



P-379

PROCESSOR

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1.0 SAFEGUARDS

General Safeguards

This section is written as a general guide for those having previous knowledge and experience with these kinds of equipment. It is not intended to contain a complete statement of all safety precautions, which should be observed by personnel using this or other electronic equipment.

To reduce the risk of fire or electric shock, do not expose this equipment to rain or moisture. Do not open the cabinet. Refer servicing to qualified personnel.

1. **READ INSTRUCTIONS** - All safety, installation, and operating instructions should be read before the equipment is operated.
2. **RETAIN INSTRUCTIONS** - The safety and operating instructions should be retained for future reference.
3. **FOLLOW INSTRUCTIONS** - All safety, installation, and operating instructions should be followed.
4. **GROUNDING AND POLARIZATION** - The P-379 Processor is equipped with a three prong grounded power plug. Do not remove the ground prong from the plug. Do not use an AC receptacle where the plug blades cannot be fully inserted.
5. **SERVICING** - Do not attempt to service this equipment yourself as opening or removing covers may expose you to dangerous voltage or other hazards and will void the warranty. Refer all servicing to qualified service personnel.
6. **DAMAGE REQUIRING SERVICE** - Unplug this equipment and refer servicing to qualified service personnel under the following conditions:
 - If the power cord or plug is damaged.
 - If liquid has been spilled or objects have fallen into the equipment.
 - If the equipment has been exposed to rain or water.
 - If the equipment does not operate normally by following the operating instructions. Adjust only those controls covered by the operating instructions. An improper adjustment may result in damage and will often require extensive work by a qualified technician to restore the equipment to its normal operation.
 - If the equipment has been dropped or the cabinet has been damaged.
 - If the equipment exhibits a distinct change in performance.

Safety and First Aid

Personnel engaged in the installation, operation, maintenance, or servicing of electronic equipment are exposed to the hazard of high voltage. It is imperative that all safety regulations and precautions are consistently observed. Knowledge of first aid procedures is recommended. The following information is presented as a reference only.



DANGEROUS VOLTAGES AND CURRENTS MAY BE PRESENT
IN THE EQUIPMENT EVEN THOUGH THE POWER IS OFF.
REFER SERVICING TO QUALIFIED PERSONNEL

- At all times, avoid placing any part of the body in series between ground and circuit points, whether power is on or off.
- It is the duty of all personnel to be prepared to give adequate emergency first aid treatment and thereby prevent avoidable loss of life.
- There are three principle degrees of burns, recognizable as follows:
 - A first-degree burn reddens the skin.
 - A second-degree burn blisters the skin.
 - A third degree burn chars the flesh and frequently places the victim in a state of shock accompanied by respiratory paralysis.
- Respiratory paralysis can cause death by suffocation within seconds. It is imperative that the approved methods of artificial respiration are initiated immediately and continue until the victim's breathing is normal.
- A muscular spasm of unconsciousness may render the victim unable to break free of the electric power. If this is the case, turn the power off immediately.



DO NOT TOUCH THE VICTIM OR YOU MAY SHARE THE SAME PREDICAMENT.

- If the power cannot be turned off immediately, very carefully loop a dry rope, article of clothing, length of strong cloth or a rolled-up newspaper around the victim and pull the victim free of the power source. Carefully avoid touching the victim or clothing.
- Once free of the power source, the victim must be placed in a reclining position and covered with a blanket or newspapers to keep warm. At the first opportunity, enlist help in summoning a doctor. If a doctor cannot be summoned, transport the victim to the doctor or a hospital. Be sure the victim is kept well covered and warm while awaiting professional treatment.

2.0 WARRANTY

Technalogix Ltd. products have been completely tested and found to meet specifications and be in proper operating condition. They are warranted to be free from defects in materials and workmanship for a period of one year from the date of shipment.

Technalogix Ltd. will not be liable for damages of whatever nature arising out of or in connection with the equipment or its use thereof. Technalogix does not assume responsibility for injury or damage resulting from the practices of untrained or unqualified personnel in the handling of this equipment.

