USER'S MANUAL

AUDIO CONTROL UNIT
(ACU)

Model 580230

For

The Rail Network
Atlanta

Aug 3, 2005

Applied Wireless Inc. ♦ 1250 Avenida Acaso, Unit F, Camarillo, CA 93012
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GENERAL DESCRIPTION

The ACU is a low power, 7-channel, FM stereo transmitter, operating in the FM band (88.1-107.7 MHz). The unit has 7 transmitter "cards" integrated into a single 19-inch chassis for rack mounting. It has two 88.1-107.7 MHz output ports for two separate antenna systems. The transmitters can individually operate in either stereo or mono mode. Each transmitter card can be set to a specific operating frequency using the two 10-position rotary switches on each card.

The ACU has an internal regulator and power supply to provide 48VDC at 0.5 Amps to external equipment. The unit is powered by the 37.5-volt supply from the rail transit vehicle.

The product is to be professionally installed and used in mass transit rail vehicles.

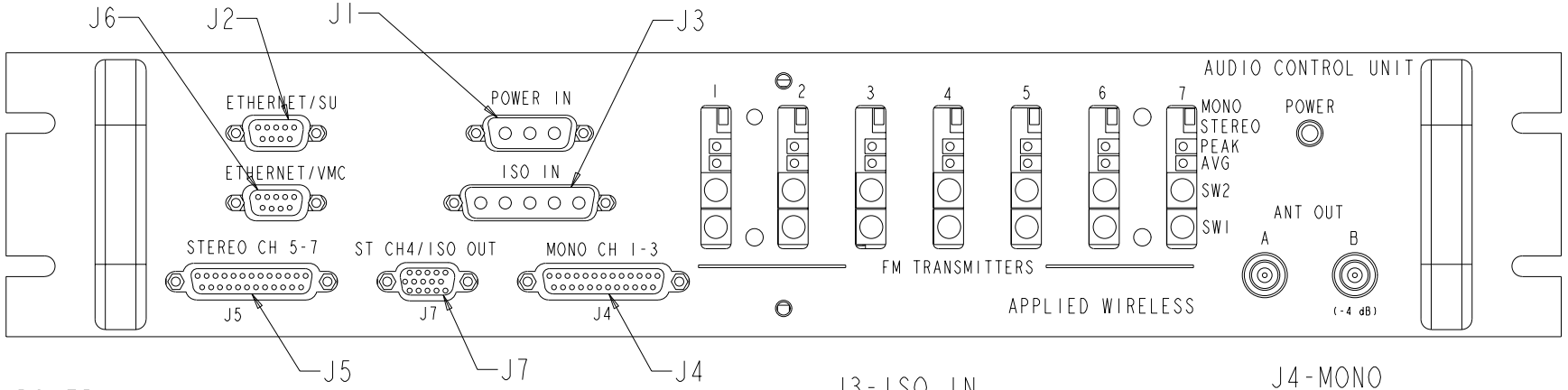
FCC Notice

FCC ID: QY4-580230

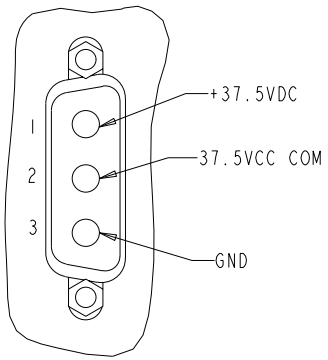
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference and
(2) This device must accept any interference received, including interference that may cause undesired operation.

