (DECIMAL) U.O.S. .X ± .030 .XXX ± .005 .XX ± .015 ANGLES + 1°			B		800-193AC/AS/AD	A
			MODEL	SCALE	SHEET 1 OF 1		

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
2	7-11-01	REDRAWN IN CAD	KT		-----
A	11-27-02	ADDED TABLE WITH CORRECTED VALUES	KT	EJ	10841
B	11-14-03	ADDED 800-207-250	KT		11073

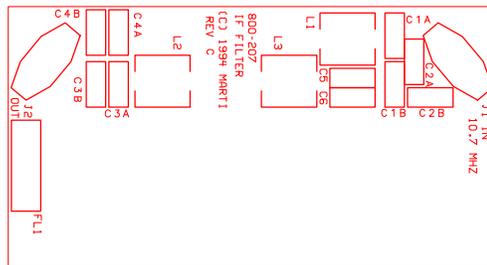


PART#	800-207-20	800-207-200	800-207-25	800-207-30	800-207-50	800-207-250
C1A	75pF	130pF	150pF	75pF	100pF	160pF
C2A	160pF	NOT USED	1000pF	240pF	300pF	NOT USED
C2B	240pF	300pF	NOT USED	160pF	300pF	150pF
C3A	270pF	NOT USED	270pF	270pF	10pF	240pF
C3B	NOT USED	240pF	NOT USED	NOT USED	75pF	NOT USED
C4A	360pF	240pF	5pF	360pF	NOT USED	240pF
C4B	NOT USED	NOT USED	160pF	NOT USED	160pF	NOT USED
C5	BUSS WIRE	BUSS WIRE	BUSS WIRE	3.3uH	BUSS WIRE	47pF
L1	3-7uH	1.5-3uH	1.5-3uH	3-7uH	1.5-3uH	1.5-3uH
L2	1.5-3uH	1.5-3uH	1.5-3uH	1.5-3uH	1.5-3uH	1.5-3uH
FL-1	360-038	360-016-1	360-025	360-024T	360-027	360-037
L3	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	1.5-3uH
C6	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	130pF

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	DESIGNER(S)	FINISH	IF FILTER BOARD			
	PROJ. LEADER	NEXT ASSY.	TYPE S	SIZE B	DWG. NO. 800-207-20/200/25/30/50/250	REV B
	MFG.	MODEL	SCALE NONE	SHEET 1 OF 1		

REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
9439	3-9-94	REDRAWN IN CAD	KT	EJ	----
A	12-2-02	ADDED TABLE TO SHOW CORRECT PARTS	KT	EJ	10841
B	11-14-03	ADDED ASSEMBLY 800-207-250	KT		11073
C	4-23-07	CHG'D 255-101 TO 255-101C	JTB		11482

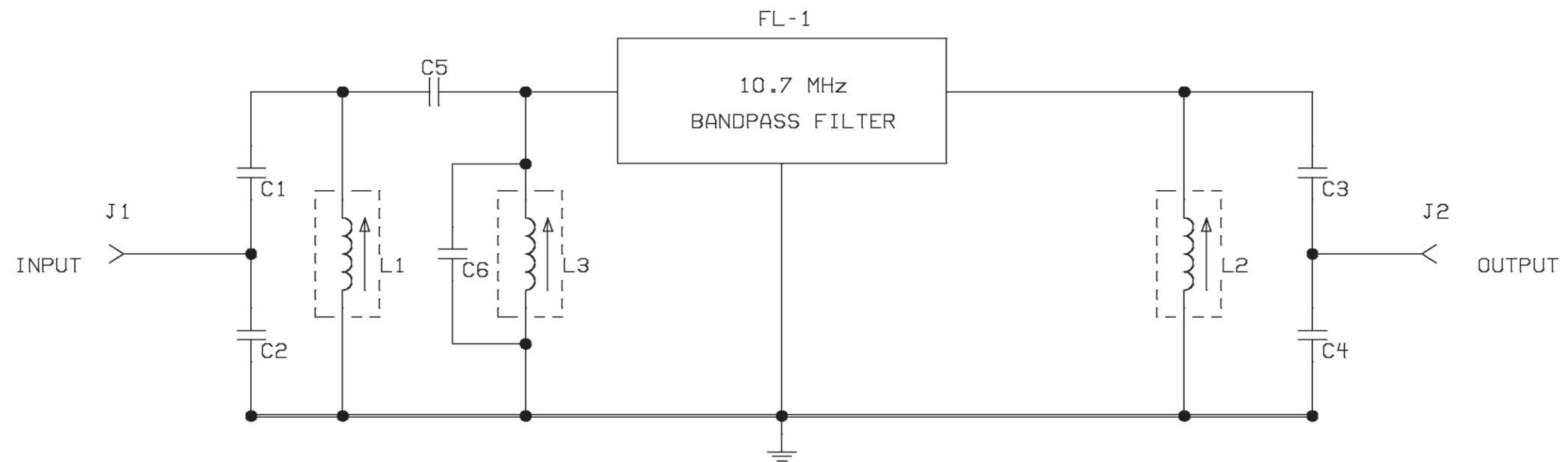


PART	800-207-20	800-207-200	800-207-25	800-207-30	800-207-50	800-207-250
C1A	255-750	256-131	215-151C	255-750	255-101	255-161
C2A	255-161	NOT USED	255-102C	255-241	215-301	NOT USED
C2B	255-241	256-301	NOT USED	255-161	215-301	256-151
C3A	255-271	NOT USED	255-271	255-271C	255-100	255-241
C3B	NOT USED	255-241	NOT USED	NOT USED	255-750	NOT USED
C4A	255-361	255-241	255-050	255-361	NOT USED	255-241
C4B	NOT USED	NOT USED	255-161	NOT USED	255-161	NOT USED
C5	580-005	580-005	580-005	330-021	580-005	255-470C
L1	350-030	350-025	350-025	350-030	350-025	350-025
L2	350-025	350-025	350-025	350-025	350-025	350-025
FL1	360-038	360-016-1	360-025	360-024T	360-027	360-037
L3	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	256-131
C6	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	350-025

MARTI ELECTRONICS

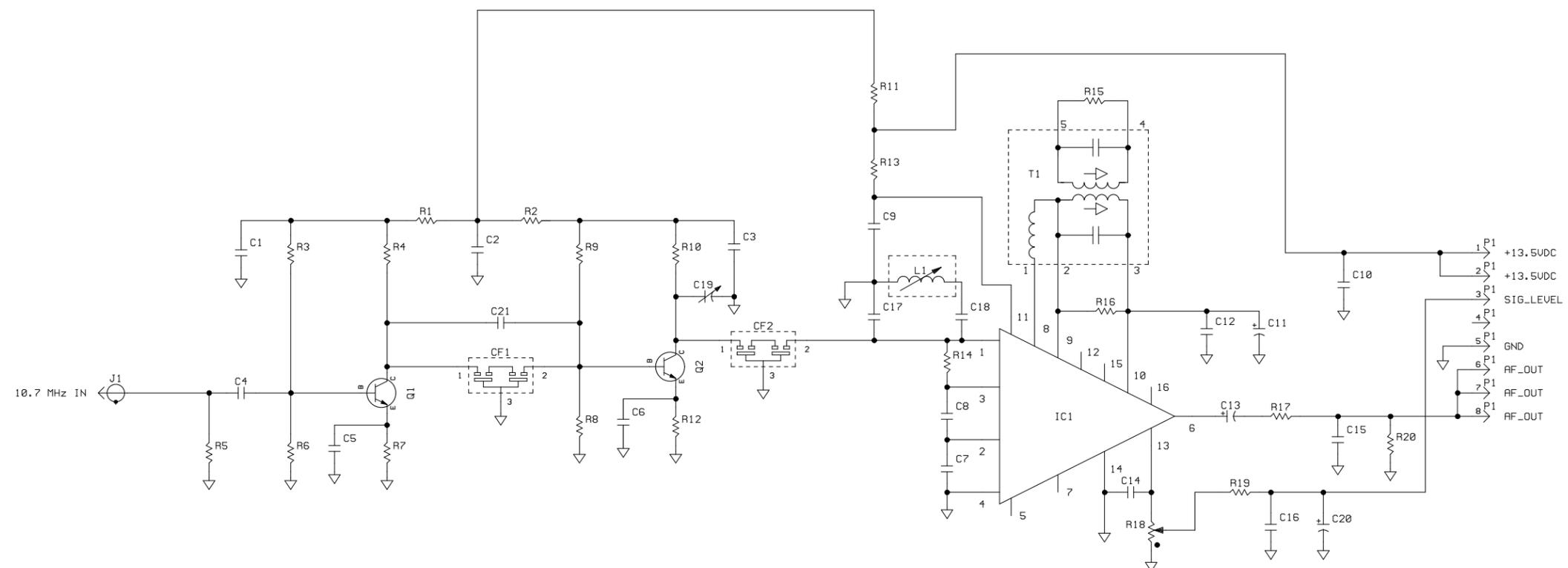
800-207-20/200/25/30/50/250 REV C

IF FILTER BOARD



<p>MARTI ELECTRONICS CLEBURNE, TX 76033-0661</p>	<p>DRAWING NO. COPYRIGHT 800-207-250 6/22/93</p>	<p>TITLE IF BANDPASS FILTER</p>
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REVISIONS			DATE	DESCRIPTION	DRAWN	APPROVED	ECH
REV	DATE	DESCRIPTION	DRAWN	APPROVED	ECH		
R	5-4-04	CHGD R18 TO 177-5050				KT	11114



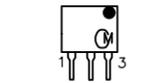
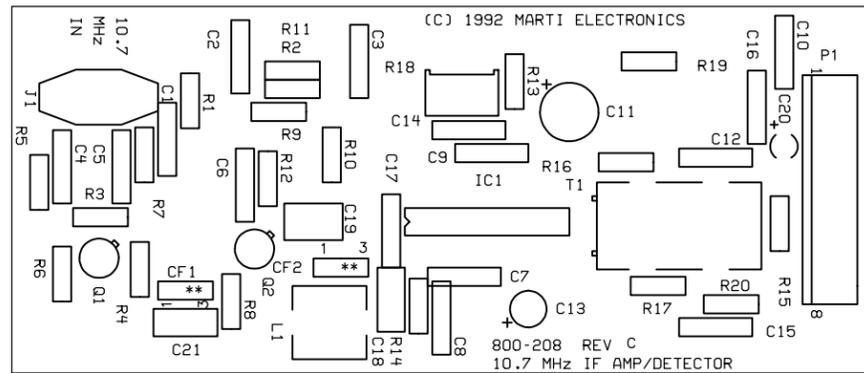
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	PROJ. LEADER	FINISH	TYPE SIZE DWG. NO. S D 800-208	REVISION A
TOLERANCE (DECIMAL) U.O.S. .x ± .030 .xxx ± .005 .xx ± .015 ANGLES ± 1°	MFG.	NEXT ASSY.	SCALE	SHEET 1 OF 1

