RADIO COMMUNICATIONS
FOR PROFESSIONALS

RITRON, INC.

MAINTENANCE AND OPERATING MANUAL
MODEL RTT
TELEMETRY TRANSCEIVER

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RTT HARDWARE SPECIFICATIONS

WEIGHT & DIMENSIONS:

Industrial Enclosure: 12.75" x 7.12" x 2.25", 3.8 lbs.
Commercial Enclosure: 9.5" x 6.25" x 1.4", 1.5 lbs.

POWER REQUIREMENTS:

105-140 VAC, 50-60 Hz, 200 mA. thru RDM-PWR or
+10-14 VDC, 15 mA for basic RTT unit plus:
- 55 mA w/RM Series Receiver & Power Lamp,
- 50 mA w/Relay Activated,
- 20 mA / each active Expansion Output,
- 750 mA w/RM Series Transmitter Activated.

TRANSCEIVER INTERFACE:

For connection to Ritron RM-Series transceivers

PIN	FUNCTION
1	Carrier Detect Input
2	Receiver Audio (line level)
3	CTCSS Detect Input
4	Monitor Control
5	+12 VDC to transceiver
6	Amplified RX Audio from transceiver
7	Ground
8	Spare
9	Transmitter Modulation
10	Transmitter Activate

NO (Normally Open) INPUTS:

3.5 mm jack, 10KΩ or less to ground to activate.

NC (Normally Closed) INPUT:

3.5 mm jack, 2KΩ or more to activate.

I/O (INPUT/OUTPUT) PORT:

8 pins, .100" centers, polarized, locking type.

1	RS-232 Data Ground
2	RS-232 Data Output
3	RS-232 Data Input
4	+12V
5	Relay Contact Normally Open (NO).
6	Relay Contact Normally Open (NO).
7	Ground
8	Normally Open Contact Input

EXPANSION PORT:

10 pins, .100" centers, polarized, locking type.

PINS	FUNCTION
1 - 8	Input/Outputs
9	Supply to External Device, +5 or +12 VDC
10	Ground

MIC. JACK:

3.5 mm, 2 cond. medium impedance, unbalanced.

TEST MIC. JACK:

3.5 mm, 3 cond. for use with Ritron Model RSM-23.

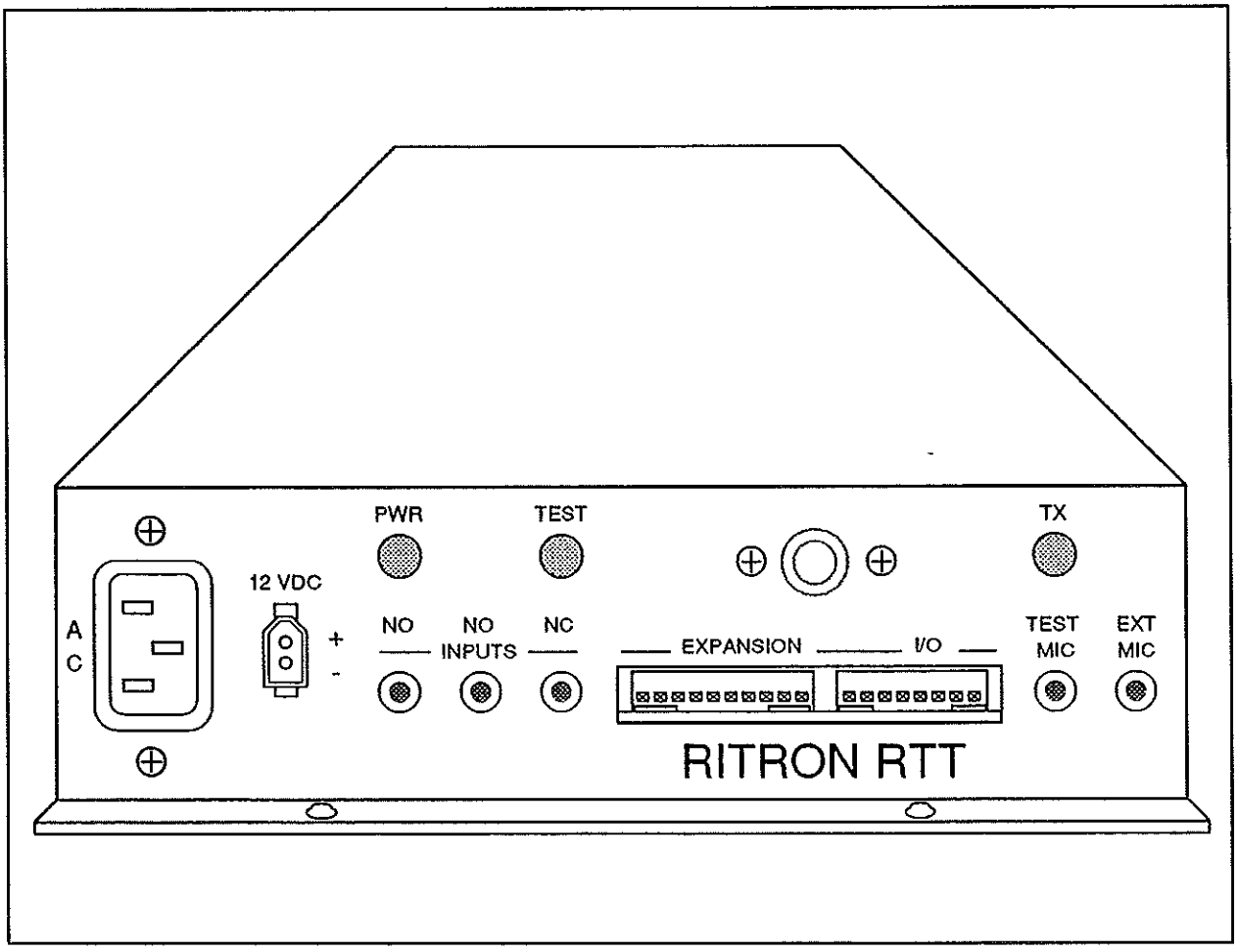
RTT FUNCTIONAL OVERVIEW

The RTT Radio Telemetry Transceiver provides wireless contact closure radio telemetry and control in a single package. Each RTT unit contains a Touch Tone Encoder/Decoder, microcontroller and Ritron RM series radio transciever. Units enclosed in the industrial case include an internal power supply. Installation is simple and requires only connection to an AC line (or 12 VDC), a suitable antenna and the user's contact closures.

Each RTT provides both a contact closure input and output (NC and NO). Additionally, the 10 position expansion connector on the front panel may be connected to commercially available solid state control panels for 8 more lines of optically isolated input/output. Sounds at a remote location can be transmitted back to a central station by the RTT's front panel mounted, high sensitivity microphone.

RTT units can be controlled by another RTT unit or from a portable radio transceiver equipped with a Touch Tone keypad or from a master computer.

The RTT's internal 3 Watt radio transceiver may be specified for operation in the frequency bands: 144-174, 406-420 and 450-470 MHz. For long distance repeater communications, CTCSS encode and decode is included and is switch programmable on the board. The unit is designed for low power applications and can be powered from either 110 VAC or 12 VDC, with automatic charger/back-up cutover to an external battery. A speaker/microphone jack is provided for local test and antenna alignment.



COMPONENTS OF A RTT SYSTEM

The basic RTT components of a functional RTT system are the hardware on the RTT unit, the associated RITRON RM series radio transceiver, a power source and the operating firmware inside the microcontroller that determines how the unit works.

Each model RM Series Radio Transceiver has its own separate manual.

When used in the industrial enclosure the RTT is powered by an internal RDM-PWR 110 VAC, 50-60 Hz power supply. Refer to the RDM-PWRA theory (p. 5) and schematic (p. 17).

When used in a Commerical enclosure the RTT is powered by an external source of 12 VDC such as the Ritron RPS-1 110 VAC wall mount power supply or other source.

RTT HARDWARE THEORY OF OPERATION

VOLTAGE REGULATOR. From the external source of +12 VDC, IC105 supplies a regulated source of +5 VDC to the circuitry of the RTT and if selected by PJ101A to the device connected to the Expansion Port.

MICROCONTROLLER. IC104 is an eight bit CMOS microcontroller that contains operating firmware that is Copyright by RITRON, INC. The clock signal for IC104 is obtained from the 3.579545 MHz oscillator of the Touch Tone Transceiver IC103.

ADDRESS/MODE SWITCH. SW102 is connected to Microcontroller inputs with pull-up resistors RN102 A-H.

TRANSCEIVER SQUELCH INPUT. PJ102 selects whether carrier or CTCSS squelch inputs will be used by the Microcontroller.

TOUCH TONE TRANSCEIVER. Consists of IC103 and is a functional block that encodes and decodes audio frequency Touch Tone signals under control of the Microcontroller. The amplitude of Touch Tones that are to be applied to the RM transceiver is controlled by R136.

RADIO TRANSCEIVER POWER CONTROL. Q117 and Q116 form a series switch which the Microcontroller uses to turn the associated RITRON RM Series radio transceiver on and off. It can be advantageous to turn off the transceiver when not required to conserve battery power.

ELECTRET MICROPHONE AND AGC AMPLIFIER. A high sensitivity electret microphone (MC101) is mounted on the front of the RTT. MIC Jack J104 allows for an external microphone to be used instead. The regulated power supplied to the Microphone and Amplifier thru Q119 and Q118 is activated only when the Microcontroller is also activating the attached RM radio transmitter. The microphone's operating bias is obtained via R128 and R129 bypassed by C111. IC102 is an operational transconductance amplifier whose gain is controlled via the AC to DC detector of Q120, CR116 and associated components. The Local Microphone is either enabled or muted by the Microcontroller with either a logic 0 or 1 applied thru R170 to the AGC detector. Touch Tones to be transmitted are mixed with the mic audio via R136 and R172.

LOCAL TEST REMOTE SPEAKER/MICROPHONE JACK. This jack is configured for use with the Ritron model RSM-23 Remote Speaker Microphone. The Microcontroller is able to determine when the RSM-23 is plugged in because the shorting connection on TEST MIC jack J105's ring circuit opens and the voltage at pin 22 of the Microcontroller goes low. Amplified Receiver Audio from the RM transceiver is sent to the Speaker.