The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

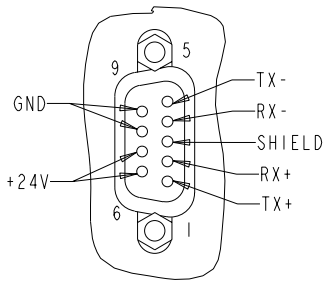


J1-POWER IN



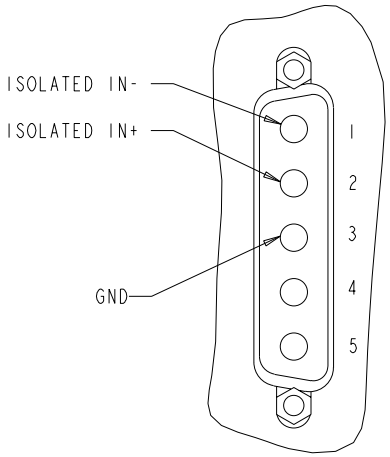
3W3 MALE

J2-ETHERNET/SU



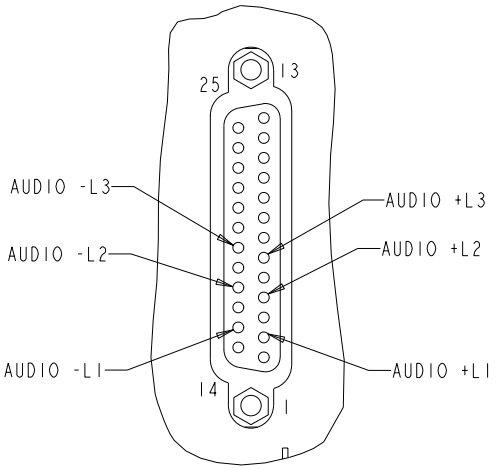
DB9 FEMALE

J3-ISO IN



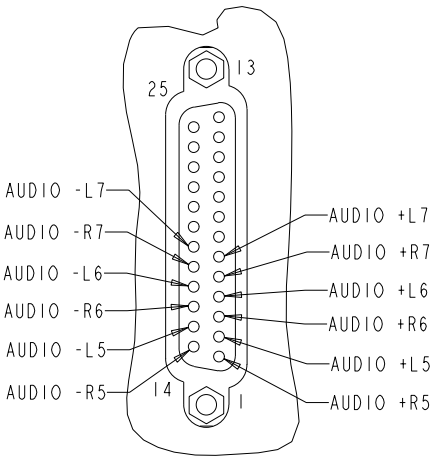
5W5 MALE

J4-MONO



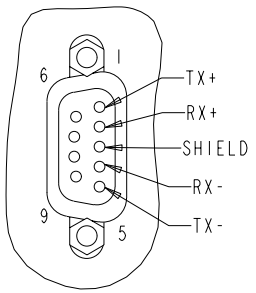
DB25 FEMALE

J5-STEREO



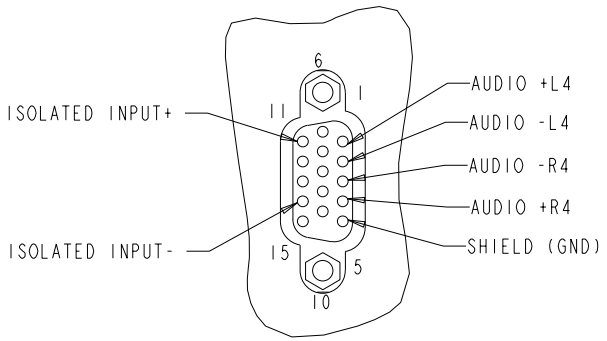
DB25 FEMALE

J6-ETHERNET/VMC



DB9 MALE

J7-ST CH4/ISO OUT



DB15HD MALE

APPLIED WIRELESS

580320-PINOUTS

ACU, DB CONNECTOR PINOUTS

REV A - 050525

FRONT PANEL FEATURES (refer to drawing 580320-PINOUTS)

Stereo/Mono Switch

Set to appropriate setting

Modulation LED's

LED's should usually be in the green, with occasional flashes of RED. No LED's lighted indicates no audio input.

SW2(LSB)/SW1 (MSB)

Set to appropriate channel. Reference the Frequency Allocation Chart.

Power LED

LED is lighted when power is applied. No light indicates either there is no power to the ACU, or the re-settable fuse has been tripped. If the PTC re-settable fuse is tripped, it will reset itself when the problem is resolved and the re-settable fuse cools.

ANT OUT A

Connect to "A" car antenna system.

ANT OUT B

Connect to "B" car antenna system. Power to this port is attenuated by 4 dB vs the "A" antenna connection port to compensate for cable losses in the longer "A" car antenna cabling.

J1 POWER IN

Connects to 37.5-volt supply.

J2 ETHERNET/SU

Connect to Ethernet port of the subscriber unit. This is a pass through connection from J6. Internally, the ACU supplies power to the SU from this port via pins 6 through 9. See drawing 460320.

J3 ISO IN

Connects internally to pins 11 and 14 on J7.

J4 MONO CH1, 2, 3

Balanced Audio Inputs for mono channels.

J5 STEREO CH 5, 6, 7

Balanced Audio Inputs for stereo channels.

J6 ETHERNET/VMC

Connect to Ethernet port on VMC. Passes signal directly through to J2.

J7 ST CH4/ISO OUT

Audio Input for Ch 4

ANTENNA INSTALLATION

The antenna system and ACU, which are exclusively installed in mass transit rail cars, must be professionally installed in accordance with these instructions.

The ACU is to be installed in the utility cabinet of the "B" rail car of a "married pair" rail car pair. See the Antenna Connection drawing 550320-ANT.

The ACU connects to the antenna system as shown in 550230-ANT.

The Leaky Feeder Antenna's are made in accordance with drawing RC-WI-002 by terminating one end in a 50-ohm resistor and connecting the other end to an N male connector.

The components required for the Antenna System assembly are as follows:

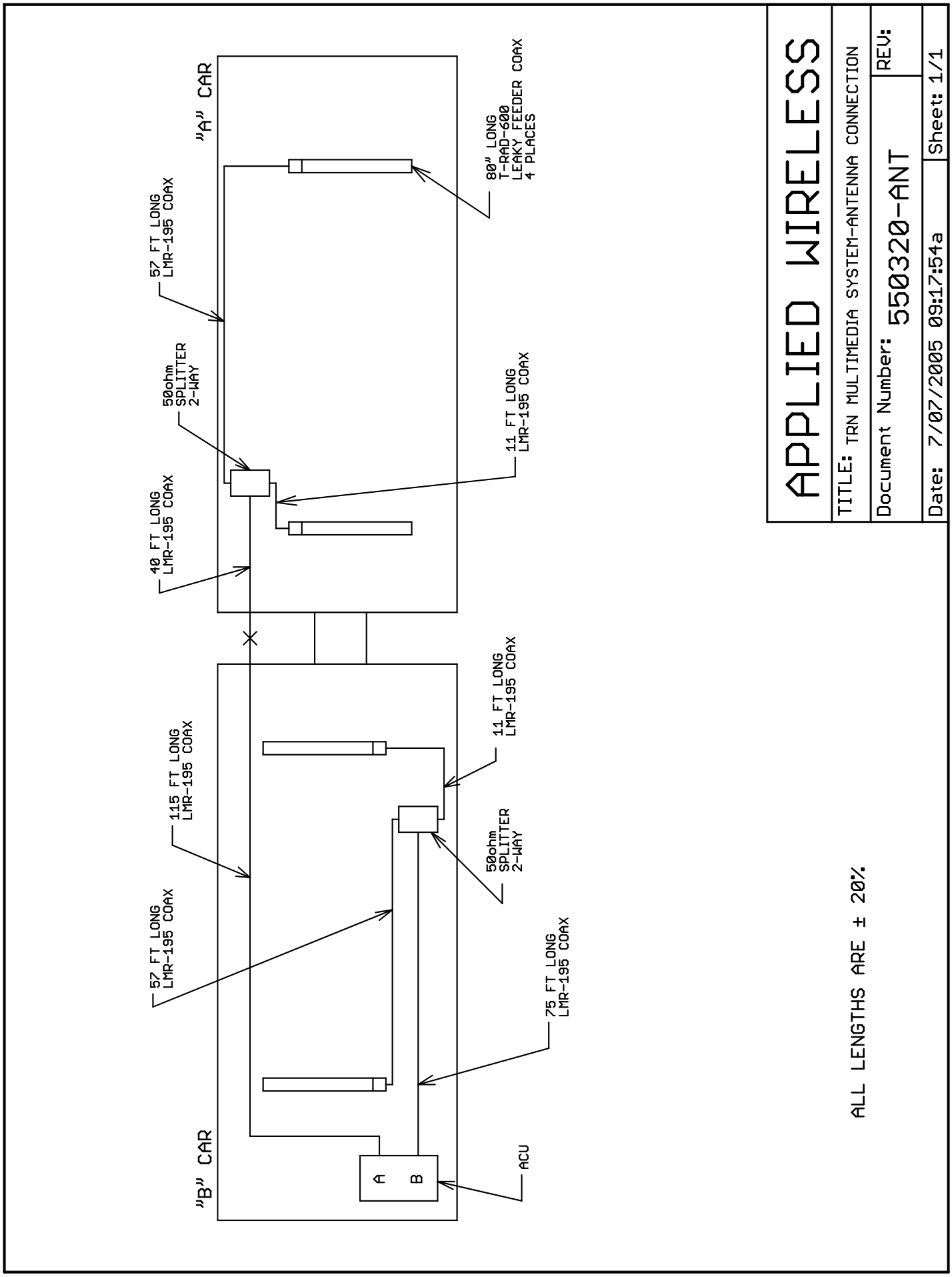
ITEM	QTY	MFG	PN	NOTES
Power Splitter, 2-Way, "F"	2	Steren	201-202	
Adapter, BNC M to F Fe	6	Steren	200-108	For use on power splitters
Antenna, Leaky Feeder, 80"	2	Times Microwave	T-RAD-600FR	See drawing RC-WI-002
Connector, N Female	2	Times Microwave	EZ-600-NF	Attaches to one end of Antenna
Coax Cable		Times Microwave	LMR-195	See drawing 550320-ANT
Connector, BNC Male	8	Amphenol	31-4320	Crimped to LMR-195 at ACU and 2-Way Splitter
Connector, N Male	2	Amphenol	82-5375-RFX	Crimped to LMR-195 at antenna.
Resistor, 50 Ohm, leaded	2	Vishay/Dale	RN60D49R9F B14	

The "A" output port of the ACU connects to the "A" rail car antenna system, which is furthest from the ACU. This port has 4-dB more output power than the "B" ACU port to compensate for the additional line losses to the "A" rail car.

The B port of the ACU is connected to the "B" rail car antenna system, which is the rail car in which the ACU is installed.

The antennas are installed at ceiling level. They are spaced 40 feet apart, 17.5 feet from each end of the rail car.

Specific assembly and routing installation information for cables, antenna and other components of the audio/video system can be found in the manual, Interior Wire Harness Pre-Fabrication Instructions, RC-WI-002.



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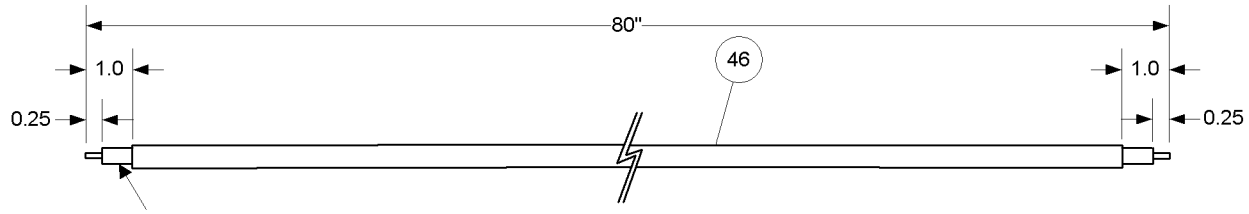
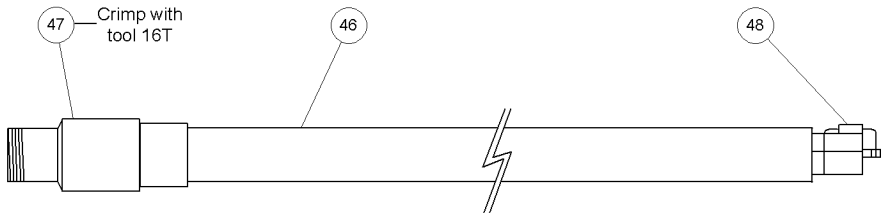
LEAKY FEEDER COAX ANTENNA ASSEMBLIES: LFF, LFR

☑ **A-car** ☑ **B-car**



Left Side Wire Marker	Right Side Wire Marker
-	-



1. Lay resistor (Item 48) on foam core of stripped coax (Item 46) as shown.
2. Wrap resistor lead around coax conductor, then solder.
3. Wrap foil tape (Item 49) around coax foil and loose resistor lead to electrically bond the lead to the foil. Do not short the resistor leads together.
4. Heat shrink a 2" long piece of tubing (Item 50) around the coax end to enclose all un-jacketed parts. Crimp the free end of the tubing closed when hot to seal the end.