MARTI ELECTRONICS INC.
 421 MARTI DRIVE, CLEBURNE, TX 76031
 817/645-0163 FAX 817/641-3869

REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
9440	9-19-01	REDRAWN IN CAD	KT	EJ	----
A	8-5-02	CHGD PAD SIZE FOR C13	KT	EJ	10741
B	4-9-03	GENERIC ASSEMBLY 800-208A ADDED	KT	EJ	10947
C	5-4-04	CHGD R18 & ADDED DETAIL "A"	KT		11114



DETAIL "A"

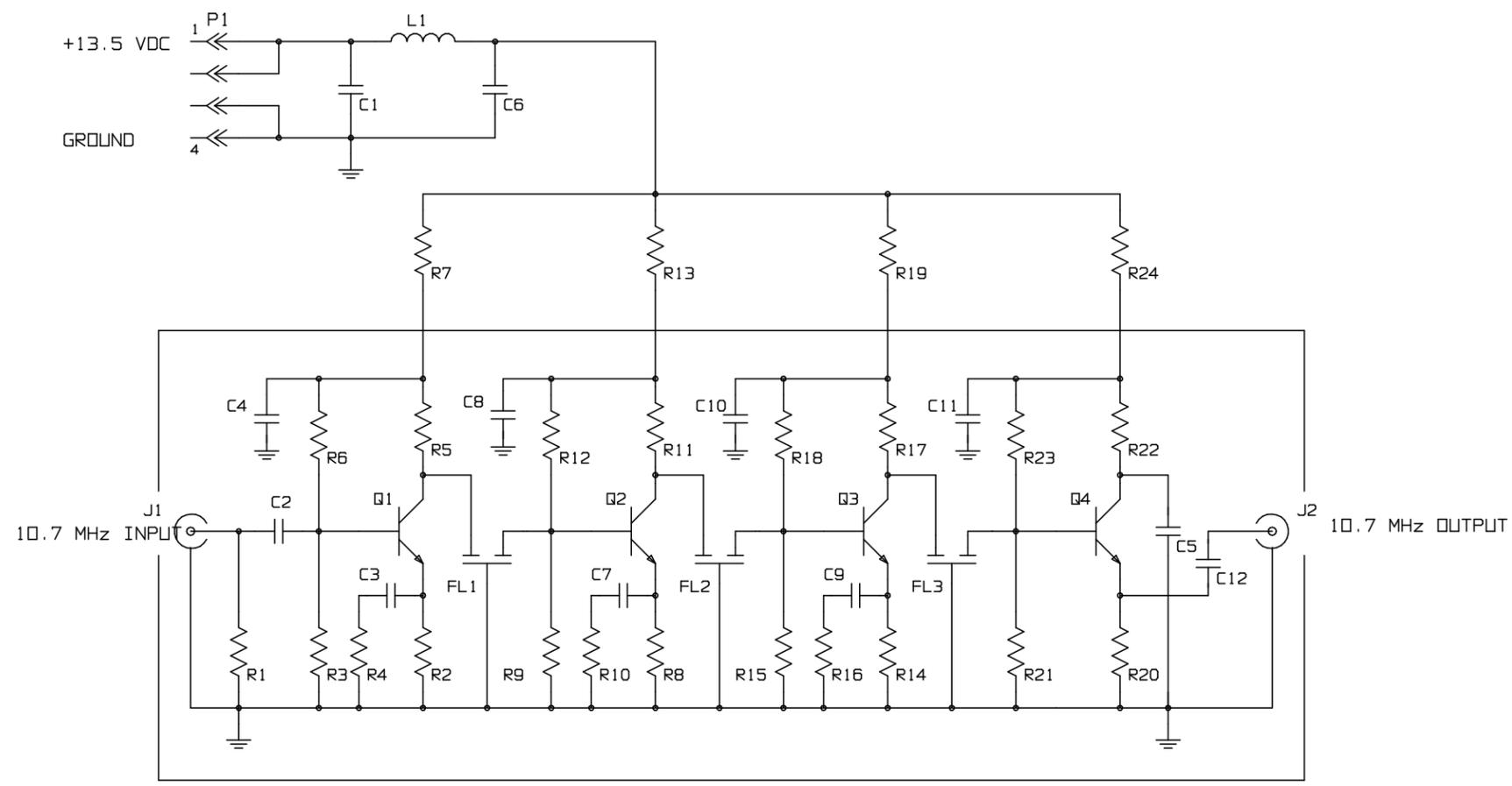
** PARTS INSTALLED IN AC/AD/AE LEVELS
SEE TABLE & DETAIL "A"

800-208AC	CF1 & CF2	360-032
800-208AD	CF1 & CF2	360-033
800-208AE	CF1 & CF2	360-035

MARTI ELECTRONICS

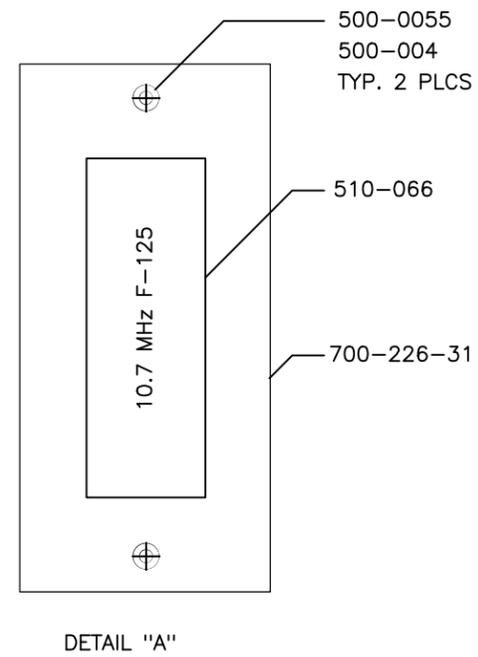
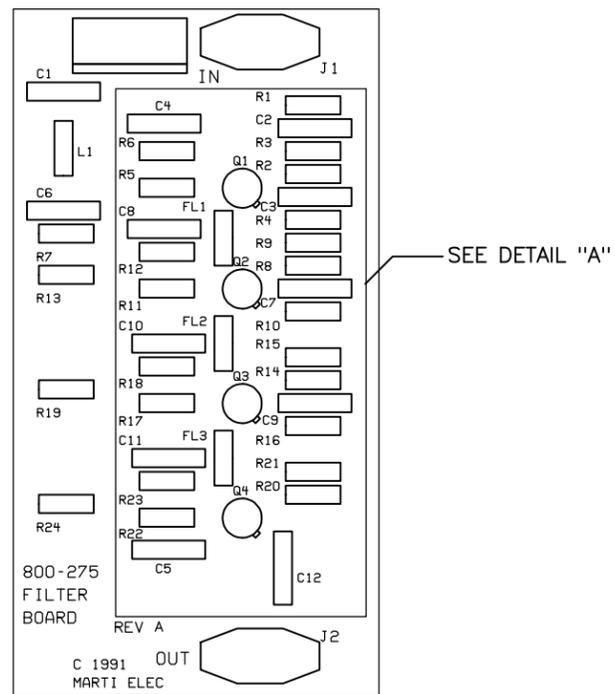
800-208A/AC/AD/AE REV C

10.7 MHZ IF AMP/DETECTOR



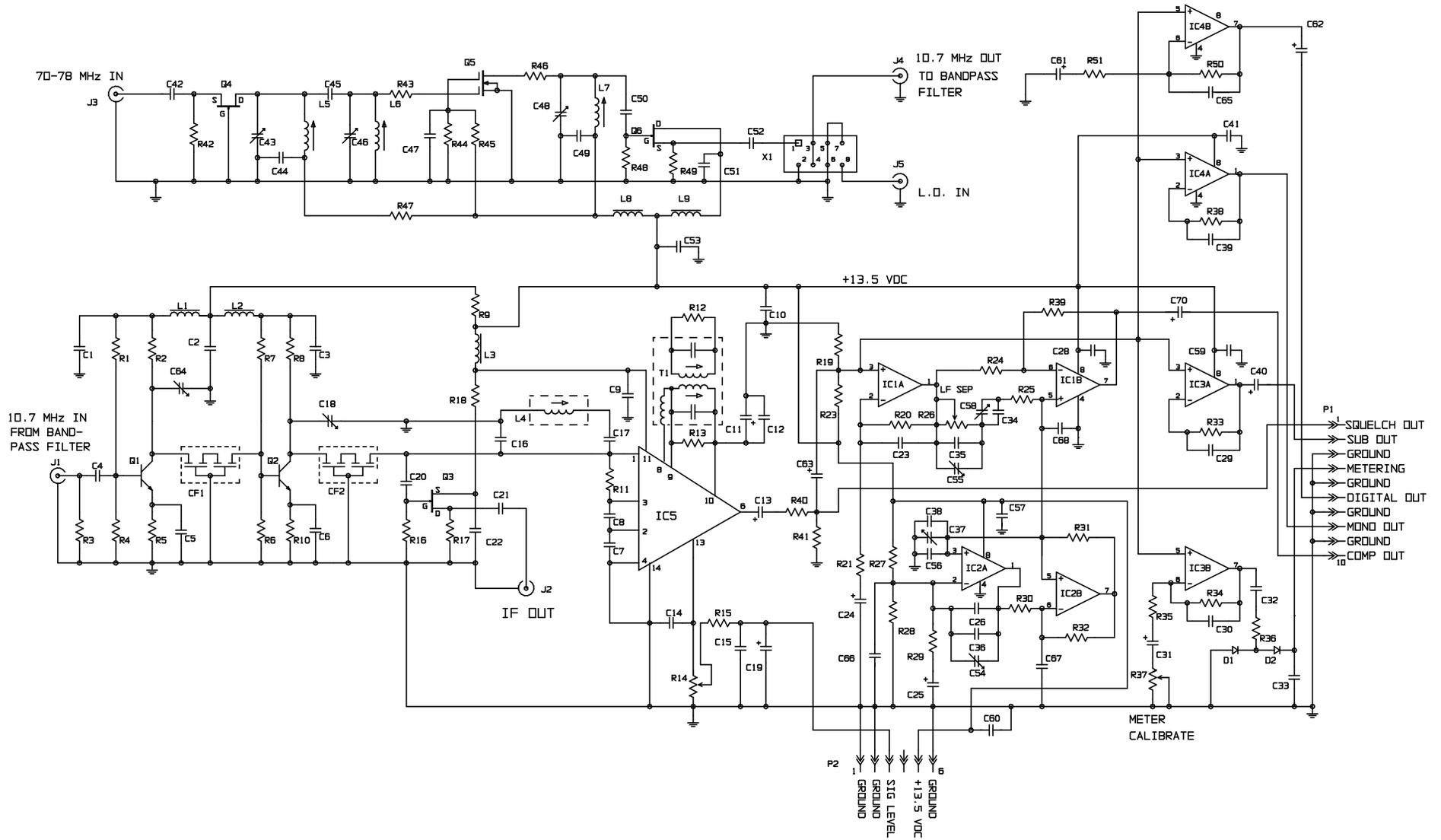
<p>MARTI ELECTRONICS CLEBURNE, TX 76033-0661</p>	<p>DRAWING NO. COPYRIGHT 800-275 <DATE> REV A</p>	<p>TITLE IF BANDPASS FILTER (EXPORT ONLY)</p>
--	---	---

REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	7-30-03	CHANGED MATERIAL FROM MC3D TO ROGERS 4350	KT	EJ	-----
B	5-5-04	ADDED DETAIL "A"	KT		11121



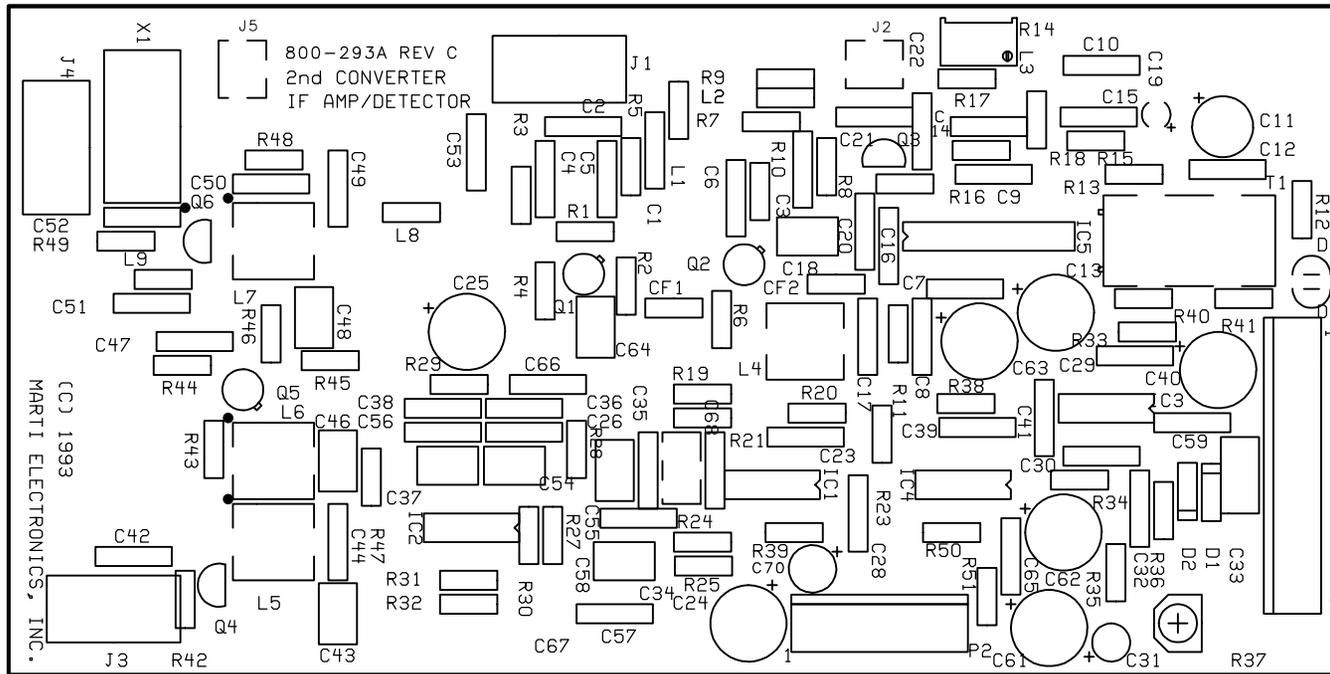
FILTER BOARD
800-275AE REV B

REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	12/4/01	R2 & R8 CHGD FROM 432 OHMS TO 909 OHMS	KT	EJ	10569
B	4/29/04	CHGD R14; ADDED C70	KT		11116

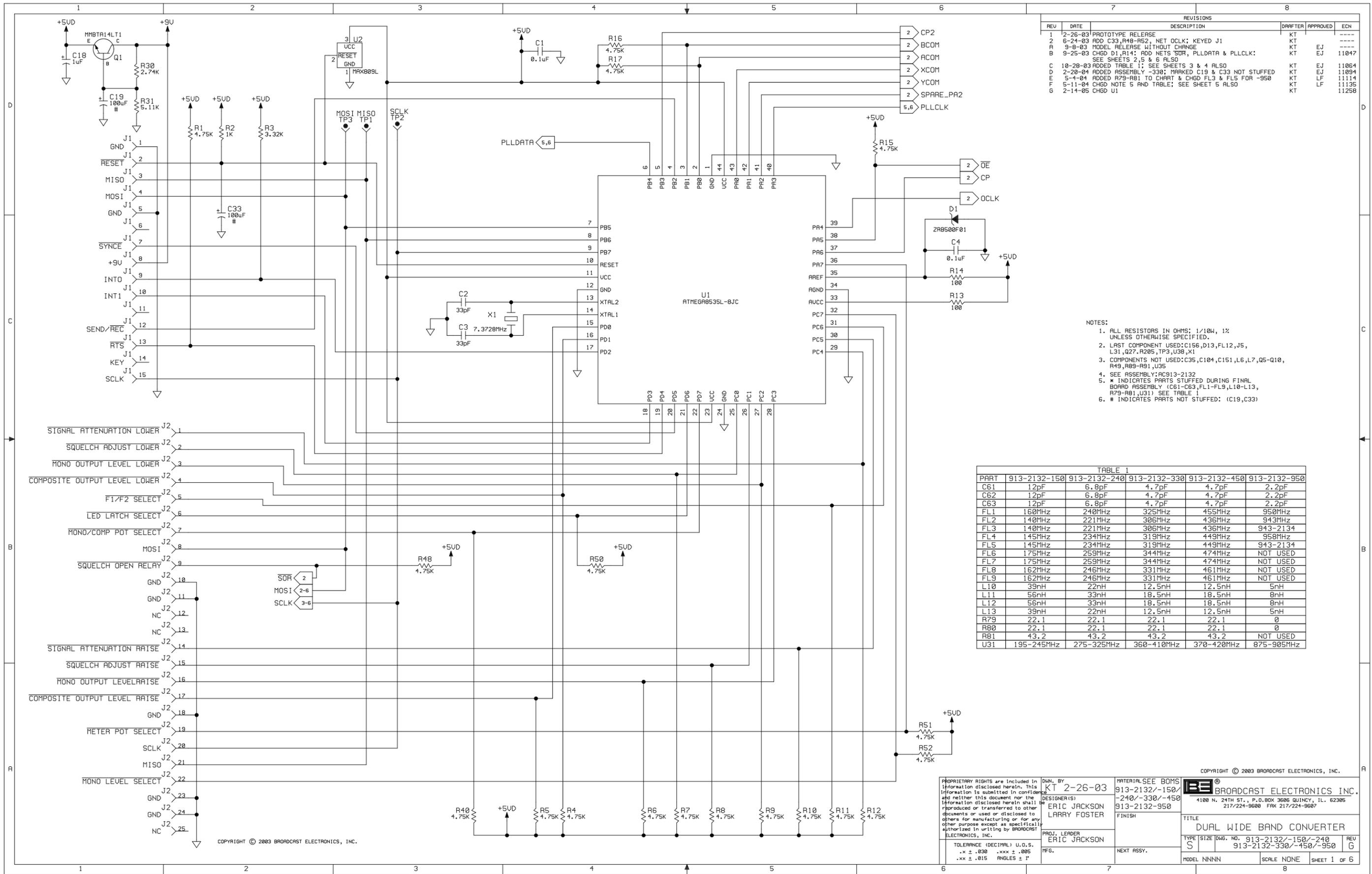


MARTI ELECTRONICS CLEBURNE, TX 76033-0661	DRAWING NO.	TITLE
	COPYRIGHT 8/25/93	800-293 REV B 2nd CONVERTER/IF AMP./DETECTOR

REV B: CHGD R2 & R8 FROM 145-431 TO DB10428 (12/4/01). ECN 10569 KT/EJ
REV C: CHGD R14 & ADDED C70 (4/30/04) ECN 11116 KT/LF



MARTI ELECTRONICS
2nd CONVERTER/IF AMP/DETECTOR
800-293A REV C



REVISIONS				
REV	DATE	DESCRIPTION	DRAFTER	APPROVED
1	2-26-03	PROTOTYPE RELEASE	KT	---
2	6-24-03	ADD C33, R48-R52, NET OCLK; KEYED J1	KT	---
A	9-8-03	MODEL RELEASE WITHOUT CHANGE	KT	EJ
B	9-25-03	CHGD D1, R14; ADD NETS SOR, PLLDATA & PLLCLK; SEE SHEETS 2, 5 & 6 ALSO	KT	EJ 11047
C	10-28-03	ADDED TABLE 1; SEE SHEETS 3 & 4 ALSO	KT	EJ 11064
D	2-20-04	ADDED ASSEMBLY -330; MARKED C19 & C33 NOT STUFFED	KT	EJ 11094
E	5-4-04	ADDED R79-R81 TO CHART & CHGD FL3 & FLS FOR -950	KT	LF 11114
F	5-11-04	CHGD NOTE 5 AND TABLE; SEE SHEET 5 ALSO	KT	LF 11135
G	2-14-05	CHGD U1	KT	11258

- NOTES:
- ALL RESISTORS IN OHMS: 1/10W, 1% UNLESS OTHERWISE SPECIFIED.
 - LAST COMPONENT USED: C156, D13, FL12, J5, L31, Q27, R205, TP3, U30, X1
 - COMPONENTS NOT USED: C35, C104, C151, L6, L7, Q5-Q10, R49, R89-R91, U35
 - SEE ASSEMBLY: AC913-2132
 - * INDICATES PARTS STUFFED DURING FINAL BOARD ASSEMBLY (C61-C63, FL1-FL9, L10-L13, R79-R81, U31) SEE TABLE 1
 - # INDICATES PARTS NOT STUFFED: (C19, C33)