Technalogix Ltd. warranty does not include:

- Misuse, neglect or accident.
- Incorrect wiring and /or improper installation.
- Unauthorized repairs, modifications or use in violation of instructions issued by Technalogix.
- Incidental or consequential damages as a result of any defect.
- Reshipment cost or insurance of the unit or replacement units or parts.
- Acts of God.

Technalogix agrees, at our option, to remedy warranted defects or furnish a new part in exchange for any part of a unit which, under normal installation, use and service, becomes defective. The user will pay for transportation costs to and from the repair center.

To claim your rights under this warranty:

- Contact Technalogix and describe the problem in as much detail as possible. See troubleshooting section in this manual. If a solution cannot be found at this time, it may be determined that the unit will have to be returned to Technalogix for repair.
- Package equipment carefully for prepaid shipment to Technalogix. Include a written description of the problem experienced and a copy of the original invoice establishing warranty status.

Technalogix reserves the right to make revisions in current production of the equipment and assumes no obligation to incorporate these changes in earlier models.

3.0 DESCRIPTION AND SPECIFICATIONS

General Description

The P-379 contains the latest in television electronics, including synthesized crystal-referenced phase-locked-loop oscillators, microprocessor control, saw-filtered if and hybrid amplifiers. In addition to these features, the U.S. version contains automatic input offset programming to remove input offsets inherent to off-air channels (0, $\pm 10\text{KHz}$), cable standard channels (0, +12.5KHz, +25KHz) and Cable HRC channels (0.3KHz master oscillator offset).

Standard Features

- Totally Microprocessor Controlled with Self-Diagnostic Monitoring
- Selectable Input Channels
 - Off-Air Channels: 2 through 83 (VHF & UHF)
 - Cable Standard Channels: 2 through 181 (54MHz through 1.2GHz)
 - Cable HRC Channels: 1 through 181 (54MHz through 1.2GHz)
- Selectable Output Channels
 - Cable Standard Channels: T7 through 118 (7MHz through 750MHz)
 - Cable HRC Channels: 1 through 181
 - Selected Using Internal Switch
- Automatic Input Offset Control
 - Detects and Corrects Input Signal Offset Frequency for Heterodyne Processing *before* the IF
- SAW-filtered IF - Designed for Adjacent Channel Operation
- +60dBmV Output Using Low-Distortion Hybrid Amplifiers
- Non-volatile Channel Memory
- Synthesized Oscillators
 - Crystal Referenced
 - Phase Locked
- Digital LED Readout
- RF Muted During Tuning
- Surface Mount Technology (SMT) Construction

Available Options

- “T” Input Channels
- Dual RS232 Control for Daisy Chain Capability
- Defeatable AGC for Manual Gain Control (MGC)

HRC Output Frequency Set:

This Technalogix frequency agile product can be set for HRC frequency output. This feature is controlled by an internal dip switch assembly, DS-1. The switch is located near the right front corner (with the panel facing you) between the test point and the output converter module. DS-1 is clearly marked on the PCB. Switch #3 placed in the OFF position switches the output frequency to HRC on all channels. The switch is normally set to ON at the factory.

Specifications

RF Characteristics

Frequency range	7 to 750 MHz
Frequency Response (one channel)	± 0.5 dB
Frequency Tolerance	± 1 KHz
Frequency Stability	± 250 Hz
RF Output Level	+60 dBmV max
Output Impedance	50 Ohms, unbalanced
Harmonics	> 60 dB below rated power
Predominant Intermodulation Distortion	dBc = decibels below visual carrier
+ 920 kHz	< -53 dBc
- 920 kHz	< -53 dBc
+ 2.66 MHz	< -53 dBc
- 2.66 MHz	< -53 dBc
+ 5.42 MHz	< -53 dBc
+ 7.16 MHz	< -53 dBc
3 rd Order Intermodulation Distortion	
+ 4.5 MHz	< -60 dBc
+ 9.0 MHz	< -60 dBc
All others	< -60 dBc
Return Loss	> 14 dB
Spurious Emissions	< -60 dBc