☐ **Inspect**

☐ **Test Resistance**

ACU SPARES LIST

PN	Description	MFG
450322	CATV AMP	Applied Wireless
450319	TRANSMITTER CARD	Applied Wireless
450323	MAIN POWER BOARD	Applied Wireless
450327	48V POWER BOARD	Applied Wireless
600130C	CONTACTS FOR J1, J3 (3W3, 5W5)	FCT Elec. FMP002P103
270024	LED Assembly	Lumex SSI-LXR4815SRD
320117-TO3	LM117 REGULATOR IC (TO-3)	National LM117HVK
610183-6	D-Connector Hardware Kit, for J2, J6	3M 3341-4
610183	D-Connector Hardware Kit, for J1, J3, J4, J5, J7	3M 3341-1L
600091-RIB	Connector Shell, 8-pin, (used on 450323)	Molex 09-50-8083
600091-4-RIB	Connector Shell, 4-pin, (used on 450320)	Molex 09-50-8043
600091-3-RIB	Connector Shell, 3-pin, (used on 450327, 450326)	Molex 09-50-8033
600092-PHO	Contact Pins, Female, 18-20 AWG (used on 600091 Connector shells)	Molex 08-52-0113

MANUFACTURER CONTACT INFORMATION

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APPENDIX

ACU Frequency Allocation Table

Channel	SW1	SW2	Freq.(Mhz)		Channel	SW1	SW2	Freq.(Mhz)
1	0	0	88.100		51	5	0	98.100
2	0	1	88.300		52	5	1	98.300
3	0	2	88.500		53	5	2	98.500
4	0	3	88.700		54	5	3	98.700
5	0	4	88.900		55	5	4	98.900
6	0	5	89.100		56	5	5	99.100
7	0	6	89.300		57	5	6	99.300
8	0	7	89.500		58	5	7	99.500
9	0	8	89.700		59	5	8	99.700
10	0	9	89.900		60	5	9	99.900
11	1	0	90.100		61	6	0	100.100
12	1	1	90.300		62	6	1	100.300
13	1	2	90.500		63	6	2	100.500
14	1	3	90.700		64	6	3	100.700
15	1	4	90.900		65	6	4	100.900
16	1	5	91.100		66	6	5	101.100
17	1	6	91.300		67	6	6	101.300
18	1	7	91.500		68	6	7	101.500
19	1	8	91.700		69	6	8	101.700
20	1	9	91.900		70	6	9	101.900
21	2	0	92.100		71	7	0	102.100
22	2	1	92.300		72	7	1	102.300
23	2	2	92.500		73	7	2	102.500
24	2	3	92.700		74	7	3	102.700
25	2	4	92.900		75	7	4	102.900
26	2	5	93.100		76	7	5	103.100
27	2	6	93.300		77	7	6	103.300
28	2	7	93.500		78	7	7	103.500
29	2	8	93.700		79	7	8	103.700
30	2	9	93.900		80	7	9	103.900
31	3	0	94.100		81	8	0	104.100
32	3	1	94.300		82	8	1	104.300
33	3	2	94.500		83	8	2	104.500
34	3	3	94.700		84	8	3	104.700
35	3	4	94.900		85	8	4	104.900
36	3	5	95.100		86	8	5	105.100
37	3	6	95.300		87	8	6	105.300
38	3	7	95.500		88	8	7	105.500
39	3	8	95.700		89	8	8	105.700
40	3	9	95.900		90	8	9	105.900
41	4	0	96.100		91	9	0	106.100
42	4	1	96.300		92	9	1	106.300
43	4	2	96.500		93	9	2	106.500
44	4	3	96.700		94	9	3	106.700
45	4	4	96.900		95	9	4	106.900
46	4	5	97.100		96	9	5	107.100
47	4	6	97.300		97	9	6	107.300
48	4	7	97.500		98	9	7	107.500
49	4	8	97.700		99	9	8	107.700
50	4	9	97.900					