PART	913-2132-150	913-2132-240	913-2132-330	913-2132-450	913-2132-950
C61	12pF	6.8pF	4.7pF	4.7pF	2.2pF
C62	12pF	6.8pF	4.7pF	4.7pF	2.2pF
C63	12pF	6.8pF	4.7pF	4.7pF	2.2pF
FL1	160MHz	240MHz	325MHz	455MHz	950MHz
FL2	140MHz	221MHz	306MHz	436MHz	943MHz
FL3	140MHz	221MHz	306MHz	436MHz	943-2134
FL4	145MHz	234MHz	319MHz	449MHz	958MHz
FL5	145MHz	234MHz	319MHz	449MHz	943-2134
FL6	175MHz	259MHz	344MHz	474MHz	NOT USED
FL7	175MHz	259MHz	344MHz	474MHz	NOT USED
FL8	162MHz	246MHz	331MHz	461MHz	NOT USED
FL9	162MHz	246MHz	331MHz	461MHz	NOT USED
L10	39nH	22nH	12.5nH	12.5nH	5nH
L11	56nH	33nH	18.5nH	18.5nH	8nH
L12	56nH	33nH	18.5nH	18.5nH	8nH
L13	39nH	22nH	12.5nH	12.5nH	5nH
R79	22.1	22.1	22.1	22.1	0
R80	22.1	22.1	22.1	22.1	0
R81	43.2	43.2	43.2	43.2	NOT USED
U31	195-245MHz	275-325MHz	360-410MHz	370-420MHz	875-905MHz

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DWN. BY: KT 2-26-03
DESIGNER(S): ERIC JACKSON, LARRY FOSTER
PROJ. LEADER: ERIC JACKSON
MFG.

MATERIAL: SEE BOMS
913-2132/-150/-240/-330/-450
913-2132-950

FINISH

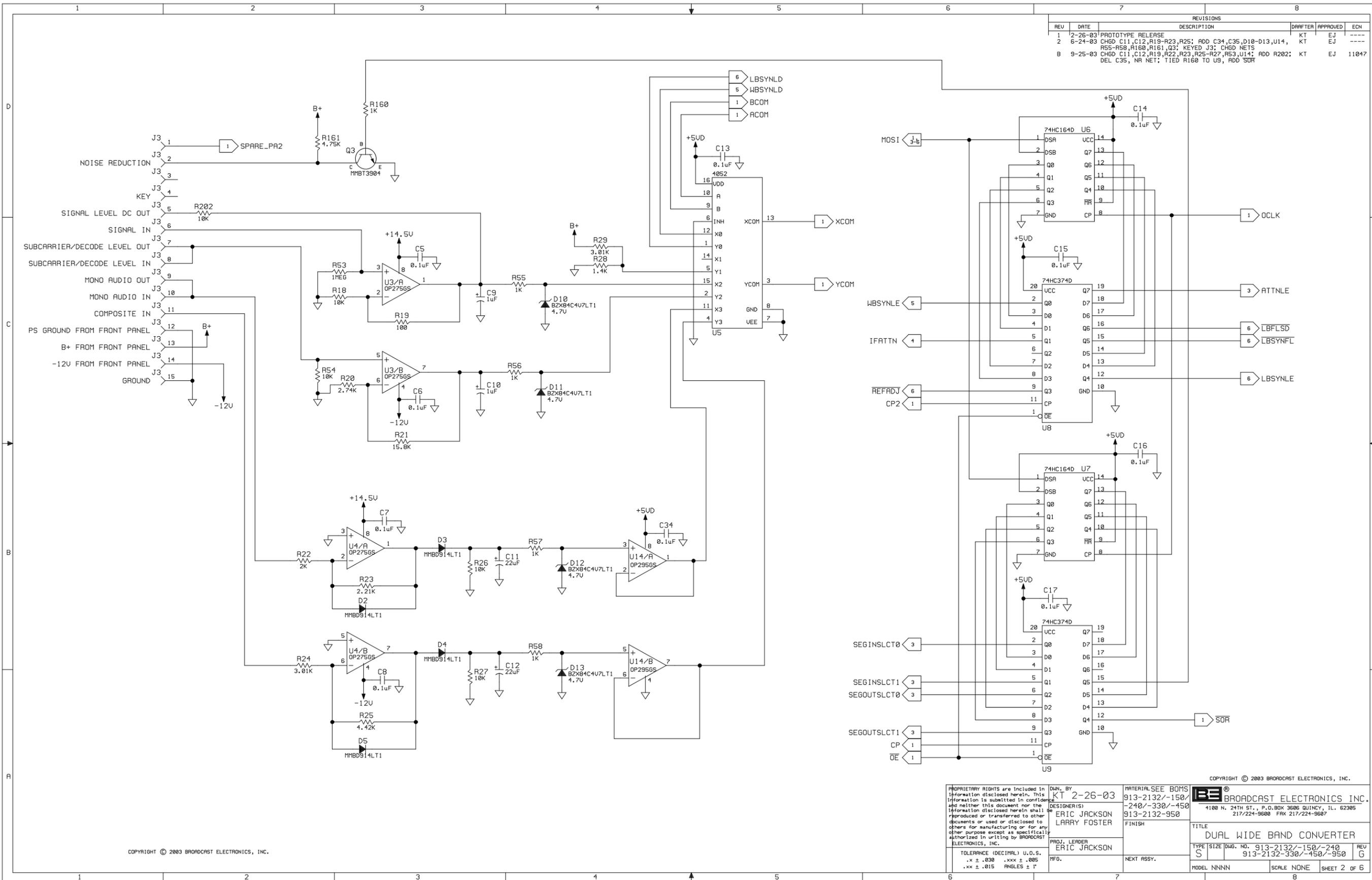
TITLE: DUAL WIDE BAND CONVERTER
TYPE: S
SIZE: 5
Dwg. NO.: 913-2132/-150/-240/-330/-450/-950
REV: G

4100 N. 24TH ST., P.O. BOX 3606 QUINCY, IL. 62305
217/224-9600 FAX 217/224-9607

SCALE: NONE
SHEET 1 OF 6

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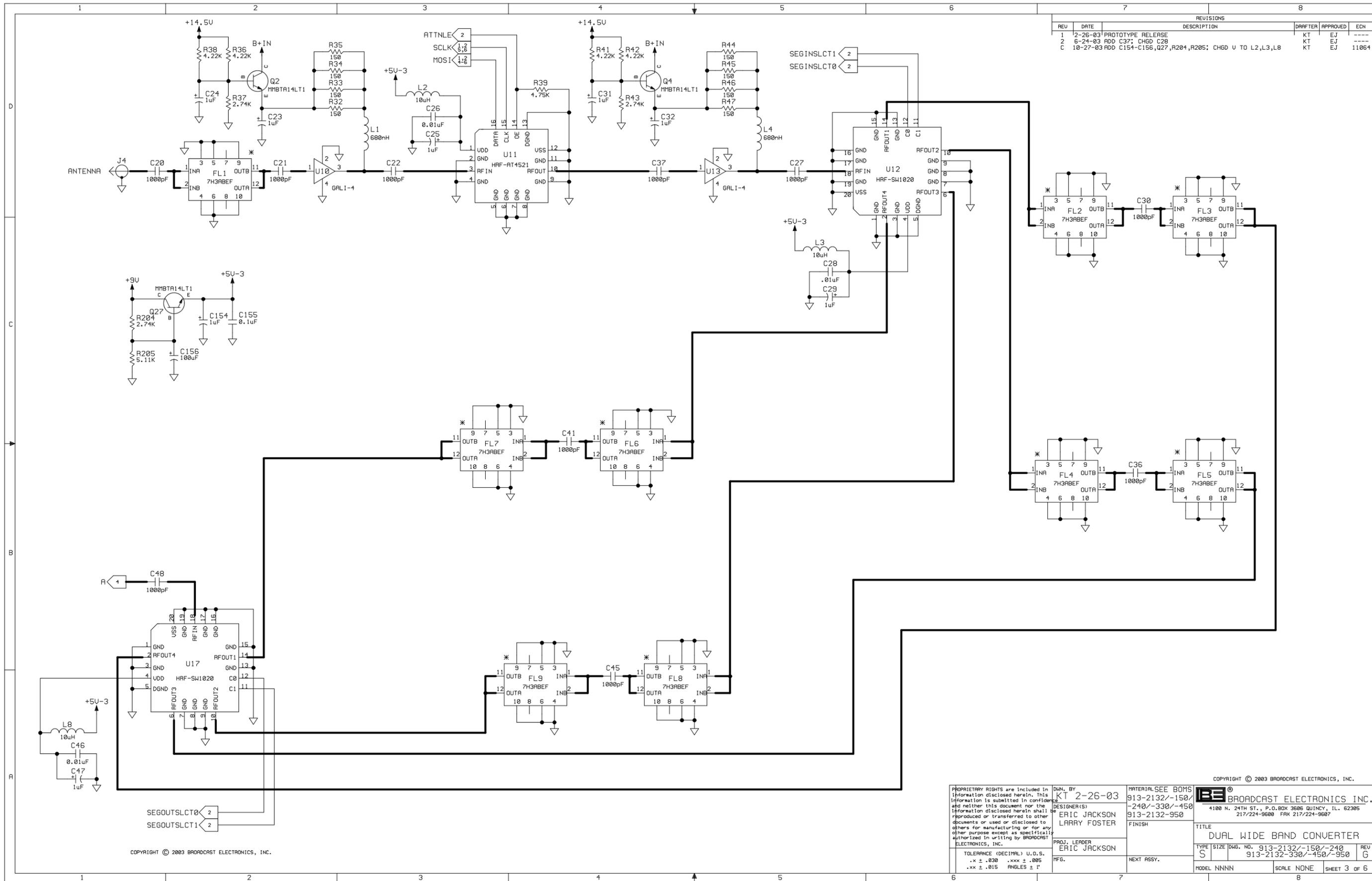


REVISIONS			DRAFTER	APPROVED	ECN
1	2-26-03	PROTOTYPE RELEASE	KT	EJ	----
2	6-24-03	CHGD C11,C12,R19-R23,R25; ADD C34,C35,D10-D13,U14, R55-R58,R160,R161,Q3; KEYED J3; CHGD NETS	KT	EJ	----
B	9-25-03	CHGD C11,C12,R19,R22,R23,R25-R27,R53,U14; DEL C35, NR NET; TIED R160 TO U9, ADD SOR	KT	EJ	11047

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	DESIGNER(S) ERIC JACKSON LARRY FOSTER	FINISH	
TOLERANCE (DECIMAL) U.O.S. .X ± .030 .XXX ± .005 .XX ± .015 ANGLES ± 1°	PROJ. LEADER ERIC JACKSON	NEXT ASSY.	TITLE DUAL WIDE BAND CONVERTER
	MFG.		TYPE SIZE DWG. NO. 913-2132/-150/-240 S 913-2132-330/-450/-950
			MODEL NNNN SCALE NONE SHEET 2 OF 6



REVISIONS				
REV	DATE	DESCRIPTION	DRAWN	APPROVED
1	2-26-03	PROTOTYPE RELEASE	KT	EJ
2	6-24-03	ADD C37; CHGD C28	KT	EJ
3	10-27-03	ADD C154-C156, Q27, R204, R205; CHGD U TO L2, L3, L8	KT	EJ

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TOLERANCE (DECIMAL) U.S.S.
 .x ± .030 .xxx ± .005
 .xx ± .015 ANGLES ± 1°

DWN. BY
 KT 2-26-03

DESIGNER(S)
 ERIC JACKSON
 LARRY FOSTER

PROJ. LEADER
 ERIC JACKSON

MATERIALS SEE BOMS
 913-2132/-150/-240/-330/-450
 913-2132-950

FINISH

NEXT ASSY.