RELAY OUTPUT. The Microcontroller turns this relay on and off under program control via Q105.

CONTACT CLOSURE INPUTS. The Normally Open and Normally Closed input jacks are logic OR'd to produce a logic 0 on the collector of Q102 and multiplexed with control signals to the Touch Tone Transceiver via R105 and applied to the Microcontroller.

EXPANSION PORT. Microcontroller Port C input/output bits 0 - 7 are brought out to pins 1 - 8 of the Expansion port through the driver/protection circuitry. The current amplifiers of Q107-114 enable the outputs to sink up to 30 mA each with respect to the +5 VDC supply when configured as outputs. When configured as inputs RN101 A-H act as pull-ups.

Pin 9 of the Expansion Port may be connected to the RTT +5VDC supply (PJ101, A position) or +12VDC (PJ101, B position). Pin 10 of the Expansion Port is connected to Chassis Ground.

WARNING: Static Discharge or High Voltages connected to these lines may destroy the Microcontroller!

DISPLAY LAMPS. The GREEN Power Lamp is connected to the Transceiver Power Switch and lights when power is applied to the transceiver. The RED Transmit Lamp is connected to the line that is used to activate the RM transceiver. The YELLOW Test Lamp is controlled by the Microcontroller via Q106. R140 and C108 enable control signals to the Lamp and Touch Tone Transceiver to share a common Microcontroller pin.

RS-232 INTERFACE. Data input is level shifted by Q104 and applied to the Microcontroller. The Data output from the Microcontroller is level shifted by Q103. The negative supply voltage for the RS-232 output is obtained by storing a charge supplied by the associated data equipment output on capacitor C105 thru diode CR103. The resulting output voltage levels are +5V for space and a negative voltage determined by the associated equipment. With no external device attached to the RS-232 input the output voltages are +5 V for space and 0 V for mark.

POWER SUPPLY BOARD (RDM-PWRA)

This power supply board features an adjustable charging voltage for an external "backup" battery, and can accommodate systems that require an alert signal when AC power fails. The RDM-PWRA board is mounted inside of the RTT industrial case, with the transceiver and telemetry modules.

The RDM-PWRA board may be connected to an AC outlet via the front panel socket, and/or to a +12 VDC battery via the 2-pin connector (also on the chassis front panel). If the unit will be plugged into an AC source, a RDM-PWRA board jumper may be set to charge an external "backup" battery.

RDM-PWRA CONNECTIONS TO RTT-REM BOARD. Refer to the RDM-PWRA schematic. P303 of the RDM-PWRA board is wired to the RTT-REM board via a 3-wire harness, to provide +12 VDC and Ground. The third wire is soldered to the RTT-REM board at expansion port P102 pin 1, and is available for connection to the RDM-PWRA board (at P303 pin 5, the AC Power Fail Output).

NOTE: This connection should be used only in AC powered RTT applications, with an external DC source used for backup only. When AC power fails, the RTT's transceiver will transmit a message to indicate loss of AC power.

CAUTION - EXTERNAL "BACKUP" BATTERY TYPE. Only Lead-acid batteries (including Gel-Cell) can be charged with the RDM-PWRA board. Do not use Nickel-Cadmium batteries with a RDM-PWRA system. The RDM-PWRA charging circuitry provides a constant voltage, not a constant current, which Nickel-Cadmium batteries require.

THEORY OF OPERATION. The front panel AC socket may be connected to a standard wall outlet (105 to 135 VAC, 60 Hz) via P301. Refer to the RDM-PWRA schematic. When an AC voltage is connected, T301 energizes; the secondary coil applies 12.5 VRMS to a full-wave bridge rectifier (CR301 - CR304). Surge protection is provided by VR301 and VR302. The DC output (approximately +16 Volts) at the cathode of CR302 is routed to: 1) IC302, 2) IC301 and 3) Q301.

IC302 applies regulated +12 VDC to K301. Capacitors C302 and C303 filter the input of IC302. C304 filters the output. The AC signal at T301's secondary is applied to CR306. The positive half-wave at CR306's cathode forward biases Q302, which then pulls one side of the relay (K301) coil to ground. K301 activates and connects +12 VDC to P303 pin 3, via fuse F302. Zener diode CR308 holds the output under +18 Volts.

IC301 applies a regulated voltage through diode CR305 to P302 pin 1 for charging an external battery. (Note that PJ301 must be in position "B".) C301 provides filtering. IC301's output is adjustable with R304; the voltage at P302 is normally set for +13.7 VDC.

Q301 turns on when AC power is applied to the RDM-PWRA board. The bridge rectifier output at R305 forward biases Q301's base-emitter junction, and current flows through R309 to ground. This pulls Q303's base "low." Q303 stays off unless AC power is removed.

When AC power is removed, Q302 turns off and the relay coil switches to source power from the battery at P302. CR307 and C305 prevent spikes on the line when the relay coil collapses. Q301 also shuts off, allowing charging capacitor C306 (or the external battery if one is connected) to forward bias Q303. Q303 switches on and applies a "low" to P303 pin 5, the AC Power Fail Output. (This output may be used for special applications.)

RTT FIRMWARE VERSION 1.2 THEORY OF OPERATION

The operating program in the Microcontroller is called Firmware. It is the sole property with

HEXADECIMAL notation is used in this description. See Table 1 (p. 10) to convert hexadecimal numbers (i.e. $2A) to decimal numbers (i.e.42) and their binary equivalents (i.e. %00101010). Additionally, Touch Tone character equivalents are shown.

ADDRESS/MODE SWITCH. The Address Switch is used by the Microcontroller to determine the Address (who am I?) and the Mode (what should I do?) of the RTT unit.

ADDRESS/MODE MAP. Because the address of the unit determines its operating mode certain address ranges are restricted as follows:

RANGE	CONFIGURATION DETERMINED BY ADDRESS SWITCHES
$00-$DF	Remotes, 223 possible.
$E0-$EF	Reserved for Remotes in Manual Mode. Bits 0 - 3 determine address of Remote as 0 - 15.
$F0-$FE	Master / Remote System Addresses. Bits 0 - 1 On the Master are the number of Remotes -1. Bits 0 - 1 On the Remotes are their Address 0 - 3. Bit 2 is set to identify the Masters. Bit 3 determines system 0 or 1. This allows 2 systems on the same freq.
$FF	Broadcast Address. Recognized by all RTT units not in Manual Mode.

GENERAL MESSAGE FORMAT. Each RTT message consists of 5 Touch Tone characters. They are sent at the rate of 10 characters per second. The RTT turns on the RM transmitter and waits 600 ms before transmitting the tones to allow for repeater operation. Refer to the Command Reference list for how the RTT responds to each message.

ORDER	CHARACTER	FUNCTION
1	ADDRESS MSB	Destination if sent by Master. Originator if sent by Remote.
2	ADDRESS LSB	Second part of the full Address.
3	COMMAND	Directs the RTT to operate per the Command List.
4	DATA	Information associated with the Command.
5	CHECKSUM	This determined from the complement of the 4 LSB's of the sum of characters 1 thru 4. A valid Message's received and computed Checksums must match. The Checksum is not required when inputing messages via the RS-232 port. It is appended by the RTT and transmitted. Likewise, received messages are checked for accuracy and the Checksum character is not sent out the RS-232 port.

HEY MESSAGES. This Message is sent from Remotes to Master upon change in state of either Alarm or Expansion Input status. There are two types of Hey messages. One is for alarm input status (Command Digit=$5, 1 bit DATA follows) and another for Expansion Inputs (Command Digit=$6, 4 bit DATA follows).

DIGIT	DESCRIPTION
0	Address of Remote Digit 1.
1	Address of Remote Digit 2.
2	Hey Master Message Digit, either Alarm or Expansion.
3	New Data, either Alarm or Expansion
4	Checksum Digit.

The Remote will turn off the Test Lamp, send the Hey Message and wait a few seconds for an Acknowledgment from a Master. If the Ack is not received after a few seconds it will again send the Hey Message. It will try 5 times and then set the Test Light and quit.

NORMAL REMOTE MODE. In the normal Remote mode all functions are available. Loss of Signal Polling is deactivated until commanded by a Master Unit.

TOUCH TONE MANUAL MODE. The Touch Tone Manual mode enables control of the RTT from a handheld radio equipped with a Touch Tone Encoder to make manual changes in status. This mode is activated by setting the 4 MSB of the DIP switch to code "E". Then the last 4 bits of the DIP switch determine the address prefix digit for commands to that particular RTT.

The "#" character is used as a terminator to initiate a command.

Digit	Function	Limits
1	Location Prefix	0 thru 9.
2	Output Selector	1 thru 9.
3	Control Digit	0 = Output Off, 1 = Output On. (even/odd)
4	Command Terminator	Always a "#".

Example: The Touch Tone digit sequence [410#] would turn off output 1 on RTT set to address "$E4" (11100100). The entry [411#] would turn that output on.

NOTE: Output 9 is the Relay Output.

RS-232 Communications Port Operation in Manual Mode. In Manual Mode, sending the character 'T' to the RTT will cause the transmitter to be activated. Subsequent characters will be transmitted as Touch Tones. A carriage return will deactivate the transmitter.

MASTER WITH ONE TO FOUR REMOTES MODE. In this mode the RTT is configured to act as a Master and exchange and poll its Remote units.

Address/Mode Switches 1, 2, 3, 4, and 6 must be set ON to configure the unit as a Master.

Switch 5 sets the system identification for system 0 or system 1. This allows two systems of a Master and Remotes to use the same radio channel without interfering. This setting must match on the Master and Remotes.

ADDRESS/MODE
DIP SWITCH SETTINGS

1	2	3	4	5	6	7	8
ON	ON	ON	ON	--	ON	--	--

On the Master, switches 7 and 8 are set to tell it how many Remotes it should address per the following table.