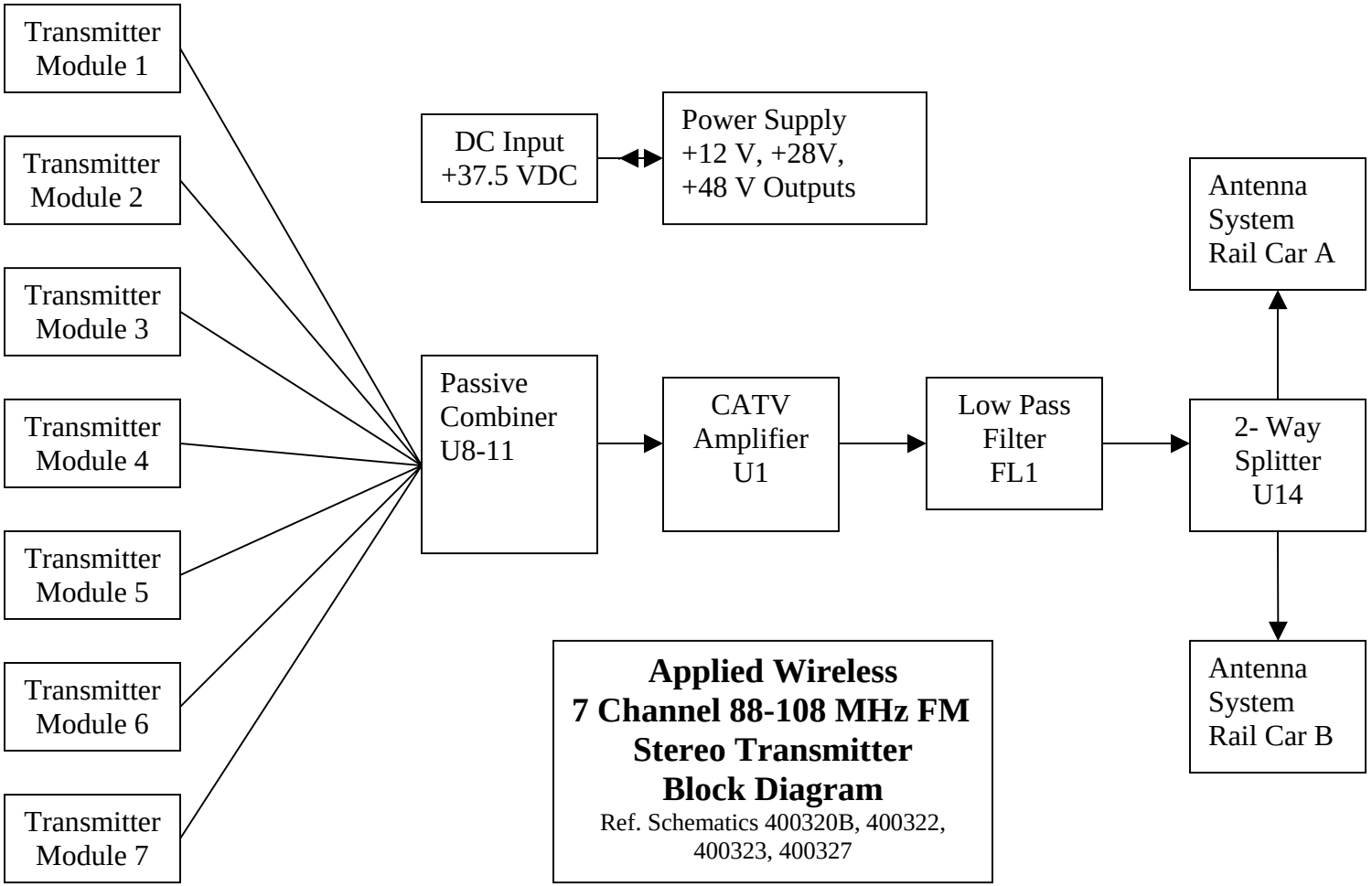
ELECTRICAL SPECIFICATION

Audio Control Unit

The following describes the specifications for an unlicensed, 7-channel FM stereo broadcast transmitter.

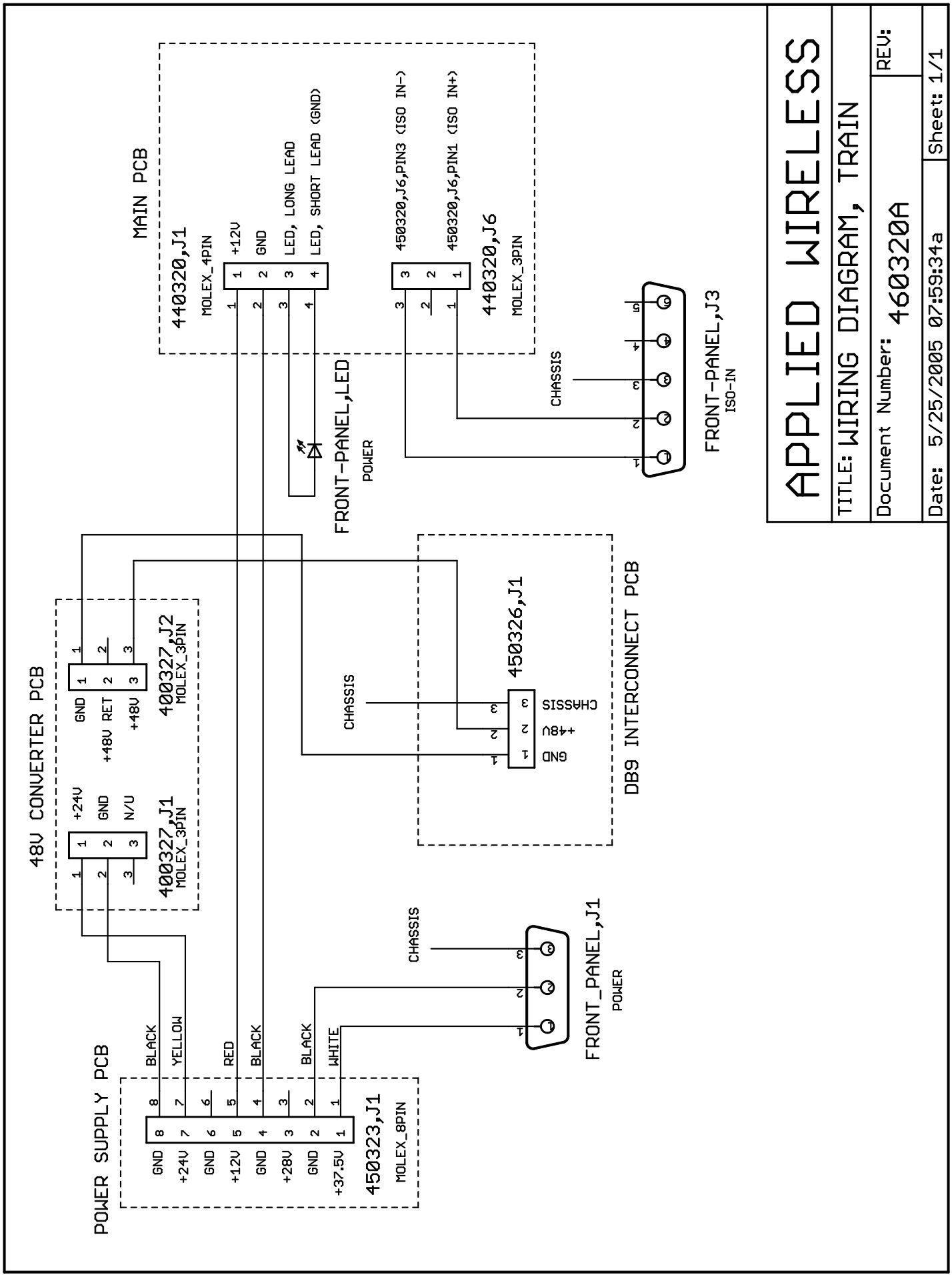
Front Panel Features	
Modulation Indicators	Green LED- Normal Red LED-Peak
Stereo/Mono Select	Slide Switch
Input Power Receptacle	3W3 D Connector Male
Ethernet-SU Power	DB-9 Female
Ethernet-VMC Data	DB9-Male
Audio Bal-In, Mono, CH1-3	DB25 Female
Audio Bal-In, Stereo, Ch 5-7	DB25 Female
Audio Bal-In, Isolated, CH 4	5W5 Male
Isolated Out- CH 4	DB15HD male
Antenna Outputs	2ea, BNC Female
Indicators	
Power Indicator	Red LED
Channel Select	2ea, 0 to 9, BCD Rotary Switch
Power Supply Attributes	
Supply Voltage	37.5 VDC (70% to 120%)
Supply Current, No S.U. Load	345mA (excluding external Proxim power requirement of 0.40 Amps
Supply Current, with SU Load	1.2A Typical
Output Voltage to SU	48VDC +/-1.0VDC
Output Current, S.U.	400mA Typical, 470mA max
Power Dissipation	26W, with SU Load, 37.5 VDC Input
Audio Input	0dB, 600ohm, Balanced. 4-wires/channel