4180 N. 24TH ST., P.O. BOX 3686 QUINCY, IL. 62305
 217/224-9600 FAX 217/224-9607

BROADCAST ELECTRONICS INC.

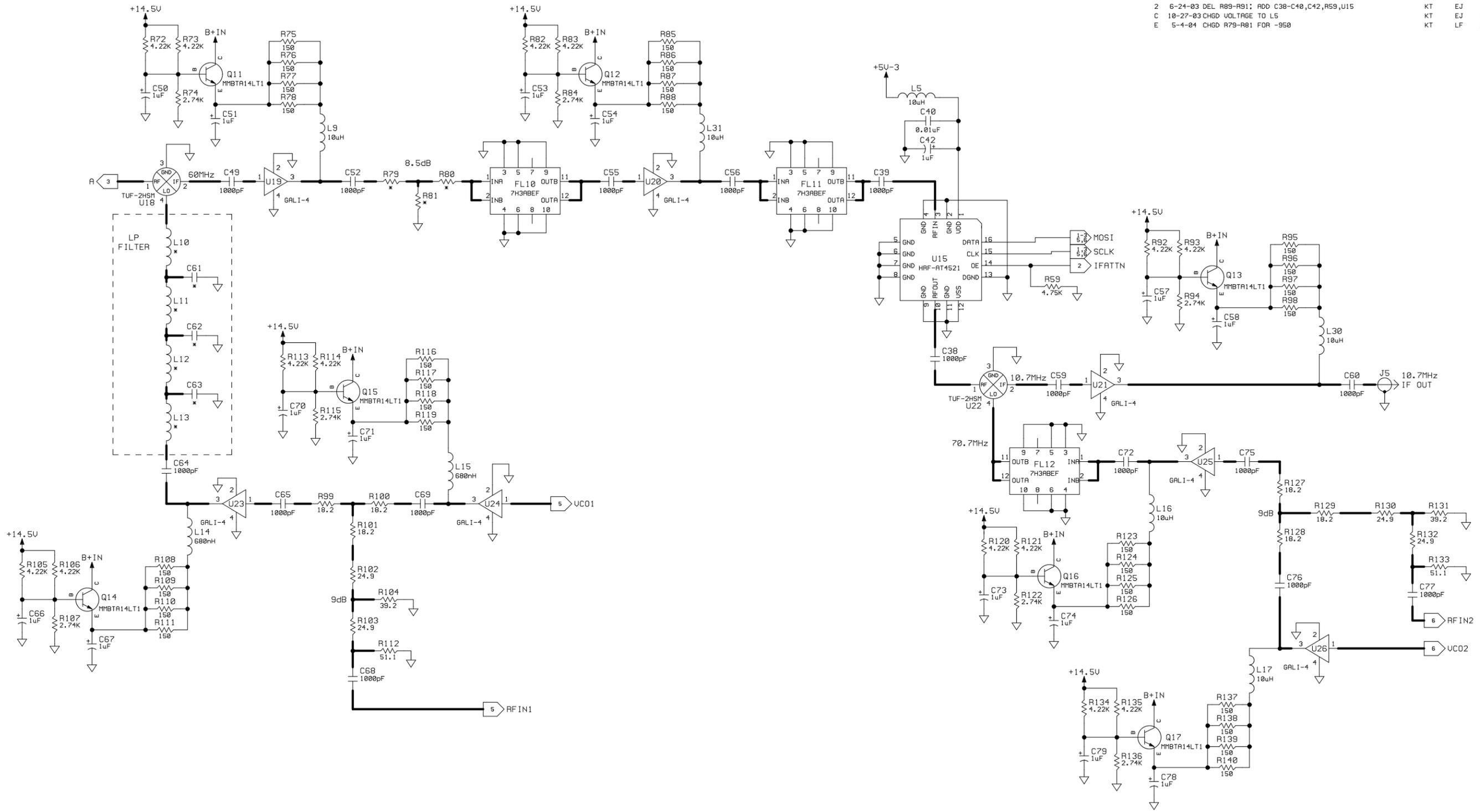
TITLE
DUAL WIDE BAND CONVERTER

TYPE SIZE DWG. NO. 913-2132/-150/-240
 S 913-2132-330/-450/-950

REV G

MODEL NNNN SCALE NONE SHEET 3 OF 6

REVISIONS				DRAFTER	APPROVED	ECN
REV	DATE	DESCRIPTION		KT	EJ	----
1	2-26-03	PROTOTYPE RELEASE		KT	EJ	----
2	6-24-03	DEL R89-R91; ADD C38-C40,C42,R59,U15		KT	EJ	11064
C	10-27-03	CHGD VOLTAGE TO L5		KT	LF	11114
E	5-4-04	CHGD R79-R81 FOR -950		KT	LF	11114



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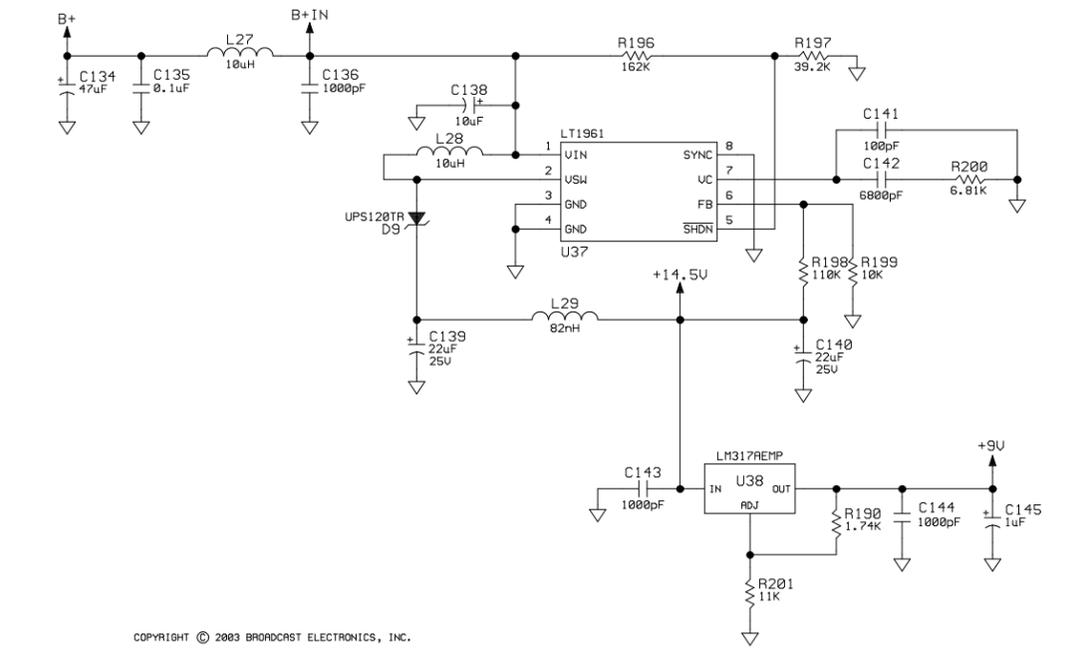
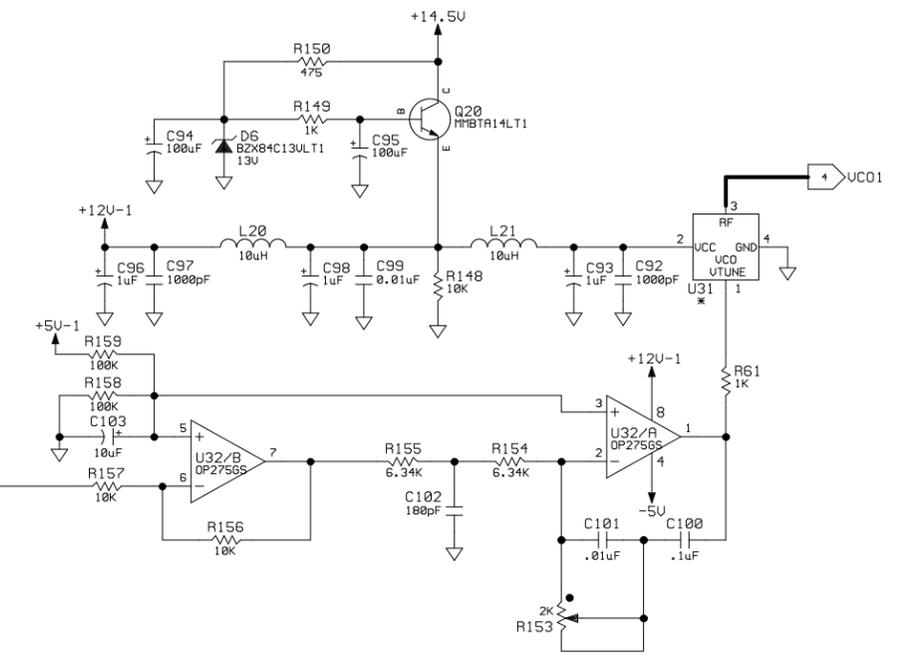
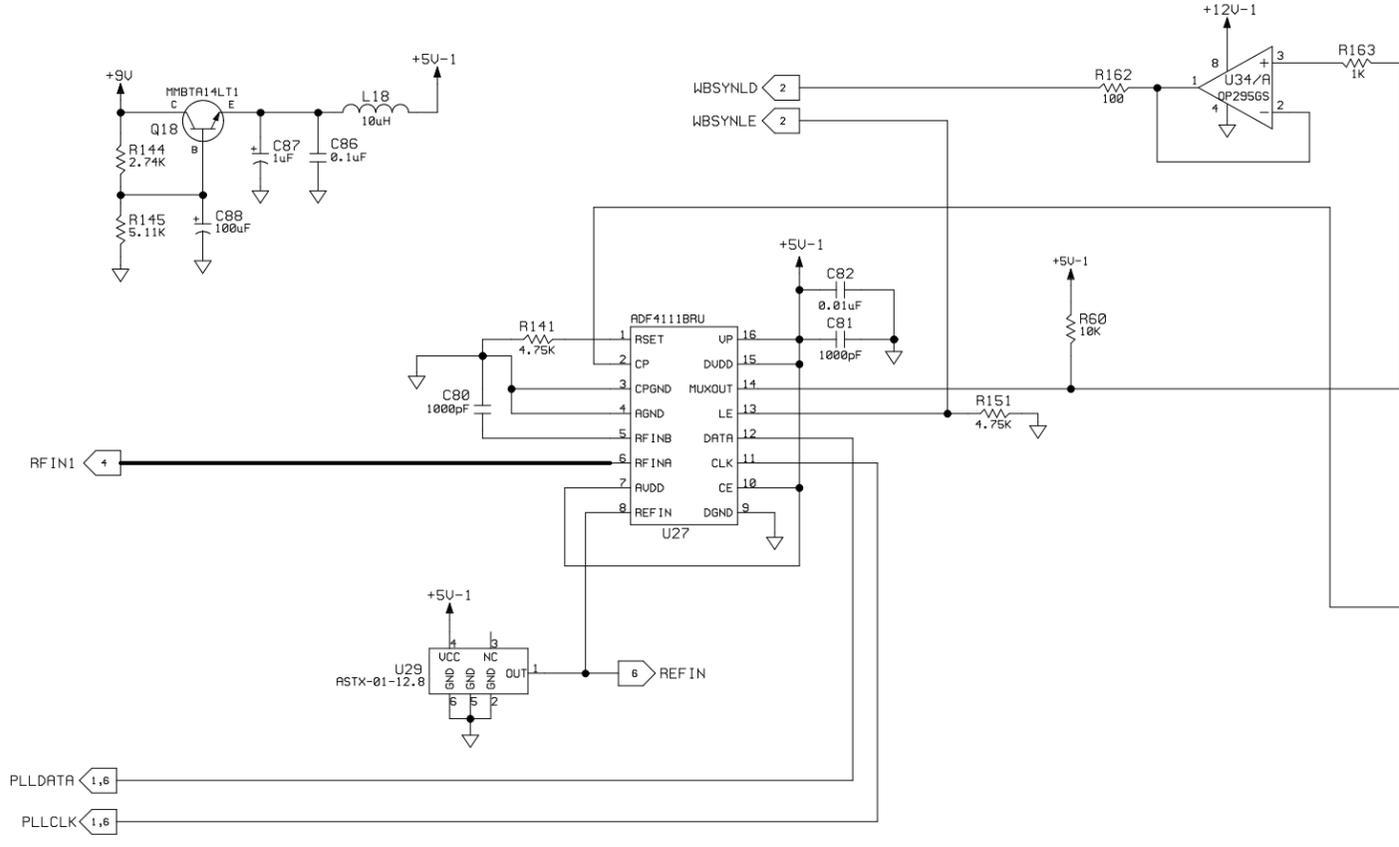
DESIGNED BY
KT 2-26-03
DESIGNER(S)
ERIC JACKSON
LARRY FOSTER
PROJ. LEADER
ERIC JACKSON
MFG.