NTSC Video Characteristics

	System M/N
Input: C3F Neg	NTSC
Input impedance	75Ohms, unbalanced
Input frequencies	7 to 800 MHz
Off-air channels	54 to 890 MHz
RF bandwidth	6.0Mhz
Input AGC range	-16 to +16 dBmV
Input AGC type	Sync Tip Ref.
Recommended input	0-10 dBmV, +60 to +70 dBuV
Noise figure	9dB VHF, 10dB UHF
Adjacent channel rejection	60dB
Image rejection	60dB
Audio carrier adjustment range	Flat Response to -10 from
Below the video carrier	Input levels

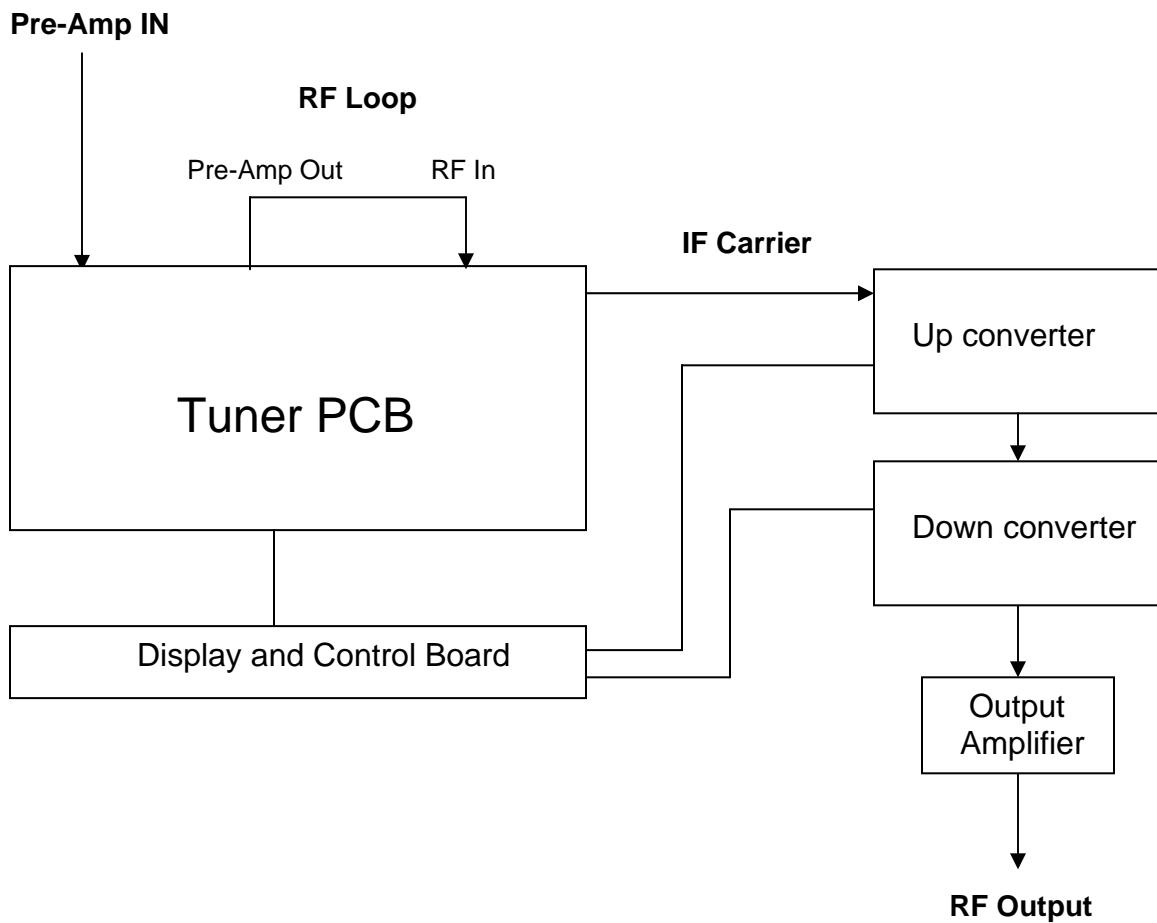
IF Section

Video IF level	+ 37 dBmV, +97 dB μ V
Audio IF Level	+22 dBmV, +82 dB μ V
Return Loss	> 14 dB
IF Frequency, Video Carrier	45.75 MHz
IF Frequency, Audio Carrier	41.25 MHz
Video Sound Spacing	+ 4.5 MHz
Vestigial side-band width	0.75 MHz
Return Loss	> 14 dB
Second IF Frequency	945.75 MHz