Address/Mode Switch Setting 1 2 3 4 5 6 7 8	Number of Remotes
- - - - - - 0 0	1
- - - - - - 0 1	2
- - - - - - 1 0	3
- - - - - - 1 1	4

REMOTE MODE FOR ASSOCIATED MASTER UNIT. On the Remote, Switches 7 and 8 determine the Address of the Remote. IMPORTANT: Remotes must be used sequentially. For example, if there are 2 Remotes the Master must be set to 01 on switches 7 and 8. The Remotes must be set to 00 and 01 on switches & and 8. A guide for setting the Address/Mode switches for Masters & Remotes follows:

BIT	DESCRIPTION
7	Address/Mode MSB, set to F for Special Modes.
6	" "
5	" "
4	Address/Mode LSB
3	Address/System Select, extra address bit, allows 2 systems on same frequency.
2	Master/Remote Select, set to a 1 to indicate a Master, 0 indicates a Remote.
1	Address/Configuration, an address for Remote, number of Remotes for the Master.
0	Address/Configuration

The Loss of Signal Mode is enabled on both the Masters and Remotes in this mode. The Master will poll its Remote(s) at the timer interval (3 min. or 30 min. factory option). If it fails to receive a reply the Master Unit's Test Lamp will light. If the Master is configured for more than a single Remote, the Local Relay will also be activated and the number of the failed Remotes preceded by an 'X' will output from the RS-232 Interface. Refer to the Loss of Signal mode (p. 8) for the Remote's operation in this mode.

MISCELLANEOUS FUNCTIONS AND FEATURES

LOSS OF SIGNAL MODE. When this mode is active, Remotes that are not polled within the limits of the Loss of Signal Timer (3 min. or 30 min. factory option) will set their internal System Fault Flag Bit and light their Test Lamp. This may be reset by plugging in the Remote Speaker Microphone, or receipt of the Cold Start Reset Command, or if it intiates a Hey message due to an input's change of state and receives an acknowledgment from the Master.

RS-232 INTERFACE. The RS-232 Interface is fixed as an ASCII, 1200 bps, 8 bits, no parity, 1 stop bit, half-duplex, no-handshake, serial port for communications with external Data Equipment such as a terminal or computer.

When the RTT is reset, either when power is initially applied or in response the the Reset command, the following message is sent out via the RS-232 interface:

> RTT.1.2, Copyright 1991, RITRON, INC.
> XX00 (Instead of "XX" is the setting of the Address/Mode switch in hexadecimal.)

In all modes, except the Manual Mode, valid messages consisting of characters 0-9 and A-F that are received via radio in Touch Tone format by the RTT are sent to the port as ASCII characters followed by a 'carriage return' and 'line feed'. Messages input to the port must terminate with a 'carriage return' and are then transmitted by the RTT with the Checksum attached. This enables the exchange of information between up to 255 remote RTT units and a Master unit under control of the external Data Equipment.

If a message is received via the RS-232 port and it is addressed to the unit itself, the message is handled by the RTT as if it had been received via the radio. This means you can use all of the commands via the RS-232 port to control the Master RTT.

RSM-23 REMOTE SPEAKER MICROPHONE. With a Ritron RSM-23 Remote Speaker Microphone plugged into the Local Mic Jack, the Fault Lamp will indicate the state of the Input. For the normally closed contact inputs, it will light when the contacts are open and be off when they are closed. Alarm transmission will be inhibited during this time. Normal operation will resume when the RSM-23 is disconnected.

WARNING: You may damage the RTT if you plug a device other than a RITRON RSM-23 into the Local Test Microphone Jack.

WARNING: You can destroy the RTT if you improperly use the Expansion Port pins or subject them to static discharges.

POWER LAMP. The Power lamp is connected to the RM series transceiver power supply and will be extinguished when the RTT is in Sleep mode.

TRANSMIT LAMP illuminates when the RM transceiver is transmitting.

TEST LAMP will light if the RTT fails to properly communicate with another RTT. A subsequent proper communication (acknowledged message) will extinguish the lamp.

CONTACT BOUNCE. Because the RTT inputs are scanned at a 10 ms rate, if the user supplied switch contacts "bounce" for more than 10 ms a series of messages that represent this noise may be transmitted. In any case, the RTT system will settle to represent the final state of the switch inputs.

RTT COMMAND DIGIT DESCRIPTIONS

RESET	$0	This resets the RTT unit as if it had just been turned on.
ACK	$ 1	This is used as a reply that indicates that a valid message was received and processed.
CON OUT	$ 2	The Remote turns on the Relay if the DATA is 1 and turns off the relay if the DATA is zero. The Remote responds with the ACK message with the DATA containing the state of the Local Input.
EXP OUT	$ 3	The RTT responds to the DATA OUT command by latching the DATA to the Expansion Port outputs.
GET CON	$ 4	The Remote responds by sending the status of the Alarm Input if the DATA is zero and the Expansion Inputs if DATA is not zero.
CON HEY	$ 5	The RTT is saying that the state of the Input has changed. The new state follows in the DATA byte.
EXP HEY	$ 6	The RTT is saying that the state of the Expansion Port input data has changed. The new state follows in the DATA byte.
MONITOR	$ 7	The RTT responds by activating its Transmitter and Local Microphone for 10 seconds. RTTs will not respond to a BROADCAST MONITOR COMMAND. If bit 0 in the DATA byte is set the Transmitter and Microphone will remain active for 63 seconds.

CCOM $8 This command sets the mode of operation of the RTT. Bits set to a '1' in the Data byte enable the following functions:
0 - Alarm Latch Enable, inputs will be latched until reset by command.
1 - Hey Message Inhibit, messages will not be sent upon a change of input.
2 - Loss of Signal Mode, Test lamp will light if not interrogated regularly.
3 - PWR Strobe Mode, transceiver power will be strobed for power savings.

SLEEP $A The RTT goes to Sleep. This saves power if running from batteries. The DATA determines how long the unit goes to sleep. The unit will wake from Sleep and transmit a HEY message if any of the inputs change state while the unit is sleeping. When the sleep time is done the unit sends a HEY message too. The DATA determines how long the unit goes to sleep (see Table 2, p. 11).

HOW $D The RTT returns an 8 bit word using the return Command and Data bytes. The Data byte determines which 8 bit word is returned.
For Data = 0, the Expansion Port is configured as all inputs and their current state is returned.
For Data = 1, the internal state of the addressed RTT is returned. Each bit is interpreted as follows:
0 - Alarm Latch Enable 4 - Contact Closure Input Status
1 - Hey Message Inhibit 5 - System Fault Flag
2 - Loss Of Signal Mode 6 - Test Mode Active
3 - Power Strobe Mode 7 - Long Loss of Signal Mode
For Data = 2, the value of an internal 8 bit counter that contains the number of times the Contact Closure Input has closed is returned.

TABLE 1

DECIMAL / HEXADECIMAL / BINARY / TOUCH TONE CONVERSION CHART

DEC	HEX	BIN	TT	DEC	HEX	BIN	TT
0	0	0000	D	8	8	1000	8
1	1	0001	1	9	9	1001	9
2	2	0010	2	10	A	1010	0
3	3	0011	3	11	B	1011	*
4	4	0100	4	12	C	1100	#
5	5	0101	5	13	D	1101	A
6	6	0110	6	14	E	1110	B
7	7	0111	7	15	F	1111	C

Use table 1 to convert Address/Mode numbers to the binary switch settings.

Remember that for reasons of compatiblity with the pulse dialing telephone network, a '0' is 10 pulses and decoded that way by the Touch Tone chip.

Examples:

HEX	DEC	BIN
02	2	00000010
7A	122	01111010
F0	240	11110000

TABLE 2

SLEEP TIME DATA TABLE

This table shows how long power to the RM transceiver will be turned off in response to a SLEEP command.

DATA	SLEEP TIME
0	30 seconds
1	1 Hour
2	12 Hours
3	1 Day
4	7 Days

EXPANSION PORT PIN DESCRIPTIONS AND RTTT-IOB CABLE WIRE COLORS

PIN	DATA BIT	FUNCTION	WIRE COLOR	PB4#1	PB4#2
1	0	INPUT	BROWN	3	
2	1	INPUT	RED	5	
3	2	INPUT	ORANGE	7	
4	3	INPUT	YELLOW	9	
5	4	OUTPUT	GREEN	-	3
6	5	OUTPUT	BLUE	-	5
7	6	OUTPUT	VIOLET	-	7
8	7	OUTPUT	GRAY	-	9
9	N/A	+12/5 VDC	WHITE	1	1
10	N/A	GROUND	BLACK	2	2

Select pin 9 output to +5 VDC for use with optically isolated industrial control modules by setting PJ101 to the A position.

I/O PORT AND RTTT-BA8 CONNECTOR DESCRIPTION

PIN	COLOR	FUNCTION
1	BROWN	GROUND, DATA
2	BLACK	DATA OUT TO EXTERNAL DEVICE
3	RED	DATA IN FROM EXTERNAL DEVICE
4	ORANGE	GROUND OR SPECIAL FUNCTION (TEST LAMP OUTPUT)
5	YELLOW	CONTACT OUTPUT
6	GREEN	CONTACT INPUT
7	VIOLET	GROUND
8	BLUE	CONTACT INPUT (NORMALLY OPEN).

RTT SYSTEM QUICK TEST SET UP. Both units must be set to operate on the same radio frequency (and with the same CTCSS tone if used). Refer to the associated Ritron transceiver manual.

PJ102 on the RTT board should be in the A position for Carrier Squelch systems and in the B position for CTCSS.

Configure one RTT unit as a Master by setting its Address/Mode switch as follows:

1	2	3	4	5	6	7	8
1	1	1	1	0	1	0	0

'1' indicates the switch in the ON position.

Configure another unit as a Remote by setting its Address/Mode switch as follows:

1	2	3	4	5	6	7	8
1	1	1	1	0	0	0	0

'1' indicates the switch in the ON position.

Apply power to both units. The internal ON/OFF switch on the RDM-PWR board should be ON or the external source of +12 VDC enabled. Both Power Lamps should come on.