MATERIAL SEE BOMS
913-2132/-150/-240/-330/-450
913-2132-950
FINISH
NEXT ASSY.

BROADCAST ELECTRONICS INC.
1100 N. 24TH ST., P.O. BOX 3686 QUINCY, IL. 62305
217/224-9680 FRX 217/224-9687

TITLE
DUAL WIDE BAND CONVERTER
TYPE SIZE DWG. NO. 913-2132/-150/-240
913-2132-330/-450/-950
REV 6
MODEL NNNN SCALE NONE SHEET 4 OF 6

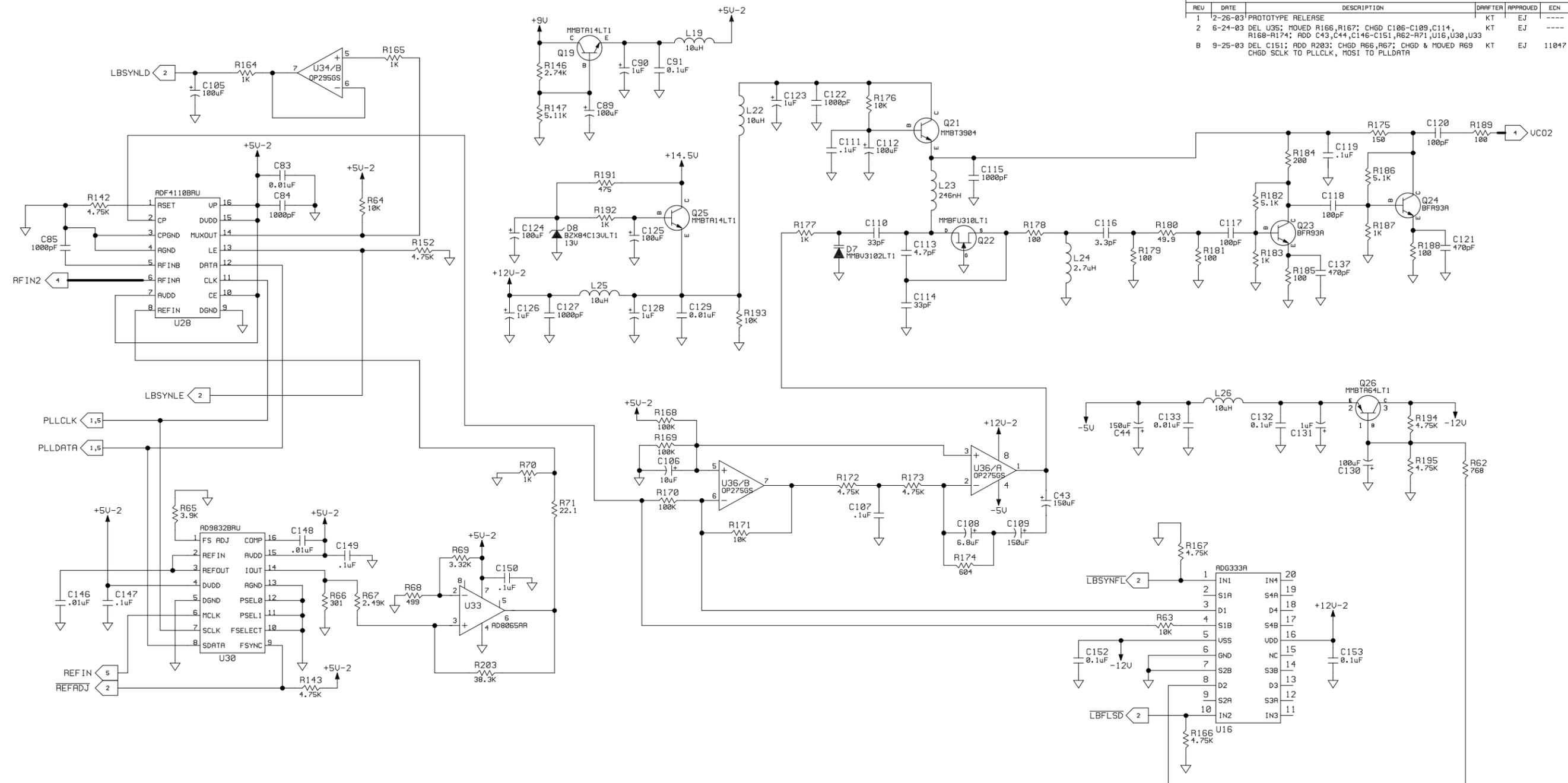
REVISIONS			DRAFTER	APPROVED	ECN
1	2-26-03	PROTOTYPE RELEASE	KT	EJ	----
2	6-24-03	DEL C104,R143,R160,R161,U30,U33; CHGD C100-C103, C139,C140,R153-R155,R162; ADD R60,R61	KT	EJ	----
B	9-25-03	CHGD C102,R153-R155,U29; CHGD SCLK TO PLLCLK, M0S1 TO PLLDATA	KT	EJ	11047
F	5-11-04	MOVED C102,R154 & R155 TO ASSEMBLY 913-2132	KT	LF	11135



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DESIGNER(S) LARRY JACKSON		FINISH	TITLE DUAL WIDE BAND CONVERTER	
PROJ. LEADER ERIC JACKSON		NEXT ASSY.	TYPE SIZE DWG. NO. 913-2132/-150/-240 913-2132-330/-450/-950	REV G
TOLERANCE (DECIMAL) U.O.S. .x ± .030 .xxx ± .005 .xx ± .015 ANGLES ± 1°		MODEL NNNN	SCALE NONE	SHEET 5 OF 6

REVISIONS					
REV	DATE	DESCRIPTION	DRAWN	APPROVED	ECN
1	2-26-03	PROTOTYPE RELEASE	KT	EJ	----
2	6-24-03	DEL U35; MOVED R166,R167; CHGD C106-C109,C114,R168-R174; ADD C43,C44,C146-C151,R62-R71,U16,U30,U33	KT	EJ	----
B	9-25-03	DEL C151; ADD R203; CHGD R66,R67; CHGD & MOVED R69	KT	EJ	11047
		CHGD SCLC TO PLLCLK, MOSI TO PLLDATA			



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TOLERANCE (DECIMAL) U.S.S.
 .x ± .030 .xxx ± .005
 .xx ± .015 ANGLES ± 1°