RF Attributes	
No. of FM Channels	7
Frequency	88.1 to 107.7 MHz, 200khz Steps
FM Deviation (Peak)	+/-75KHz Typical
Environmental Specifications	
Operating Temperature	-10F to +120F
Vibration/Shock	IEC 61373, Edition 1999-1 Paragraphs 8.0, 9.1, and 10.1.
EMC	
Conducted Emissions	Per EN5501, Class A, 150kHz to 30 MHz
Radiated Emissions	Per EN 5501, Class A, 30MHz to 1GHz
Immunity	
RF Electromagnetic Field	Per EN61000-4-3, 80MHz to 1 GHz and 1.4 to 2.0 GHz at 10V/m, 1 KHz AM, 80% Modulation
Fast Transients	Per EN61000-4-4, 2KV on Power Lines
Power Line Surges	Per EN61000-4-5, Line to Gnd, Line to Line, +/-0.5kV, +/-1.0kV, +/-2.0kV



Applied Wireless
7 Channel 88-108 MHz FM Stereo Transmitter
Block Diagram

Ref. Schematics 400320B, 400322, 400323, 400327



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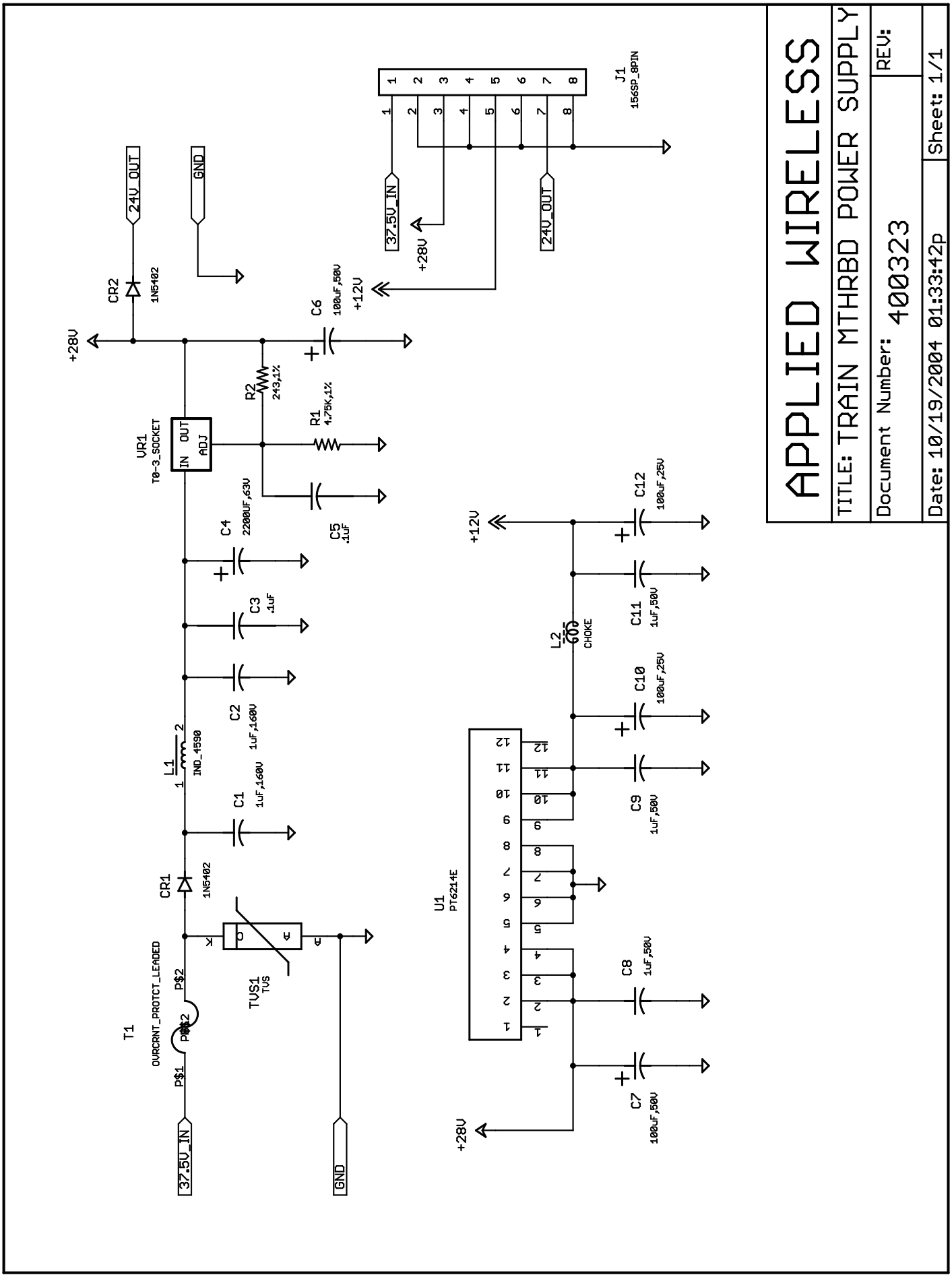