After a couple of seconds, the Master Unit will activate its transmitter to poll the Remote. The Remote will respond and then both units will standby.

Plug an RSM-23 Speaker/Microphone into each unit's TEST MIC jack. Use the RSM-23 Microphones to verify radio communications between each unit.

Plug a shorted 3.5 mm plug into the Master's NO input. The Test lamp will illuminate. Remove the plug and the lamp will go out. Repeat this test for the Remote unit then remove the RSM-23 microphones.

Plug a shorted 3.5 mm plug into the Master's NO input. The Master will transmit to the Remote and you will hear the Remote's Relay close. The Remote's Transmit lamp will light as it acknowledges receipt of the message. Remove the plug and you will again see the Master transmit to the Remote and hear the internal relay open.

Plug the shorting plug into the Remote's NO input. The Remote will transmit to the Master and you will hear the Master's Relay close. Remove the plug and the message to open it will be sent and acknowledeged.

Basic operation of the RTT system is now verified.

RTT-150 JUMPER/SWITCH SETTINGS

RM-150 RADIO TRANSCEIVER JUMPER SETTINGS

JUMPER	POS	SELECTS
PJ101	A	Line Level RX Audio
PJ201	A	TX Audio Pre-emphasized
PJ202	B	TX at Full Power
PJ301	A	TX Activated by low input.
PJ501	A	RX Audio, De-emphasized.
PJ502	B	RX Audio, High Pass Enabled
PJ503	A	Tone Squelch
PJ504	B	No Tone Reversal

RM-150 RADIO TRANSCEIVER DIP SWITCH SETTINGS

RM Switch Setting (100 Hz CTCSS) (0 = ON)	POSITION:	9-8-7-6-5-4-3-2-1
	SETTING:	0-0-0-0-0-1-0-1-1

RTT-REM JUMPER SETTINGS

JUMPER	POS	SELECTS
PJ101	A	Expansion Port Power Supply, +5 VDC Detect
PJ102	B	CTCSS input to microprocessor
PJ103	Shorted	RM monitor disabled.
PJ104	Shorted	Loss Of Signal Timer at 3 minutes.

RTT-450 JUMPER/SWITCH SETTINGS

RM-450 RADIO TRANSCEIVER JUMPER SETTINGS

JUMPER	POS	SELECTS
PJ101	A	Line Level RX Audio
PJ201	A	TX Audio, Pre-emphasized
PJ202	B	TX At Full Power
PJ301	A	TX Activated by Low Input
PJ501	A	RX Audio, De-emphasized
PJ502	B	RX Audio, High Pass Enabled
PJ503	A	Tone Squelch
PJ504	B	No Tone Reversal

RM-450 RADIO TRANSCEIVER DIP SWITCH SETTINGS

RM Switch Setting (100 Hz CTCSS) (0 = ON)	POSITION:	6-5-4-3-2-1
	SETTING:	1-0-1-1-0-0

RTT-REM JUMPER SETTINGS

JUMPER	POS	SELECTS
PJ101	A	Expansion Port Power Supply, +5 VDC Detect
PJ102	B	CTCSS input to microprocessor
PJ103	Shorted	RM monitor disabled.
PJ104	Shorted	Loss Of Signal Timer at 3 minutes.

RDM-PWRA SCHEMATIC REFERENCE PARTS LIST

NOTE: This parts list reflects the most current component values (ECN 1786). If a component value given in the schematic differs from that in the parts list, the parts list should be considered correct.

REF#	DESCRIPTION	RITRON #
C 301	100µF ELT CAP 25V .12~ .32~	01503010
C 302	3300µF ELT CAP 35V 1.75~.72	01503032
C 303	.1µF X7R MLCER CAP 50V .100 r K	01515463
C 304	100µF ELT CAP 25V .12~ .32~x.48	01503010
C 305	.01µF Y5V CERDIS CAP 25V .200	01516451
C 306	100µF ELT CAP 25V .12~ .32~x.48	01503010
C 308	.001µF Y5P CERDIS CAP 50V .100	01516239
CR301	1N5400-3AMP-50PIV-POWER REC	04810024
CR302	1N5400-3AMP-50PIV-POWER REC	04810024
CR303	1N5400-3AMP-50PIV-POWER REC	04810024
CR304	1N5400-3AMP-50PIV-POWER REC	04810024
CR305	1N4001 DIODE 50 VOLT/1AMP	04810003
CR306	1N4001 DIODE 50 VOLT/1AMP	04810003
CR307	1N4001 DIODE 50 VOLT/1AMP	04810003
CR308	1N5355A; ZENER 18V; 5W	04820119
F 301	1/2 AMP 3AG SLO BLOW FUSE	05110015
F 302	2 AMP 3AG FUSE MED BLOW	05110013
IC301	LM317T ADJ. VOLTAGE REG.	03131027
IC302	MC78T12CT;3 AMP VOLT. REG	03131028
K 301	RELAY; DPDT 12VDC 3A SMALL	04500006
P 301	105/135VAC 3PIN CONNECTOR	02100131
P 302	MOLEX 2-PIN PLUG	02100006
P 302	MOLEX CONTACT PIN	02100044
P 303	6 PIN MALE HEADER	02100082
PJ103	2 PIN SHORTING PLUG	02100075
PJ301	3 PIN STRAIGHT HEADER	02100024
Q 301	MPS-4124 NPN LOW NOISE AUD.	04800006
Q 302	TRANSISTOR NPN 1W MPSW01A	04800048
Q 303	MPS-4124 NPN LOW NOISE AUD.	04800006
R 301	100 Ω 5W 5% CER WW PWR RES	04720013
R 302	270 Ω; 1/4W; 5% CF RESISTOR	04700126
R 303	2.7K Ω 1/4W 5% CF RESISTOR	04700138
R 304	500 Ω MINI POT W/VERT ADJ	04750001
R 305	100K Ω 5% 1/4W CF RESISTOR	04700157
R 306	100K Ω 5% 1/4W CF RESISTOR	04700157
R 307	10K Ω 5% 1/4W CF RESISTOR	04700145
R 307	100K Ω 5% 1/4W CF RESISTOR	04700157
R 308	100K Ω 5% 1/4W CF RESISTOR	04700157
R 309	10K Ω 5% 1/4W CF RESISTOR	04700145
SW301	SWITCH; DPDT 2-CHANNEL	05100002
T 301	X-FORMER; 14V	05600033
VR301	130 V VARISTOR	05111002
VR302	130 V VARISTOR	05111002

HARDWARE

HW101	RADIOMODEM ENCLOSURE	01401013
HW103	MOLEX 2-PIN SOCKET	02100005
HW104	UHF FML OVAL CHASSIS MT	02160022
HW105	SOLDER LUG; KEYSTONE 909	02800010
HW106	BOTTOM PLATE FEET	02800048
HW108	ANGLE BRACKET 6/32" TAP	02800079
HW109	#4-40 X 1/4" PPHMS	02801005
HW110	#4-40 X 3/8" PPHMS	02801012
HW111	#6-32 X 3/8" PPMS	02801018
HW112	#4-40 HEX NUT	02802003
HW113	#6-32 HEX NUT	02802007
HW114	#4 LOCKWASHER	02803004
HW115	#6 LOCKWASHER	02803006
HW117	1/8"GR.063-.125 POP RIV	02806001
HW118	1/8"GR.313-.375 POP RIVET	02806002
HW119	5/32"GR.126-.187 POP RIV	02806004
HW120	FUSE COVER; RUBBER	03100013
HW121	FUSE HOLDER;PC MNT	05120002
HW122	#18AWG STRANDED WIRE;BLK	06001007
HW123	#28AWG STRANDED WIRE;RED	06001021
HW124	#28AWG STRANDED WIRE;YEL	06001022
HW125	#28AWG STRANDED WIRE;GRE	06001023
HW126	#28AWG STRANDED WIRE;WHI	06001025
HW127	#28AWG STRANDED WIRE;BLK	06001026
HW128	#28AWG STRANDED WIRE;ORA	06001028
HW129	#28AWG STRANDED WIRE;BLU	06001029
HW130	#28AWG STRANDED WIRE;GRAY	06001030
HW131	WIRE;#22AWG/IRPVC;RED	06001054
HW132	WIRE;#22 AWG/IRPVC;BLK	06001055
HW133	3 WIRE AC POWER CORD	06001059
HW135	#4 5/8" METAL STANDOFF	02800117
HW136	#6 SOLDER LUG	02800116
HW137	3/4" MINI TIEWRAP	02800088
HW138	#22AWG STRANDED WIRE;GRN	06001094