DWN. BY
 KT 2-26-03

DESIGNER(S)
 ERIC JACKSON
 LARRY FOSTER

PROJ. LEADER
 ERIC JACKSON

MATERIALS SEE BOMS
 913-2132/-150/-240/-330/-450
 913-2132-950

FINISH

TITLE
 DUAL WIDE BAND CONVERTER

TYPE SIZE DWG. NO. 913-2132/-150/-240
 913-2132-330/-450/-950

REV
 G

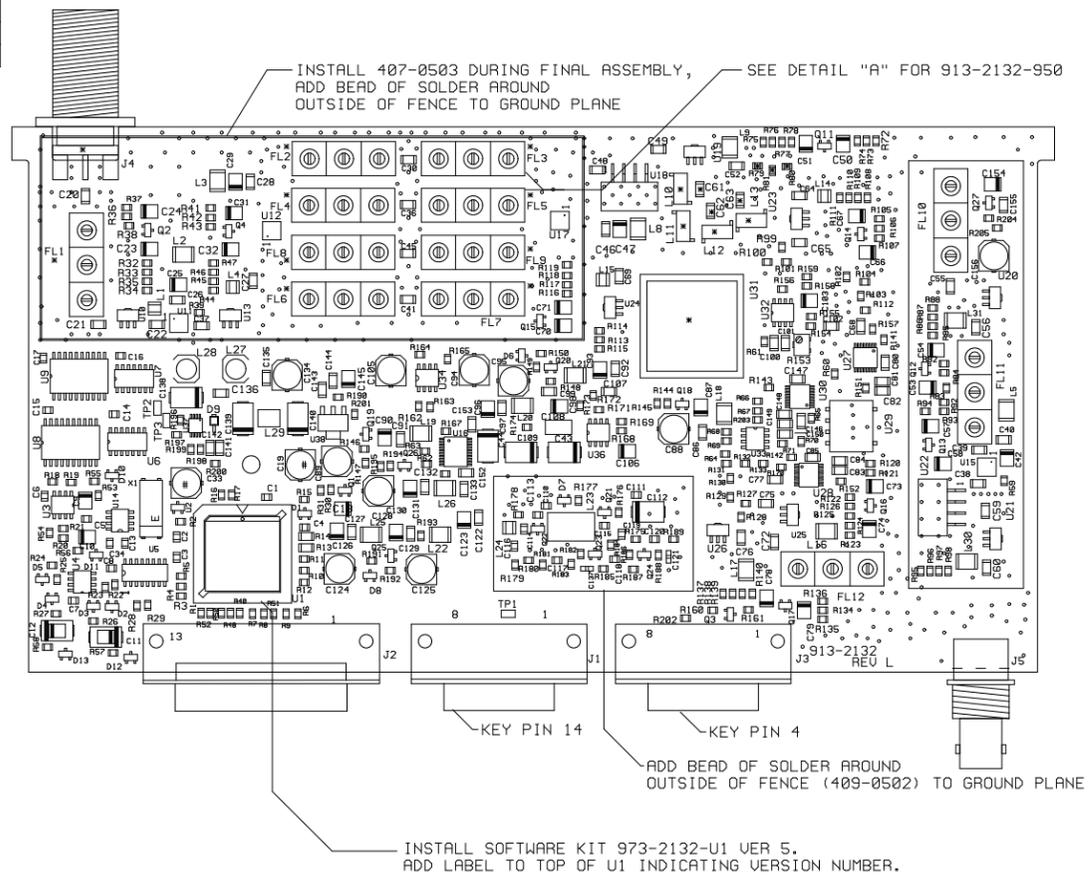
MODEL NNNN SCALE NONE SHEET 6 OF 6

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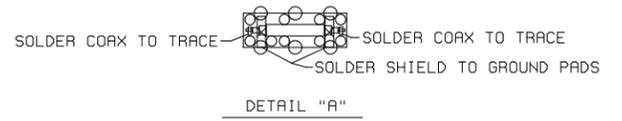
4180 N. 24TH ST., P.O. BOX 9606 QUINCY, IL. 62305
 217/224-9600 FAX 217/224-9607

PART	913-2132-150	913-2132-240	913-2132-330	913-2132-450	913-2132-950
C61	270-120	270-608-1	270-407-1	270-407-1	270-202
C62	270-120	270-608-1	270-407-1	270-407-1	270-202
C63	270-120	270-608-1	270-407-1	270-407-1	270-202
FL1	361-0160	360-0240	360-0325	360-0455	360-0950
FL2	360-0140	360-0221	360-0306	360-0436	360-0943
FL3	360-0140	360-0221	360-0306	360-0436	943-2134
FL4	361-0145	360-0234	360-0319	360-0449	360-0958
FL5	361-0145	360-0234	360-0319	360-0449	943-2134
FL6	360-0175	360-0259	360-0344	360-0474	NOT USED
FL7	360-0175	360-0259	360-0344	360-0474	NOT USED
FL8	361-0162	360-0246	360-0331	360-0461	NOT USED
FL9	361-0162	360-0246	360-0331	360-0461	NOT USED
L10	350-202	350-205	350-192	350-192	350-198
L11	350-200	350-203	350-194	350-194	350-199
L12	350-200	350-203	350-194	350-194	350-199
L13	350-201	350-205	350-192	350-192	350-198
R79	102-2201	102-2201	102-2201	102-2201	102-0000
R80	102-2201	102-2201	102-2201	102-2201	102-0000
R81	102-4302	102-4302	102-4302	102-4302	NOT USED
U31	400-246	400-325	400-410	400-420	400-905

REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	3-6-03	PROTOTYPE RELEASE	KT	EJ	----
2	7-2-03	SEVERAL CHANGES ACROSS BOARD	KT	EJ	----
A	9-8-03	MODEL RELEASE WITHOUT CHANGE	KT	EJ	----
B	9-26-03	ADD R202,R203; DEL C35,C151; CHGD C11,C12,C102, D1,R14,R19,R22,R23,R25-R27,R53,R66,R67,R153-R155, U14,U29; CHGD & MOVED R69; ADDED NOTES	KT	EJ	11047
C	10-28-03	ADD C154-C156,Q27,R204,R205,407-0503	KT	EJ	11064
D	11-11-03	FIXED D1	KT	EJ	11074
E	2-20-04	ADDED -330 ASSEMBLY: MARKED C19 & C33 NOT STUFFED	KT	LF	11094
F	5-4-04	CHGD FL3,FL5 & R79-R81 FOR 913-2132-950	KT	LF	11114
G	5-11-04	ADDED SOFTWARE NOTE	KT	LF	11125
H	5-11-04	MOVED C102,R154 & R155 TO ASSEMBLY 913-2132	KT	LF	11135
J	1-20-05	UPDATED SOFTWARE 973-2132-U1 TO VER 5	KT	LF	11245
K	2-14-05	CHGD U1	KT	LF	11258
L	5-19-05	CHGD SOLDERMASK TO ALLOW BETTER FLOW SOLDER	KT		11292



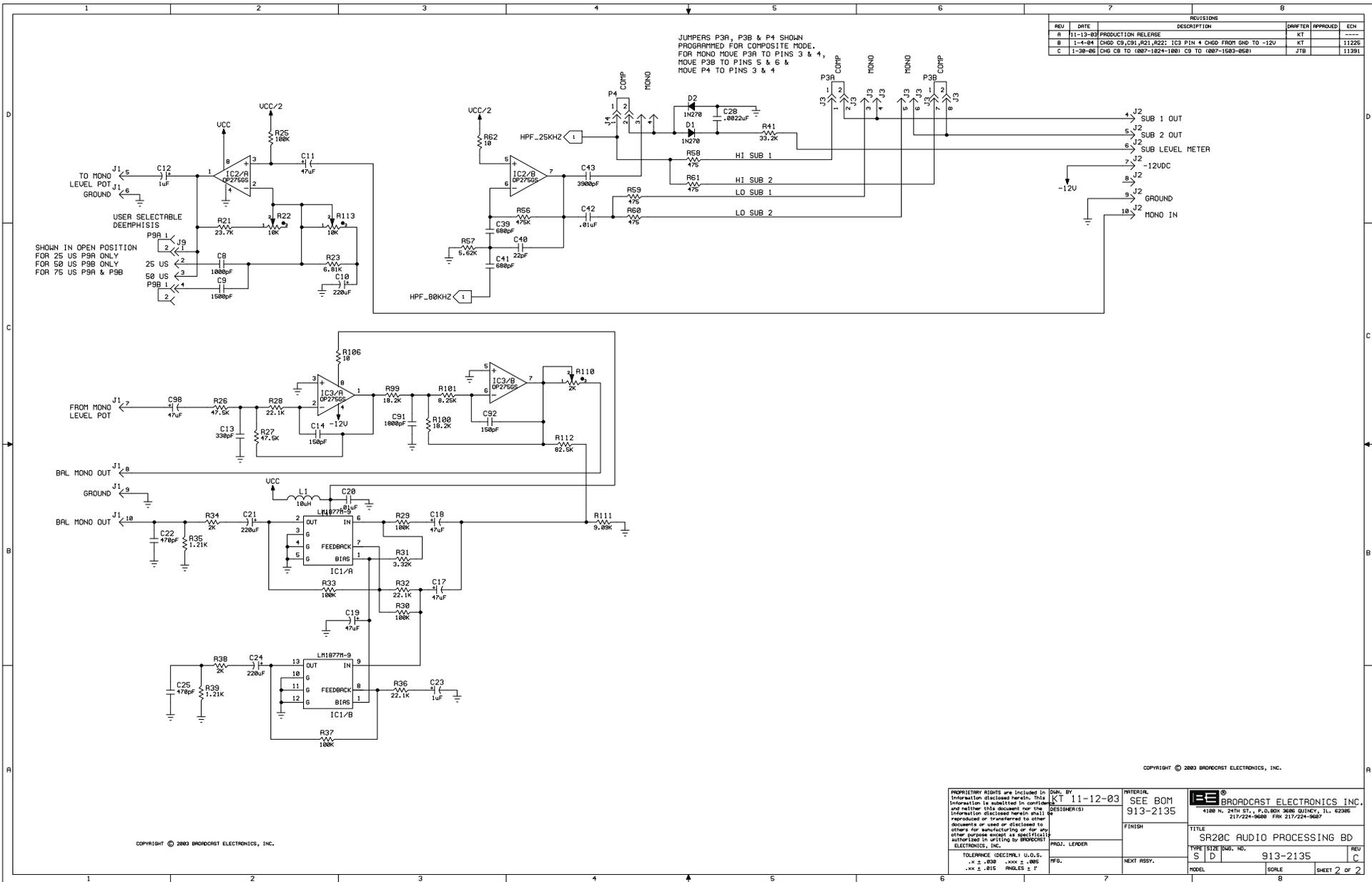
- NOTES:
- * INDICATES PARTS STUFFED DURING FINAL BOARD ASSEMBLY (C61-C63,C102,FL1-FL9, J4,L10-L13,R79-R81,R154,R155,U31) SEE TABLE 1
 - # INDICATES PARTS NOT STUFFED: (C19,C33)