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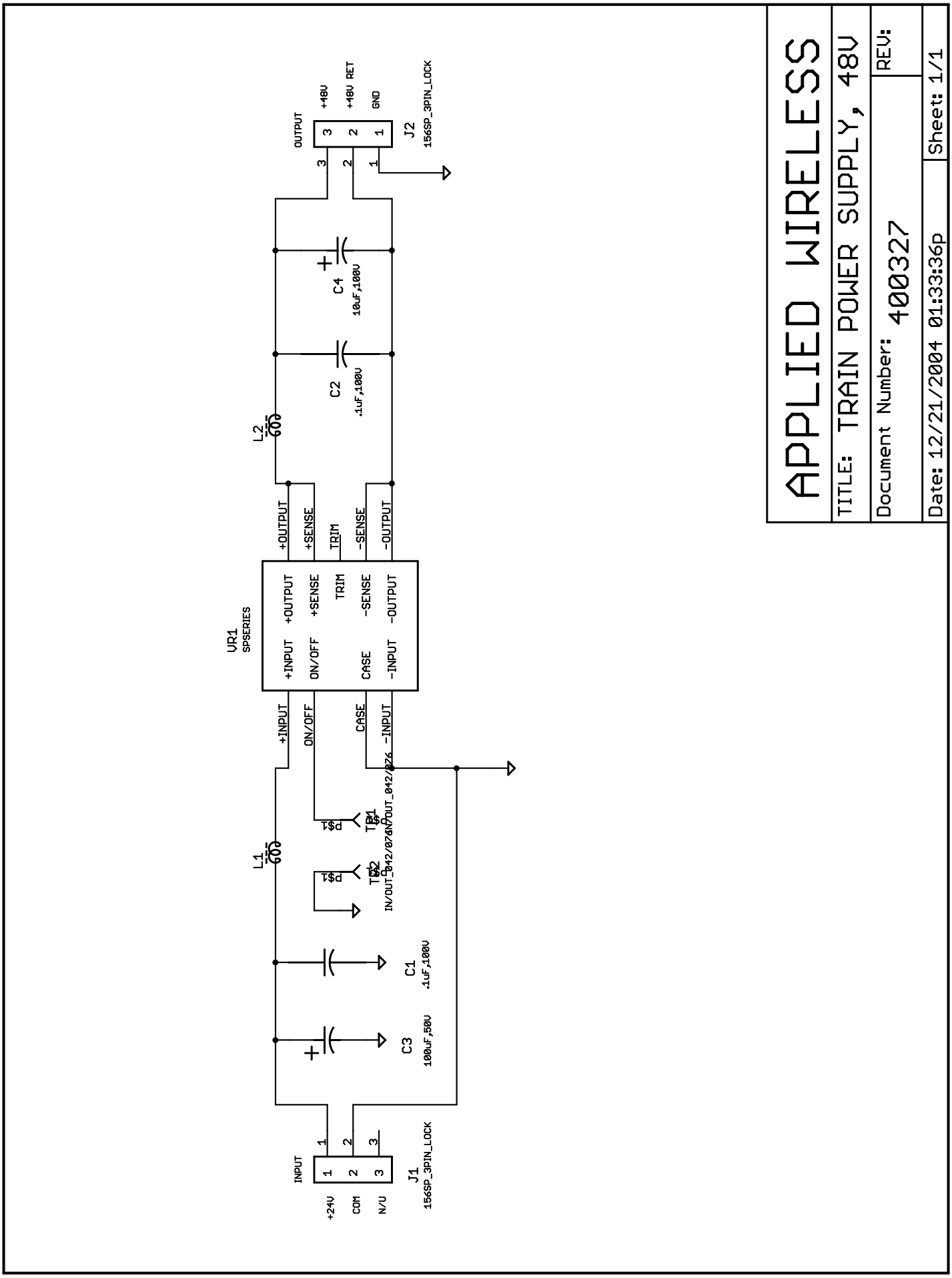