Physical Characteristics

Power Requirements	100-130, 210-230 VAC, 50/60 Hz
Operating Temperature	0 - 50°C
Weight	12 lbs
Dimensions (Processor only)	W-19", D-14 ", H 1.75", 1U-high

Block Diagram



4.0 INSTALLATION

This section contains installation recommendations, unpacking, inspection, and installation instructions for the Technalogix P-379 Processor. Carefully read all material in this section prior to installation. Also read and review operating procedures later in this section.

Building Recommendations

The quality of the building is of great importance if you are to expect long life and continued performance from the processor. The building must be clean, dry, temperature controlled and secure. The processor takes up a single 1-U high space on a 19" rack. Don't forget to allow space in the building for any additional racks to house test equipment, a workbench area, line regulating transformers, ladders, equipment and parts storage, first aid kit, emergency generator if used, as well as heating and cooling devices that may be unique to your installation. A sloping roof will tend to develop leaks less rapidly. The building should be well roofed with good material. The cooling load will be lowered with reflective or light colored roofing material.

Heating and Cooling Requirements

The environment's temperature will contribute greatly to the length of the processor's life. Technalogix recommends that the building's filtered air intake must have capacity for all air-flow in the building plus an additional 20%. Keep the intake below the roofline to avoid intake of solar heated air. Please ensure that the intake and exhaust areas are on the same side of the building to avoid pressure differentials during windy conditions. Also, do not position intake near exhaust's preheated air. If air conditioning is required to cool the shelter, discuss the situation with a qualified HVAC technician. Under average conditions, 12,000 BTUs will cool approximately 500 square feet to a comfortable level.

Electrical Service Recommendations

Technalogix recommends that a qualified, licensed local electrician be consulted for the required electrical service. We suggest local electricians because:

- The personnel knows the local codes
- The personnel can be on site readily
- You are apt to get better overall support if you give what business you can to local suppliers

Technalogix recommends that proper AC line conditioning and surge suppression be provided on the primary AC input to the power amplifier. All electrical service should be installed with your national electrical code in your area, any applicable provincial or state codes, and good engineering practice. Special consideration should be given to lightning protection of all systems in view of the vulnerability of most translator sites to lightning. Lightning arrestors are recommended in the service entrance. Straight and short grounds are recommended. The electrical serviced must be well grounded. Do not connect the unit to an open delta primary power supply, as voltage fluctuations could harm the unit. Branch your circuits. Do not allow your lights, your workbench plugs, and your translating equipment off of one circuit breaker. Each translator should have its own circuit breaker, so a failure in one does not shut off the whole installation.

Antenna and Tower Recommendations

Your preliminary engineering workgroup should establish your antenna and tower requirements, both for receiving and transmitting antennas. Construction of sturdy, high quality antenna/tower systems will pay off in terms of coverage of your service area, the overall quality and saleability of your radiated signal, and reduced maintenance expenses. Technalogix provides complete turnkey antenna systems if needed. If your site is serving as a translator, your receiving antenna should be line of sight to the originating station, both winter and summer. The foliage will change with season. Transmitting antennas can enhance or seriously impair the translator output. It is assumed that one has been selected prior to system installation, but the best-designed antenna system will function poorly if shortcuts and compromises are used during installation. Follow the manufacturer's instructions exactly, along with any engineering data prepared for the site.

The selection, routing, and length of coaxial cable are extremely important in the installation. If there is a 3 dB line loss in the cable between your unit's output and the transmitting antenna, a 500 watt unit will only deliver 250 watts to the antenna. Buy the best cable you can obtain, route it via the shortest way to the antenna, and keep it straight. Do not form it into sharp bends on its way. Do not use any more cable fittings for the installation than absolutely necessary. All cautions here apply equally to all coaxial cables in the system - input and output. The better known tower manufacturers offer complete technical and safety documentation with their towers. Be sure that you have this information as it regards wind loading, guying, etc. Be absolutely safe and certain about this aspect as human lives may be at stake.