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	DESIGNER(S)	FINISH	
TOLERANCE (DECIMAL) U.O.S. .X ± .030 .XXX ± .005 .XX ± .015 ANGLES + 1°	PROJ. LEADER	NEXT ASSY.	TITLE DUAL WIDE BAND CONVERTER
TYPE SIZE DWG No. 913-2132/-150/-240 REV A C 913-2132-330/-450/-950 L		MODEL NNNN SCALE 1/1 SHEET 1 OF 1	

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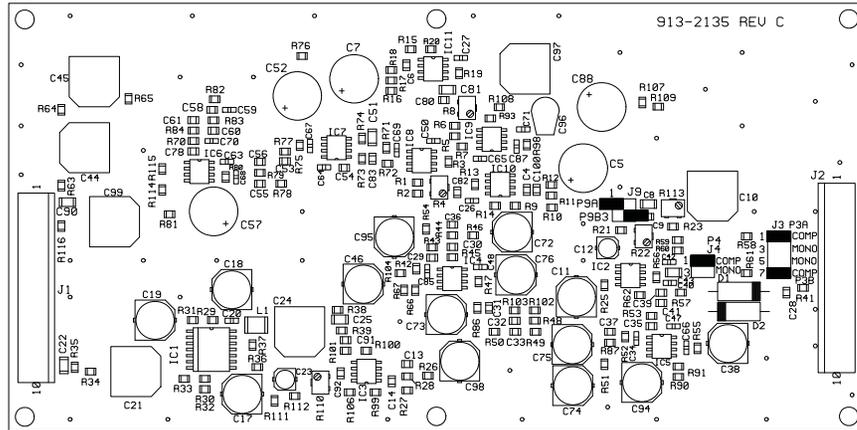
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	DESIGNER:	FINISH	
PROJ. LEADER	HFB.	NEXT ASSY.	TYPE SIZE DWG. NO. S D 913-2135
		SCALE	REV C
		SHEET 2 OF 2	

NOTES:

- JUMPERS P3A, P3B & P4 ARE SHOWN PROGRAMMED FOR COMPOSITE MODE. FOR MONO MODE MOVE P3A TO PINS 3 & 4 OF J3, MOVE P3B TO PINS 5 & 6 OF J3 & MOVE P4 TO PINS 3 & 4 OF J4.
- JUMPERS P9A & P9B SHOWN IN OPEN POSITION FOR USER SELECTABLE DEEMPHISIS, SEE CHART FOR LEVELS.

USER SELECTABLE DEEMPHISIS ON J9

	P9A	P9B
25	1-2	4
50	1	3-4
75	1-2	3-4



REVISIONS

REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	11-19-03	PRODUCTION RELEASE	KT	EJ	----
B	1-4-04	ADD C100: CHGD C5,C7,C9,C51-C53,C57,C58,C61,C80-C83, C88,C90,C91,R21,R22: TIED IC3 PIN 4 TO -12V	KT	LF	11225
C	1-27-06	CHG C8 TO 007-1024-100 C9 TO 007-1503-050	JTB		11391

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TOLERANCE (DECIMAL) U. O. S.
 .X ± .030 .XXX ± .005
 .XX ± .015 ANGLES + 1°

DWN. BY
 KT 11-19-03

DESIGNER(S)

PROJ. LEADER

MFG.

MATERIAL

SEE BOM
 913-2135

FINISH

NEXT ASSY.



BROADCAST ELECTRONICS INC.

4100 N. 24TH ST. P.O. BOX 3606 QUINCY, IL. 62305
 217/224-9600 FAX 217/224-9607

TITLE
 SR20C AUDIO PROCESSING BD

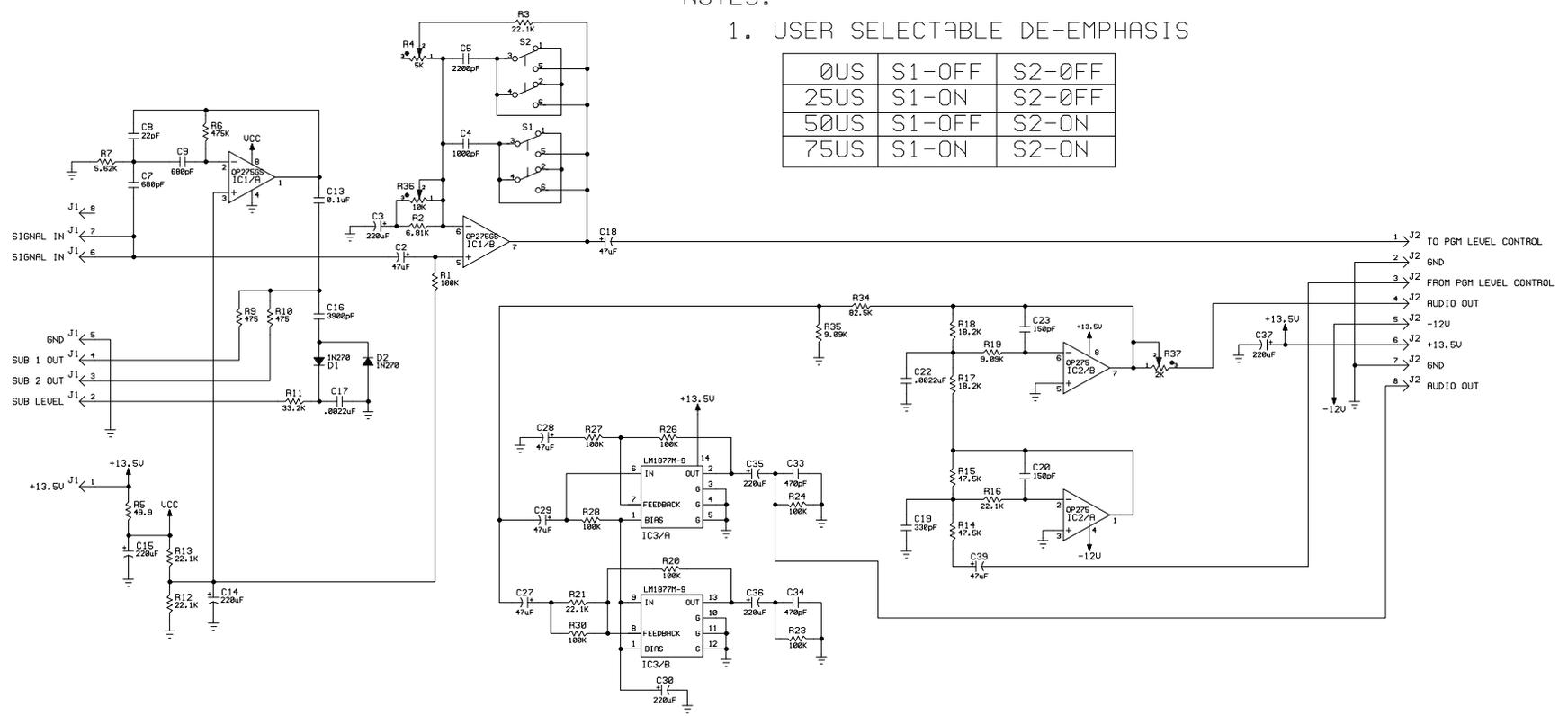
TYPE	SIZE	DWG No.	REV
A	B	913-2135	C

MODEL NNNN SCALE 1/1 SHEET 1 OF 1

REVISIONS					
REV	DATE	DESCRIPTION	DRAWN	APPROVED	ECH
A	12-21-83	PRODUCTION RELEASE	KT	E7	11183
B	7-12-84	TIED IC2 & IC3 TO +13.5V, IC1 TO GND; FLIPPED J1	KT		11183
C	1-30-86	ADD NOTE 1	JTB		11391

NOTES:
1. USER SELECTABLE DE-EMPHASIS

0US	S1-OFF	S2-OFF
25US	S1-ON	S2-OFF
50US	S1-OFF	S2-ON
75US	S1-ON	S2-ON



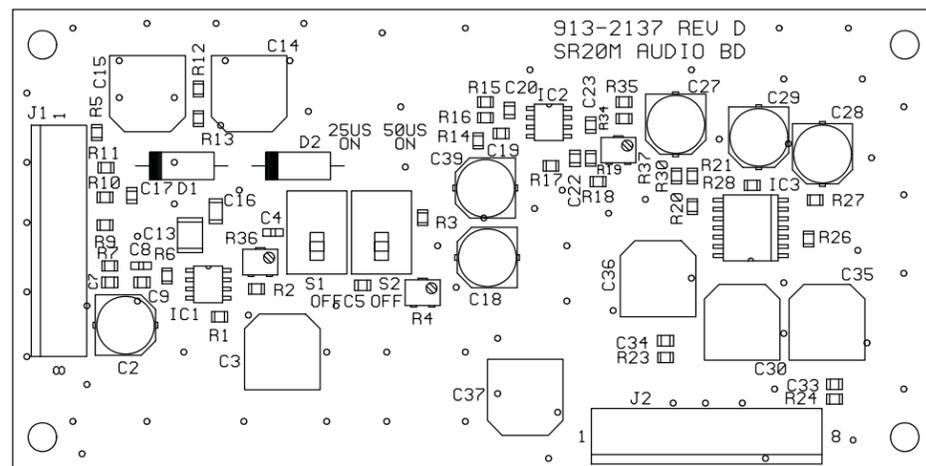
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	FINISH S D	TITLE SR20M AUDIO BD.	
PFD. LEADER		NEXT ASSY.	REV C
SCALE		SHEET 1 OF 1	

REVISIONS

REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	12-3-03	PRODUCTION RELEASE	KT	EJ	----
B	7-12-04	CONNECTED IC2 & IC3 TO +13.5V, IC1 TO EGND; FIXED J1	KT		11183
C	1-30-06	ADD SILKSCREEN FOR S1,S2	JTB		11391
D	4-4-06	CHG C13 TO (007-1045)	JTB		11422



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	KT 12-3-03		SEE BOM 913-2137				
	DESIGNER(S)		FINISH		TITLE		
	PROJ. LEADER		NEXT ASSY.		SR20M AUDIO BD		
TOLERANCE (DECIMAL) U.O.S. .X ± .030 .XXX ± .005 .XX ± .015 ANGLES + 1°		MFG.		TYPE	SIZE	DWG No.	REV
				A	B	913-2137	D
				MODEL NNNN		SCALE 1/1	SHEET 1 OF 1