RTT-REM SCHEMATIC REFERENCE PARTS LIST

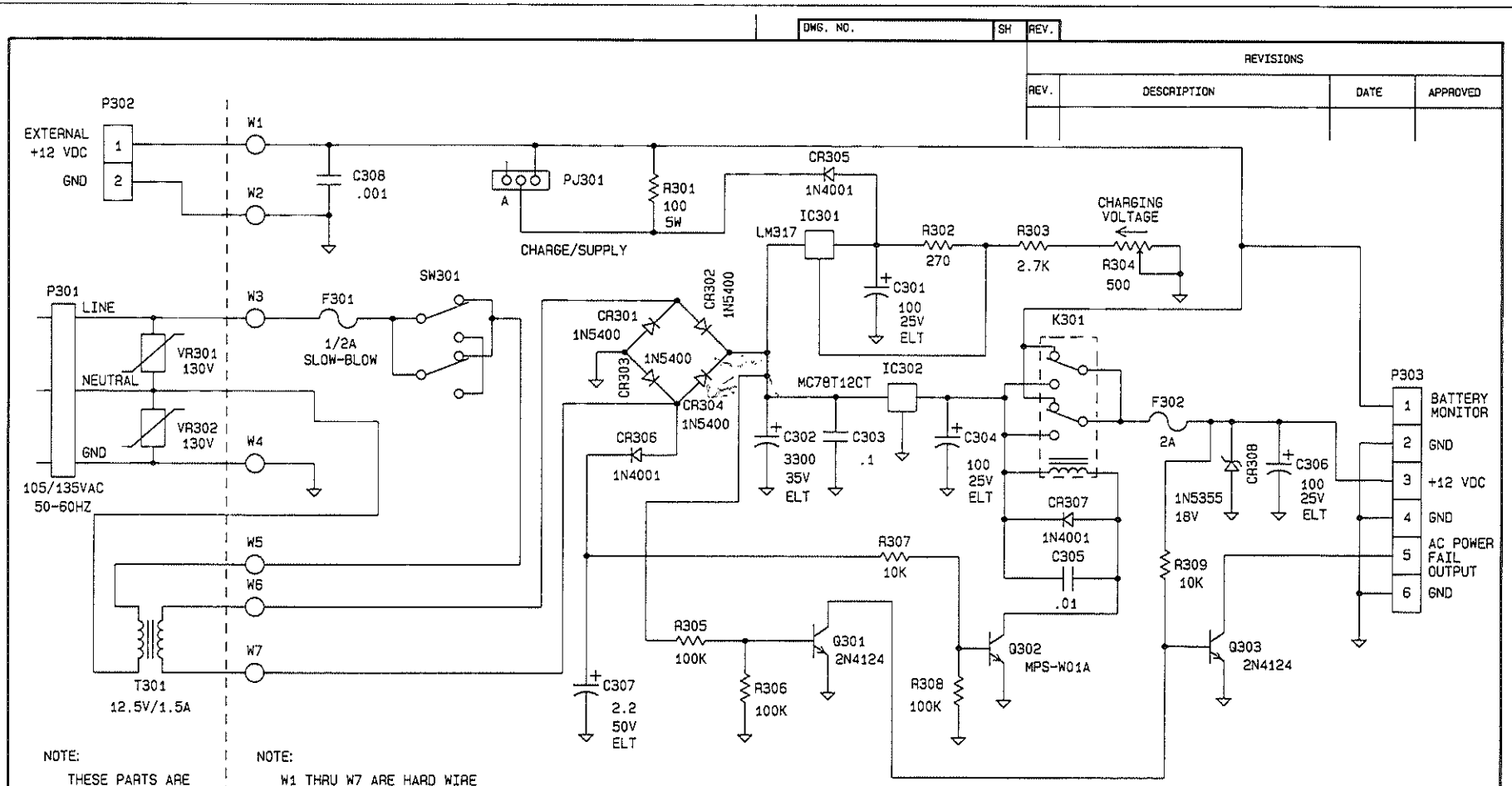
NOTE: This parts list reflects the most current component values (ECN 1801). If a component value given in the schematic differs from that in the parts list, the parts list should be considered correct.

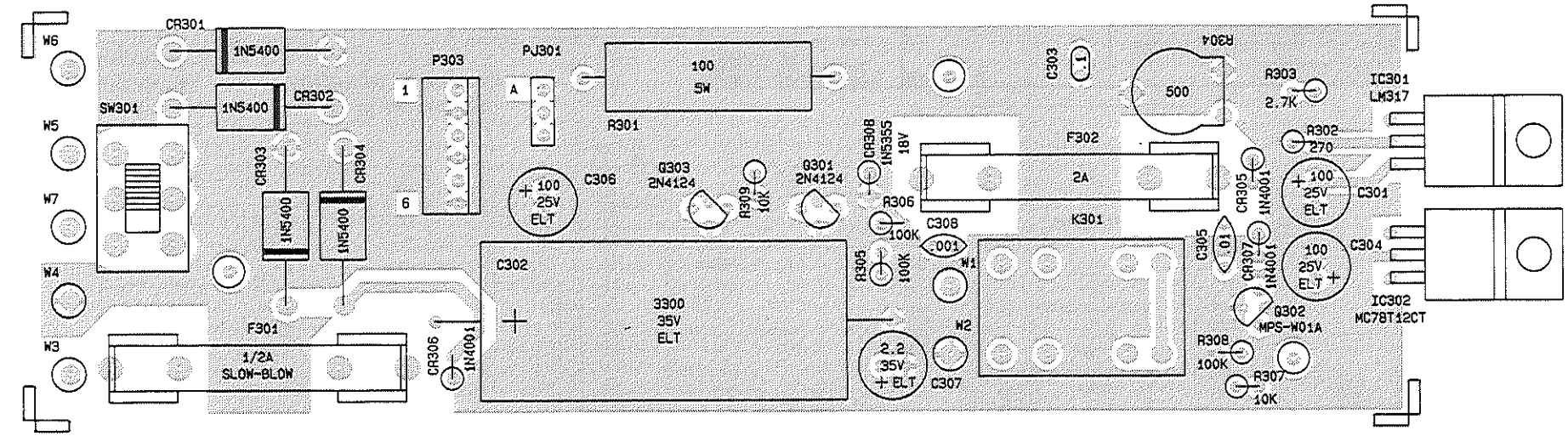
REF#	DESCRIPTION	RITRON #
C 101	.001 µF Y5P CERDIS CAP 50V .100 r M	01516239
C 102	.001 µF Y5P CERDIS CAP 50V .100 r M	01516239
C 103	.001 µF Y5P CERDIS CAP 50V .100 r M	01516239
C 104	100 µF ELT CAP 25V .12" .32"x.48" r	01503010
C 105	10 µF ELT CAP 16V .1" .2"x.46" r	01503006
C 106	.01 µF Y5V CERDIS CAP 25V .200 r Z	01516451
C 107	.001 µF Y5P CERDIS CAP 50V .100 r M	01516239
C 108	.1 µF X7R MLCER CAP 50V .100 r K	01515463
C 109	.001 µF X7R 1206 50V CHIP CAP	15121102
C 110	.1 µF X7R MLCER CAP 50V .100 r K	01515463
C 111	10 µF TANT CAP 16V(C) .1" r 20%	01502013
C 112	.1 µF X7R MLCER CAP 50V .100 r K	01515463
C 113	.1 µF X7R MLCER CAP 50V .100 r K	01515463
C 114	1 µF TANT CAP 35v(v) .1" 20%	01502007
C 115	.1 µF X7R MLCER CAP 50V .100 r K	01515463
C 116	.01 µF MYLAR CAP 100V .200" r 10%	01501050
C 117	.01 µF Y5V CERDIS CAP 25V .200 r Z	01516451
C 118	.1 µF X7R MLCER CAP 50V .100 r K	01515463
C 119	.1 µF X7R MLCER CAP 50V .100 r K	01515463
C 121	.1 µF X7R MLCER CAP 50V .100 r K	01515463
C 123	.001 µF Y5P CERDIS CAP 50V .100 r M	01516239
C 124	.01 µF MYLAR CAP 100V .200" r 10%	01501050
C 125	1 µF TANT CAP 35v(v) .1" 20%	01502007
C 126	.001 µF Y5P CERDIS CAP 50V .100 r M	01516239
C 127	.1 µF X7R MLCER CAP 50V .100 r K	01515463
C 128	.1 µF X7R MLCER CAP 50V .100 r K	01515463
C 129	1 µF TANT CAP 35v(v) .1" 20%	01502007
C 130	.1 µF X7R MLCER CAP 50V .100 r K	01515463
C 131	33 pF NP0 CERDIS CAP 50V .200x.1 r	01510021
C 132	100 µF ELT CAP 25V .12" .32"x.48" r	01503010
C 133	.001 µF Y5P CERDIS CAP 50V .100 r M	01516239
C 134	.001 µF Y5P CERDIS CAP 50V .100 r M	01516239
C 135	220 µF ELT CAP 16V .12" .32"x.48" r	01503011
C 136	220 µF ELT CAP 16V .12" .32"x.48" r	01503011
C 137	.001 µF Y5P CERDIS CAP 50V .100 r M	01516239
C 138	1 µF TANT CAP 35v(v) .1" 20%	01502007
C 141	.0033 µF MYLAR CAP 100V .125" r 10%	01501043
CR101	1N4148; DIODE/GENERAL PURPOSE	04810001
CR102	1N4148; DIODE/GENERAL PURPOSE	04810001
CR103	1N4148; DIODE/GENERAL PURPOSE	04810001
CR104	1N4148; DIODE/GENERAL PURPOSE	04810001
CR106	1N4148; DIODE/GENERAL PURPOSE	04810001
CR107	1N4148; DIODE/GENERAL PURPOSE	04810001
CR108	1N4148; DIODE/GENERAL PURPOSE	04810001
CR109	1N4148; DIODE/GENERAL PURPOSE	04810001
CR110	1N4148; DIODE/GENERAL PURPOSE	04810001
CR111	1N4148; DIODE/GENERAL PURPOSE	04810001
CR112	1N4148; DIODE/GENERAL PURPOSE	04810001
CR113	1N4148; DIODE/GENERAL PURPOSE	04810001
CR114	1N4148; DIODE/GENERAL PURPOSE	04810001
CR115	1N4148; DIODE/GENERAL PURPOSE	04810001
CR116	1N4148; DIODE/GENERAL PURPOSE	04810001
CR118	1N5355A; ZENER 18V; 5W	04820119
CR119	1N4001 DIODE 50 VOLT/1AMP	04810003
CR120	1N4148; DIODE/GENERAL PURPOSE	04810001
CR121	1N4148; DIODE/GENERAL PURPOSE	04810001
DC101	MANUAL TECHNICAL RTT-REM	01451152
DS101	LAMP INCANDESCENT 12V/LEADS	02450008
DS102	LAMP INCANDESCENT 12V/LEADS	02450008
DS103	LAMP INCANDESCENT 12V/LEADS	02450008
F 101	3 AMPERE AXIAL PICO FUSE	05110016
IC101	CA3260AE DUAL BI-MOS OP AMP	03131017
IC102	OP AMP TRANSCONDUCT CA3080AE	03131049
IC103	DTMF TRANSCIEVER MITEL MT8880	03132059
IC104	MC1468705G2 EPROM PROCESSOR	03132039
IC105	5 VOLT REGULATOR (TO-220)	03131016
J 101	3.5MM 3-COND PC MOUNT JACK	02100048
J 102	3.5MM 3-COND PC MOUNT JACK	02100048
J 103	3.5MM 3-COND PC MOUNT JACK	02100048
J 104	3.5MM 3-COND PC MOUNT JACK	02100048
J 105	3.5MM 3-COND PC MOUNT JACK	02100048
K 101	DPDT 12V 600 OHM RELAY	04500012
MC101	EM80-A RUBBER ECM MOUNT	02800102
MC101	PRIMO EM-80 ECM	05500022
P 101	10 POS METHODE HEADER	02100156
P 103	8 PIN POLARIZED RA HEADER	02100329
PJ101	3 PIN STRAIGHT HEADER	02100024
PJ101	2 PIN SHORTING PLUG	02100075
PJ102	3 PIN STRAIGHT HEADER	02100024
PJ102	2 PIN SHORTING PLUG	02100075
PJ103	2 PIN SHORTING PLUG	02100075
PJ103	2 PIN .1" HEADER STRIP	02100159
PJ104	2 PIN SHORTING PLUG	02100075
PJ104	2 PIN .1" HEADER STRIP	02100159
Q 101	2N4126 PNP GP AUDIO TO-92	04800011
Q 102	MPS-4124 NPN LOW NOISE AUD.	04800006
Q 103	2N4126 PNP GP AUDIO TO-92	04800011
Q 104	MPS-4124 NPN LOW NOISE AUD.	04800006
Q 105	MPS-4124 NPN LOW NOISE AUD.	04800006
Q 106	MPS-4124 NPN LOW NOISE AUD.	04800006
Q 107	2N4126 PNP GP AUDIO TO-92	04800011
Q 108	2N4126 PNP GP AUDIO TO-92	04800011
Q 109	2N4126 PNP GP AUDIO TO-92	04800011
Q 110	2N4126 PNP GP AUDIO TO-92	04800011
Q 111	2N4126 PNP GP AUDIO TO-92	04800011
Q 112	2N4126 PNP GP AUDIO TO-92	04800011
Q 113	2N4126 PNP GP AUDIO TO-92	04800011
Q 114	2N4126 PNP GP AUDIO TO-92	04800011
Q 115	2N4126 PNP GP AUDIO TO-92	04800011
Q 116	IRF9531P CHANNEL FET	04800047
Q 117	MPS-4124 NPN LOW NOISE AUD.	04800006
Q 118	2N4126 PNP GP AUDIO TO-92	04800011
Q 119	MPS-4124 NPN LOW NOISE AUD.	04800006
Q 120	MPS-4124 NPN LOW NOISE AUD.	04800006
Q 121	TRANSISTOR NPN 1W MPSW01A	04800048
Q 122	2N5461 P-CHANNEL JFET	04800038
R 101	1K Ω 5% 1/4W CF RESIS.	04700133
R 102	1K Ω 5% 1/4W CF RESIS.	04700133
R 103	1K Ω 5% 1/4W CF RESIS.	04700133
R 104	10K Ω 5% 1/4W CF RESIS.	04700145
R 105	10K Ω 5% 1/4W CF RESIS.	04700145
R 106	10K Ω 5% 1/4W CF RESIS.	04700145