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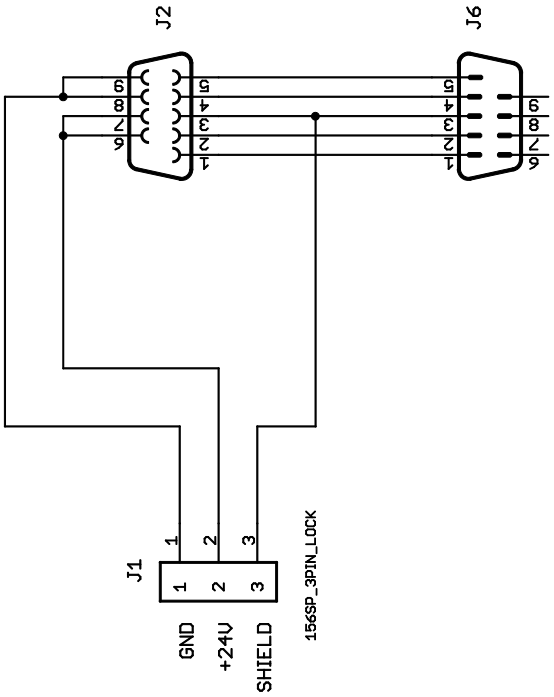

APPLIED WIRELESS

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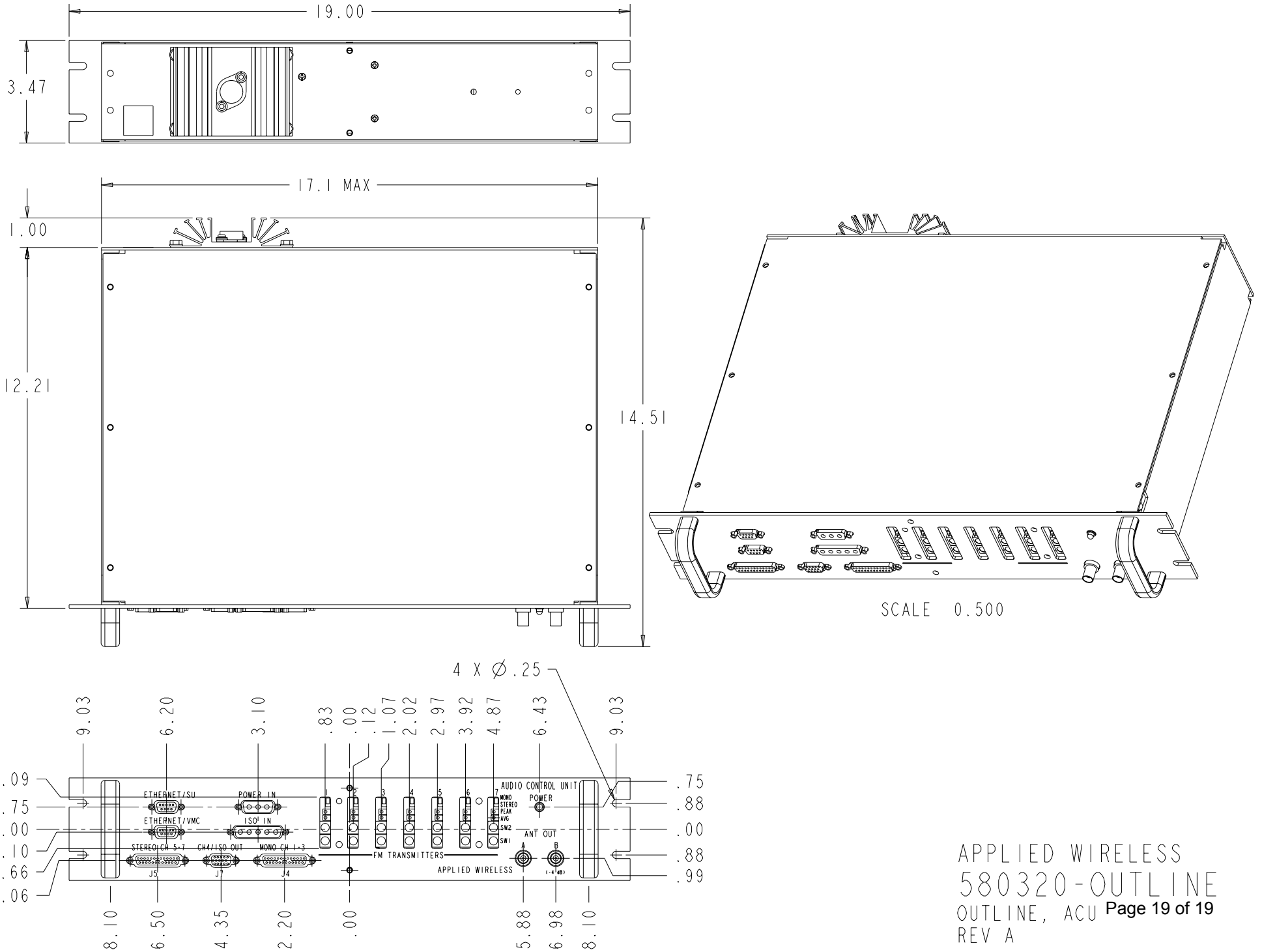

APPLIED WIRELESS
580320-OUTLINE
OUTLINE, ACU
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