Shelter Security

The FCC requires that the translator be secure from entry or control by unauthorized persons, and that any hazardous voltages or other dangers (including most tower bases) be protected by locks or fences as necessary to protect personnel and prevent unauthorized tampering or operation. Security of the building further implies that it be secure from wildlife. Use sturdy construction materials, including sheet metal if necessary. Holes around conduit, cable, and other similar entry points should be stuffed with steel wool and caulked to prevent entry of wildlife. Other features of security for your shelter may include its location with respect to the prevailing wind conditions. Location leeward of some natural topographical feature will prevent wind damage and snowdrifts. Check the soil runoff conditions that may slow or hasten wind or water erosion and other concerns that may be unique to your location.

Unpacking and Inspection

Check the outside of the container. Carefully open the container and remove the processor. Retain all packing material that can be reassembled in the event that the equipment must be returned to the factory.



Exercise care in handling equipment during inspection to prevent damage due to rough or careless handling.

Visually inspect the enclosure of the processor for damage that may have occurred during shipment. Check for evidence of water damage, bent or warped chassis, loose screws or nuts, or extraneous packing material in connectors. Inspect all connectors for bent connector pins. If the equipment is damaged, a claim should be filed with the carrier once the extent of the damage is assessed. Technalogix cannot stress too strongly the importance of immediate careful inspection of the equipment and subsequent immediate filing of the necessary claims against the carrier if necessary. If possible, inspect the equipment in the presence of the delivery person. If the equipment is damaged, the carrier is your first area of recourse. If the equipment is damaged and must be returned to the factory, phone for a return authorization. Claims for loss or damage may not be withheld from any payment to Technalogix, nor may any payment due be withheld pending the outcome thereof. Technalogix cannot guarantee the carrier's performance.

Location and Function of Controls and Connectors

The following illustrations depict the location of the installation connectors when installing the power amplifier with a processor.

FRONT



BACK



Aural Carrier Level - Allows user to set aural carrier level relative to visual carrier level. Processor is factory tested at –10 dBc (decibels below visual carrier).

Input Source – Allows the user to select between cable HRC, cable standard or off-air.

Input Select – Allows the user to select the desire channel for input signal.

Output Select – Selects the desired channel of operation. If you require a lower channel than the one currently displayed, push the toggle switch down. The channels will change one at a time as many times as you press the switch. Holding the select switch in the up or down position will “scan” to the desired channel. It is normal for the frequency lock LED to turn off during and for a few seconds after, changing channels. The switch must be held up or down initially for three seconds. This helps to ensure that no accidental channel changes will occur.

Output Level – Sets visual carrier output level.

RF Out Test Point – Provides a sample of the RF output level which is 20 dB below the actual value. RF test point is only a relative indicator of the actual RF output level and may vary. All RF operating measurements should be made at the RF output of the unit.

RF Output - Modulated Audio/ Video output capable of +60 dBmV levels using built in low distortion hybrid amplifiers.

RS-232 Ports – Set up for optional RS-232 control option.

Combined IF Input/ Output – 45.75 MHz visual carrier and 41.25 MHz audio carrier intermediate frequency signal loop.

RF In – Modulated RF input – Recommended RF input is 0 dBmV to 5 dBmV.

T-Channel Switch – Allows the user to switch the optional T-channel on or off. To use the T-Channel Input Option, if the unit is so equipped, ensure that that a T-channel input source is attached to the F-connector marked “T-Channel IN” on the rear panel. Position the T-Channel switch on the rear panel of the P-379 to the “ON” position.

5.0 OPERATING PROCEDURE

Preliminary Hook-up

1. Position the Technalogix P-379 agile processor in its installation mount or rack.
2. Locate the antenna lead or cable drop that will provide the input signal for the P-379 agile processor.
3. Ensure that the input signal provides an adequate signal. The recommended input level for best performance from the Technalogix P-379 Processor is 0 to +10dBmV (+60dBuV to +70dBuV).