REF#	DESCRIPTION	RITRON #
R 107	10K Ω 5% 1/4W CF RESIS.	04700145
R 108	100 Ω 5% 1/4W CF RESIS.	04700121
R 109	10K Ω 5% 1/4W CF RESIS.	04700145
R 110	10K Ω 5% 1/4W CF RESIS.	04700145
R 111	10K Ω 5% 1/4W CF RESIS.	04700145
R 112	15K Ω 5% 1/4W CF RESIS.	04700147
R 113	10K Ω 5% 1/4W CF RESIS.	04700145
R 114	10K Ω 5% 1/4W CF RESIS.	04700145
R 116	10K Ω 5% 1/8W CF RESIS.	04700845
R 117	1K Ω 5% 1/4W CF RESIS.	04700133
R 128	10K Ω 5% 1/4W CF RESIS.	04700145
R 129	1K Ω 5% 1/4W CF RESIS.	04700133
R 130	10K Ω 5% 1/4W CF RESIS.	04700145
R 131	4.7K Ω 5% 1/4W CF RESIS.	04700141
R 132	10K Ω 5% 1/4W CF RESIS.	04700145
R 133	220K Ω 5% 1/4W CF RESIS.	04700161
R 134	68K Ω 5% 1/8W RESIS.	04700855
R 135	100K Ω 5% 1/8W CF RESIS.	04700857
R 136	10K Ω TRIM POT/HORZ MOUNT	04750008
R 137	330K Ω 5% 1/8W CF RESIS.	04700863
R 138	ZERO Ω 5% 1/4W CF RESIS.	04720009
R 139	270K Ω 5% 1/4W CF RESIS.	04700162
R 140	10K Ω 5% 1/4W CF RESIS.	04700145
R 149	220K Ω 5% 1/4W CF RESIS.	04700161
R 150	10K Ω 5% 1/4W CF RESIS.	04700145
R 151	10K Ω 5% 1/4W CF RESIS.	04700145
R 152	10K Ω 5% 1/4W CF RESIS.	04700145
R 153	ZERO Ω 5% 1/4W CF RESIS.	04720009
R 154	47K Ω 5% 1/4W CF RESIS.	04700153
R 155	3.9K Ω 5% 1/4W CF RESIS.	04700140
R 156	10K Ω 5% 1/4W CF RESIS.	04700145
R 159	4.7K Ω 5% 1/4W CF RESIS.	04700141
R 160	4.7K Ω 5% 1/4W CF RESIS.	04700141
R 161	1M Ω HORIZ.MINI TRIM POT 3/8"	04750003
R 162	2.2M Ω 5% 1/4W CF RESIS.	04700173
R 163	10K Ω 5% 1/4W CF RESIS.	04700145
R 164	10K Ω 5% 1/4W CF RESIS.	04700145
R 165	10K Ω 5% 1/4W CF RESIS.	04700145
R 166	10K Ω 5% 1/4W CF RESIS.	04700145
R 167	10K Ω 5% 1/4W CF RESIS.	04700145
R 168	180K Ω 5% 1/4W CF RESIS.	04700160
R 169	27K Ω 5% 1/4W CF RESIS.	04700150
R 170	27K Ω 5% 1/4W CF RESIS.	04700150
R 171	27K Ω 5% 1/4W CF RESIS.	04700150
R 172	56K Ω 1/4W 5% CF RESIS.	04700154
R 173	180K Ω 5% 1/4W CF RESIS.	04700160
R 175	1K Ω 5% 1/4W CF RESIS.	04700133
R 177	10K Ω 5% 1/4W CF RESIS.	04700145
R 178	10K Ω 5% 1/4W CF RESIS.	04700145
R 179	100K Ω 5% 1/8W CF RESIS.	04700857
R 180	1M Ω 5% 1/8W CF RESIS.	04700869
R 181	10K Ω 5% 1/4W CF RESIS.	04700145
RN101	10K X 9 RESISTOR NETWORK	04720025
RN102	100K X 9 RESISTOR NETWORK	04720046
SW102	8-POSITION DIP-SWITCH	05100025
Y 101	3.579545 MHZ COLOR BURST XTAL	02300025
Y 102	4.0 MHZ CRYSTAL	02300049
Y 102	4.0MHZ CRYSTALHIGH STABILITY	02300057
Z 101	FAIR-RITE BEAD ON AXIAL LEADS	01801029
Z 102	FAIR-RITE BEAD ON AXIAL LEADS	01801029
Z 103	FAIR-RITE BEAD ON AXIAL LEADS	01801029
Z 104	FAIR-RITE BEAD ON AXIAL LEADS	01801029

HARDWARE

REF#	DESCRIPTION	RITRON #
HW101	HI/LO POWER SOCKET	02100118
HW102	INCANDESCENT LAMP COVER; YEL	02450011
HW103	HEATSINK; TO-220 LAY DOWN	02600003
HW104	DIP SOCKET; 16-PIN	02100102
HW105	8 PIN .1" POLAR CONNECTOR	02100133
HW106	INCANDESCENT LAMP COVER; GRN	02450009
HW107	INCANDESCENT LAMP COVER; RED	02450010
HW108	4-40 X 3/8" PHIL (PHMS)	02801012
HW109	4-40 X 1/4" X 3/32" HEX NUT	02802003
HW110	#4 INTERNAL TOOTH LOCKWASHER	02803004
HW111	TWIN LEAD COAX CABLE; INCHES	06001084
HW222	#28 AWG STRANDED WIRE;GRN IN	06001023
HW223	1/16 BLK HEATSHRINK; INCHES	06002014
HW224	RECEPTACLE TERMINAL	21122001
HW225	TERMINAL MALE .058 DIA. TIN PLATE	21202001
HW226	TERMINAL, CRIMP CONTACT	02100046
HW227	CABLE, 22 AWG	06001017
HW228	LUG, SPADE, #6	21134001
HW229	SHRINK TUBING, 1/4", BLK	06002001
HW230	BAR. STRIP, DB, 3/8", 4 POS.	21712003
HW231	LABEL, RTT I/O ID	14230034
HW232	TERMINAL, CRIMP, LOOSE	21122002
HW233	#6 X 5/8" PHIL SCREW	02801056


DWG. NO.
SH
REV.
REVISIONS
REV.
DESCRIPTION
DATE
APPROVED
P302
EXTERNAL +12 VDC
GND
1
2
W1
W2
C308 .001
PJ301
A
CHARGE/SUPPLY
R301 100 5W
CR305 1N4001
IC301 LM317
R302 270
R303 2.7K
CHARGING VOLTAGE
R304 500
C301 100 25V ELT
P301
LINE
NEUTRAL
GND
105/135VAC 50-60HZ
W3
W4
F301 1/2A SLOW-BLOW
SW301
VR301 130V
VR302 130V
CR301 1N5400
CR302 1N5400
CR303 1N5400
CR304 1N5400
K301
IC302 MC78T12CT
C302 3300 35V ELT
C303 .1
C304 100 25V ELT
F302 2A
CR306 1N4001
CR307 1N4001
C305 .01
1N5355 18V
CR308
C306 100 25V ELT
P303
1 BATTERY MONITOR
2 GND
3 +12 VDC
4 GND
5 AC POWER FAIL OUTPUT
6 GND
R307 10K
R309 10K
W5
W6
W7
T301 12.5V/1.5A
R305 100K
R306 100K
R308 100K
Q301 2N4124
Q302 MPS-W01A
Q303 2N4124
C307 2.2 50V ELT
NOTE:
THESE PARTS ARE MOUNTED ON THE EB-RMU CHASSIS.
NOTE:
W1 THRU W7 ARE HARD WIRE CONNECTIONS TO EB-RMU CHASSIS.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : FRACTIONS DECIMALS ANGLES
MATERIAL
FINISH
NEXT ASSY
USED ON
APPLICATION
DO NOT SCALE DRAWING
CONTRACT NO.
APPROVALS
DATE
DRAWN C. KRESSEL 12/15/89
CHECKED
ISSUED
RITRON, INC.
505 W. CARMEL DR. CARMEL, IN. 46032
RDM-PWRA BOARD SCHEMATIC
SIZE B
FSCM NO.
DWG. NO. 1770130
REV. E
SCALE
SHEET



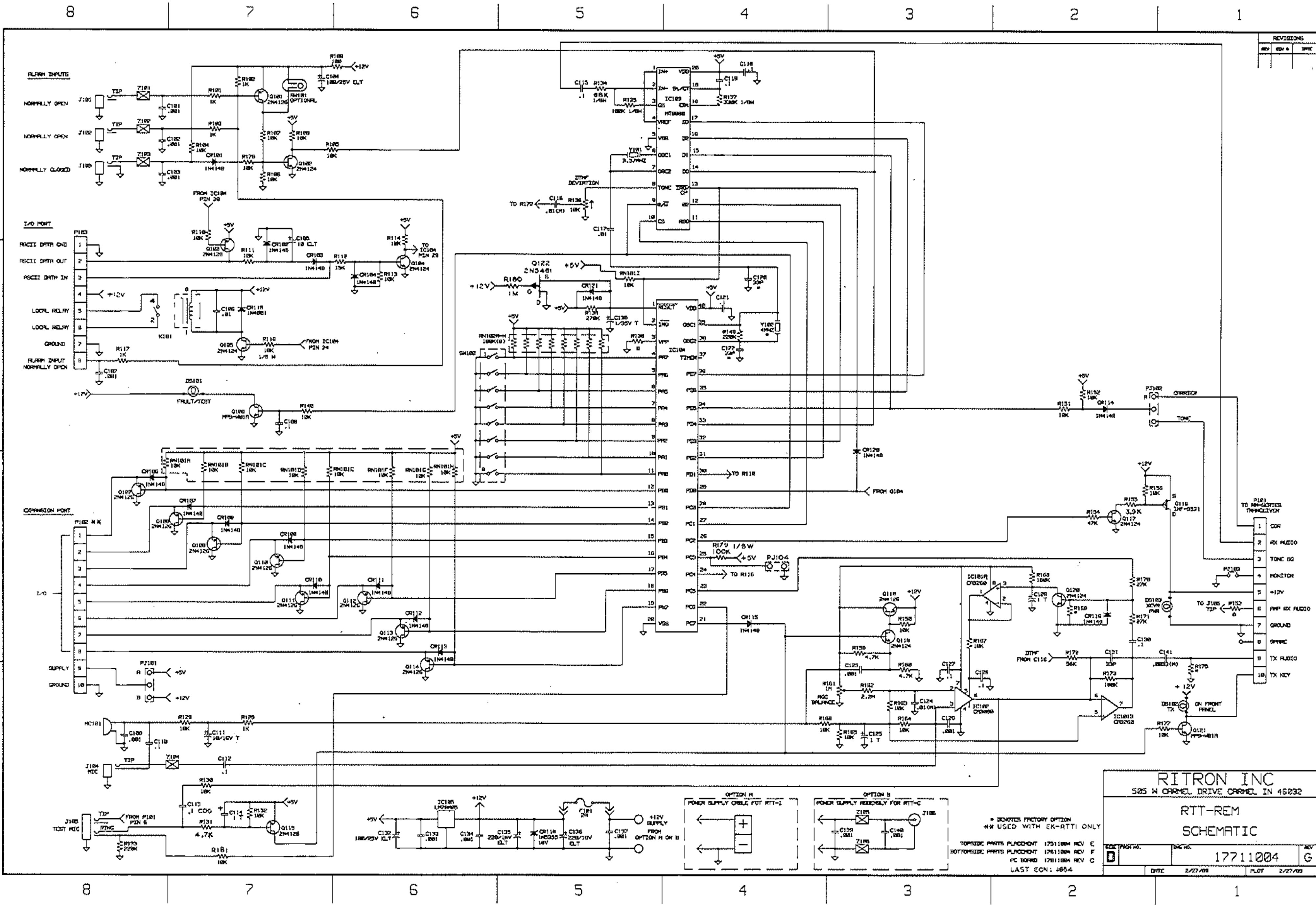
RITRON, INC.