Setup and Operation

1. Connect the input-source cable drop or antenna lead to the F connector On the rear panel of the P-379 marked "RF INPUT".

NOTE: If you have a P-379T, also connect the T- or return-channel input source cable to the F-connector on the rear panel of the P-379 marked "T-INPUT".
2. Connect the output of the P-379 to a 50 Ohms load via an RF cable connected to the F-connector marked "RF OUTPUT" on the rear panel of the P-379.
3. Connect the Technalogix P-379 to a proper AC electrical source. The correct electrical input type for the unit is marked on the rear panel, directly under the entrance of the power cord into the unit.



Exercise care in handling equipment during inspection to prevent
Damage due to rough or careless handling.

Technalogix power supplies are designed so that, under certain power line or heat buildup conditions, the unit shuts off. An indication is no RF output, although the POWER LED on the front panel remains illuminated. If this occurs, unplug the power cord and wait at least two (2) minutes before reapplying power. Upon reapplying power, you should again have RF output. If the unit fails to provide RF output again, or should the unit return to shutdown mode, telephone your distributor for assistance or call Technalogix direct at 403-347-5400. Remember: Technalogix recommends a 1.75" air circulation space between each piece of rack-mounted equipment.

4. Input channel selection. Select the desired input source type and channel using the front panel controls. Because the built-in input offset feature automatically removes any input offset, no calculations or adjustments are required. The Technalogix P-379 Agile Processor has a built-in delay in the input- and output-channel tuning circuits. In order to change channels, hold the channel select switch in the up- or down-position for at least three seconds. When the circuit is defeated, channel selection will proceed normally. Channels can be changed one at a time by raising/lowering the channel select switch one channel at a time; or channels can be scanned rapidly by raising/lowering the channel select switch and holding it while the unit rapidly moves through the channels. However, once the channel select switch is released for more than one second, the delay-tuning circuit reactivates.

Until an active input channel is selected, the input channel display will flash. Once the input channel is selected, the input channel display will stop flashing as long as the input signal level is within the required capture range. If the input channel display continues to flash after a known, active input channel is selected, check the level of the input signal to ensure it is at adequate levels for detection (from -5dBmV to $+10\text{dBmV}$) and not too low or too high.

The FREQUENCY LOCK LED on the front panel display may also blink during input-channel tuning. This is because, when the unit is being tuned, an RF-output muting circuit is enabled to ensure that moving RF carriers do not interfere with any existing channels on the cable system.

T-Channel Input Option. To use the T-Channel Input Option, if the unit is so equipped, ensure that that a T-channel input source is attached to the F-connector marked "T-Channel IN" on the rear panel. Position the T-Channel switch on the rear panel of the P-379 to the "ON" position.

If your P-379 has green LED's on the front panel, above the channel select switch, the LED marked "T-channel" will illuminate when a channel in that range is selected. If your P-379 does not have green LED's, but does have a three-number channel display, the selected T-channel will be indicated by a "-" (minus) sign preceding the number of the T-channel selected. When in T-channel operation, only the T-channels will be selected.

5. Select the desired output channel. Unless otherwise specified, the unit is factory set for cable standard channel frequencies and the microprocessor automatically selects the proper FCC offset for the output channels, requiring no calculations or adjustments.

NOTE: For HRC output channels, see the section in this manual entitled HRC Output Frequency Set.

During output-channel tuning, the FREQUENCY LOCK LED on the front panel display may also blink during input-channel tuning. This is because, when the unit is being tuned, an RF-output muting circuit is enabled to ensure that moving RF carriers do not interfere with any existing channels on the cable system.

6. Connect a spectrum analyzer (recommended) or a field strength meter to the F-connector marked "RF OUTPUT" on the rear panel of the P-379 agile processor. If the unit is already connected to another device, disconnect that device from the unit.
7. using the front panel control marked "OUTPUT LEVEL," adjust the RF output of the unit. The recommended output level is between +55dBmV and +60dBmV (+115dBuV and +120dBuV).