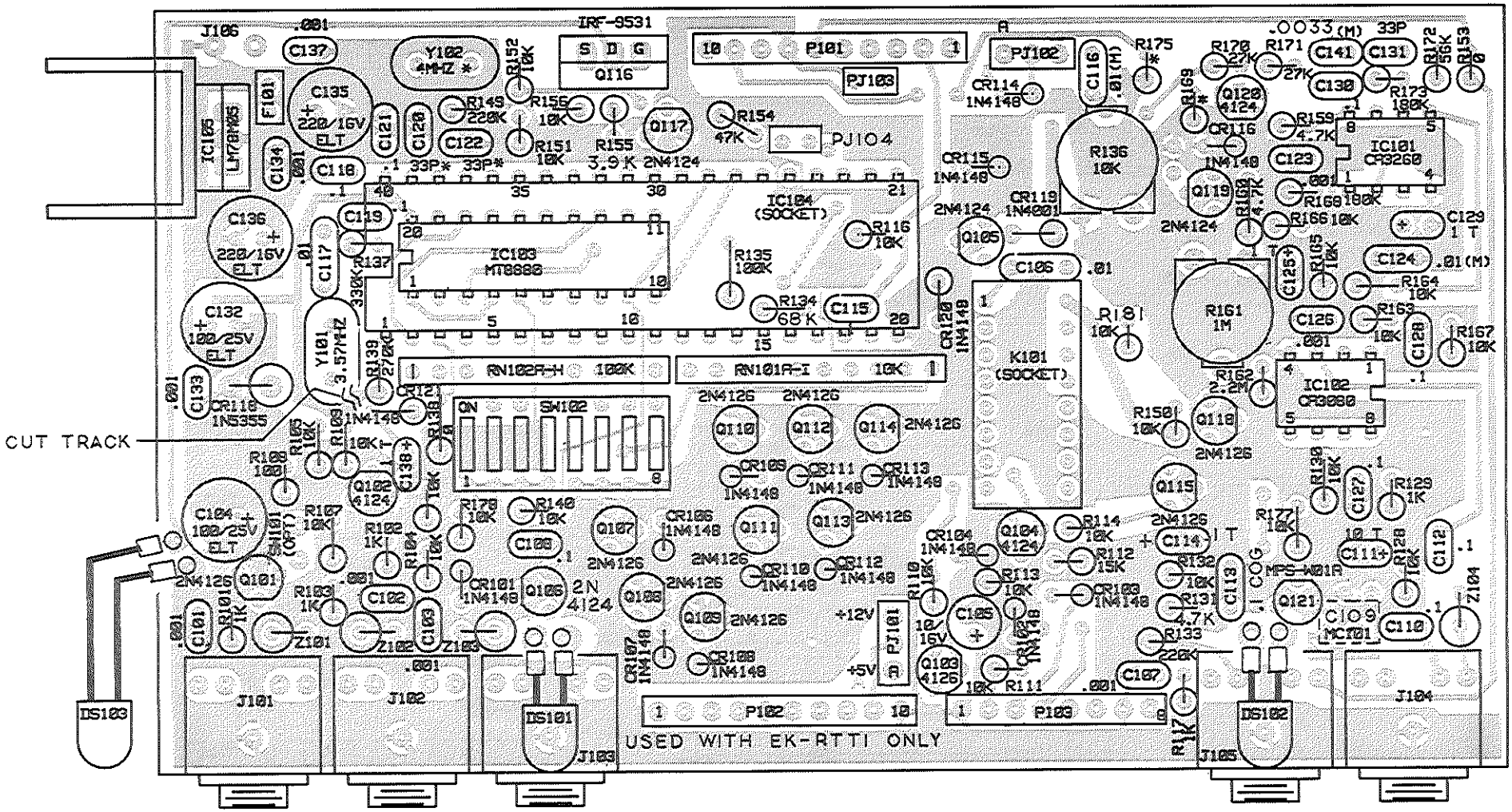
RDM-PWRA

TOP SIDE PARTS PLACEMENT 1750130 REV.E

SCHEMATIC 1770130 REV.E

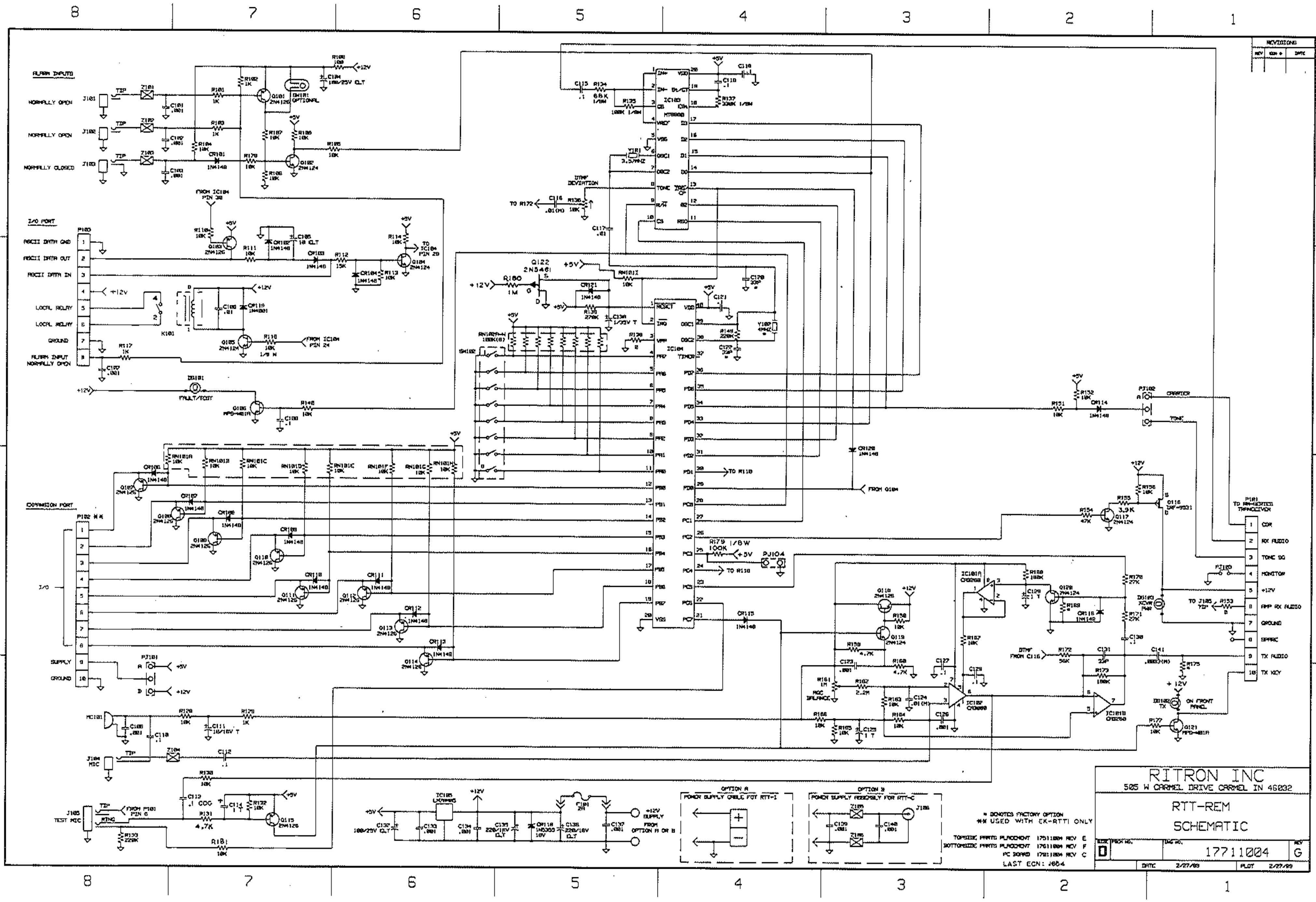
PC BOARD 1700130 REV.D

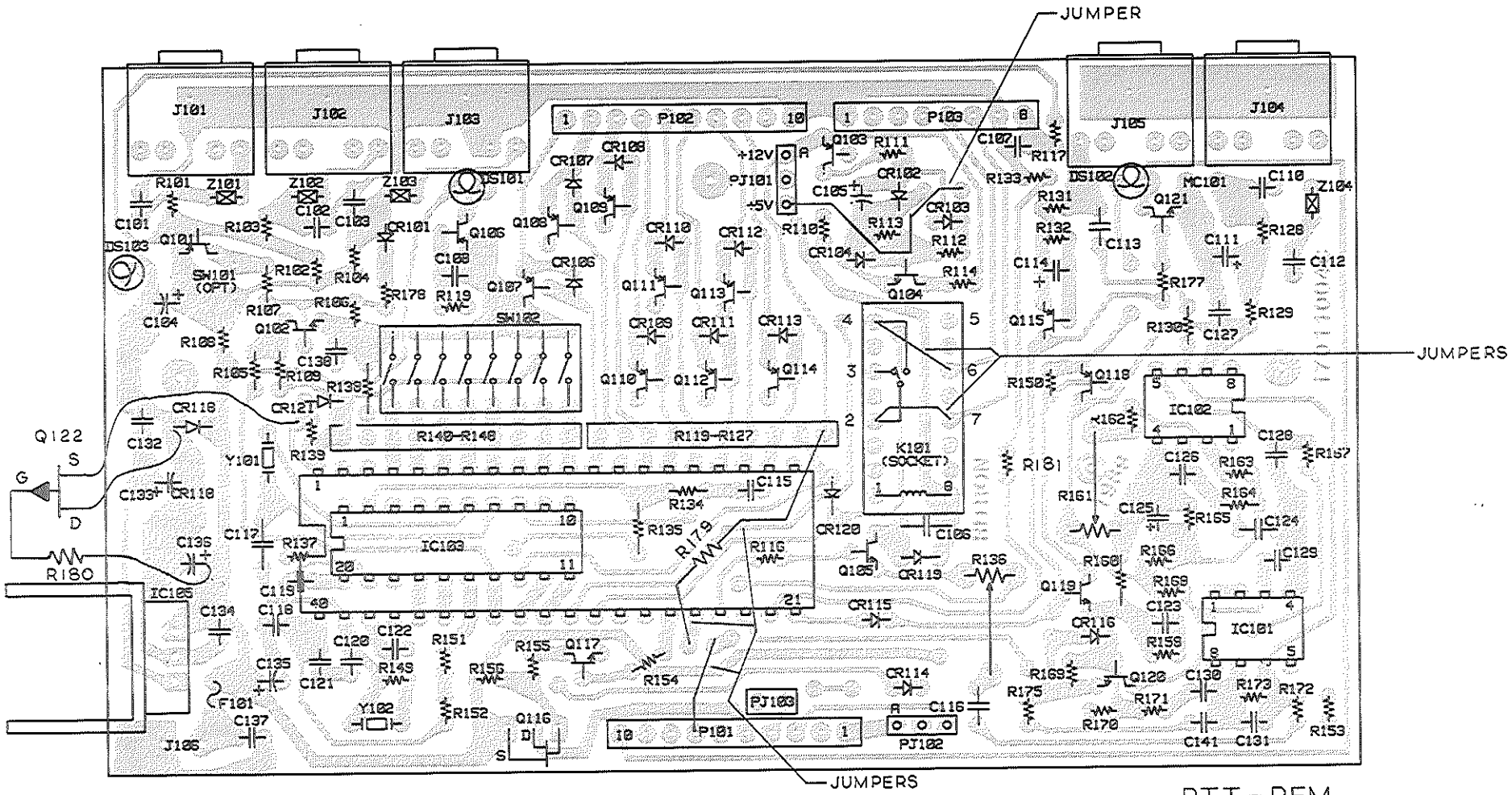

RITRON INC
505 W CARMEL DRIVE CARMEL IN 46032
RTT-REM
SCHEMATIC
17711004
G
ALARM INPUTS
NORMALLY OPEN
NORMALLY OPEN
NORMALLY CLOSED
I/O PORT
ASCII DATA GND
ASCII DATA OUT
ASCII DATA IN
LOCAL RELAY
LOCAL RELAY
GROUND
ALARM INPUT NORMALLY OPEN
EXPANSION PORT
SUPPLY
GROUND
FAULT/TEST
TEST MIC
P101 TO RM-SERIES TRANCEIVER
COR
RX AUDIO
TONE DQ
MONITOR
+12V
AMP RX AUDIO
GROUND
OPARC
TX AUDIO
TX KEY
ON FRONT PANEL
AGC BALANCE
DTMF DEVIATION
OPTION A
POWER SUPPLY CABLE FOT RTT-I
OPTION B
POWER SUPPLY ASSEMBLY FOR RTT-C
+12V SUPPLY FROM OPTION A OR B
* DENOTES FACTORY OPTION
** USED WITH EK-RTTI ONLY
TOPSIDE PARTS PLACEMENT 17511004 REV E
BOTTOMSIDE PARTS PLACEMENT 17511004 REV F
PC BOARD 17811004 REV C
LAST ECN: 4854
REVISIONS



SCHEMATIC 17711004 REV G
BOTTOMSIDE PARTS PLACEMENT 17611004 REV F
PC BOARD 17011004 REV C
LAST ECN # 1654

RTT-REM
TOPSIDE PARTS PLACEMENT
17511004
REV E


RITRON INC
505 W CARMEL DRIVE CARMEL IN 46032
RTT-REM
SCHEMATIC
17711004
G
ALARM INPUTS
NORMALLY OPEN
NORMALLY OPEN
NORMALLY CLOSED
I/O PORT
ASCII DATA GND
ASCII DATA OUT
ASCII DATA IN
LOCAL RELAY
LOCAL RELAY
GROUND
ALARM INPUT NORMALLY OPEN
FAULT/TEST
EXPANSION PORT
SUPPLY
GROUND
TEST MIC
TO RM-SERIES TRANSCEIVER
COR
RX AUDIO
TONE DQ
MONITOR
+12V
AMP RX AUDIO
GROUND
SPARE
TX AUDIO
TX KEY
CARRIER
TONE
ON FRONT PANEL
DTMF DEVIATION
OPTION A
POWER SUPPLY CABLE FOR RTT-I
OPTION B
POWER SUPPLY ASSEMBLY FOR RTT-C
+12V SUPPLY FROM OPTION A OR B
* DENOTES FACTORY OPTION
** USED WITH EK-RTTI ONLY
TOPSIDE PARTS PLACEMENT 17511004 REV E
BOTTOMSIDE PARTS PLACEMENT 17511004 REV F
PC BOARD 17211004 REV C
LAST ECN: 1664
DATE 2/27/89
PLOT 2/27/89
REVISIONS



PC BOARD 17911004 REV C
SCHEMATIC 17711004 REV G
TOPSIDE PARTS PLACEMENT 17511004 REV E
LAST ECN: 1654

RITRON INC
CARMEL IN

RTT-REM
BOTTOMSIDE PARTS PLACEMENT
17611004
REV F