Setting the RF output level below +55dBmV may adversely affect the parameters of the modulating signal; setting the RF output level above +60dBmV will adversely affect the quality of performance of the P-379. Ensure that the RF output level is checked each time an output channel is selected, particularly when the selected channel is a return or "T" channel or when the channel selected is in a different band from the previous channel.

NOTE: Ensure that you do not overdrive the power amplifier. Please see the power amplifier manual for recommended levels.

8. While the RF OUTPUT signal is still connected to the spectrum analyzer or field strength meter, observe the aural carrier level. The difference between the video carrier level and the audio carrier level – the “Delta AV” or ΔAV – should be the same as the input source. In other words, if the RF INPUT signal ΔAV is 13dB, the RF OUTPUT signal ΔAV should be $13dB \pm 2dB$. Minor adjustment of this ΔAV may be made either at the input signal source (if the input signal is not from an off-air source) or with the AURAL CARRIER LEVEL control on the front panel of the P-379. When switching to either of the frequency sources (STD or HRC), the internal aural carrier attenuator drops automatically from 6dB to 0dB since the ΔAV for cable signals has normally been preset at the headend. However, the ΔAV for off-air signals may vary considerably. Normal operation level of the aural carrier is 10 to 13dB below the video carrier. If adjustment of the AURAL CARRIER LEVEL control on the front panel of the P-379 will not bring the ΔAV of an off-air signal into an acceptable range, check the ΔAV of the input signal. If the ΔAV of the input signal is too small or is negative (the aural carrier is above the video carrier), it is possible that the AURAL CARRIER LEVEL control of the P-379 will be unable to compensate. Check the input signal before contacting Technalogix for return-for-repair information.

Translator Hookup

1. Connect modulated video from P-379 RF OUT to the Technalogix power amplifier.
2. Turn down RF level on P-379 all the way.
3. Ensure that IF OUT is connected to IF IN on the P-379 processor using the loop F to F cable supplied.
4. Connect the transmitting antenna cable to the RF output connector on the power amplifier. It is recommended that a quality through line wattmeter be installed in this same line.
5. Verify that all signal and RF cables are connected properly.
6. After following proper installation procedures outlined in the power amplifier manual, plug the power amplifier's power cords into an appropriate electrical outlet.

Output power should be adjusted with a sync and blanking signal only with the aural carrier removed. This is simply done by disconnecting one end of the audio carrier loop found on the back panel of the P-379.

AUTOMATIC MORSE CODE KEYING DEVICE

Translators must be equipped with a device that identifies the call signal of the translator in Morse code (usually by frequency shifting the aural carrier not less than 5 kHz or amplitude modulating the aural carrier with a 200 Hertz tone) once each hour. This feature can be disabled if the parent station for the translator sends the call sign of the translator in the visual picture or identifies it as part of the aural modulation. The end user must do this as a regulation of FCC.

6.0 PROBLEM TROUBLESHOOTING GUIDE

The guide below covers some typical symptoms, possible associated causes and suggested actions to follow before returning the unit for repair. It is not meant to be all-inclusive.

Symptom	Possible Cause	Suggested Action
No output Weak output	Unit tuned to output channel different from desired (this occurs particularly on the units which have green LED on the front panel to indicate "T" channels and channels above 99)	Ensure selected output channel is desired channel
	Unit tuned to input channel in a different range than desired	Check INPUT SOURCE SELECT switch for proper source selection
	Input signal is too weak	Ensure input signal strength is within specified range
	IF loop cable on rear of unit loose/disconnected	Check IF loop cable is securely attached
	Unit not plugged in or not getting power	Check power cord and power source, fuse
Excessive noise Spurious signals	Output level above rated maximum (most often occurs when changing from high-number channel to low-number channel, especially to the "T" channels)	Measure RF output from rear panel jack and adjust front panel OUTPUT LEVEL control as required
	IF level too high (most often occurs when routing IF through scrambler or other external device)	Measure normal IF output level for applied CW /unmodulated input carrier and ensure same level is returned to unit after external processing
	Input signal too strong or no input signal at all	Measure input RF level and pad to within specified input levels; if signal not present, change to active channel
Bad/noisy video	Aural carrier interfering with video carrier	Measure Aural Carrier level and/or adjust AURAL CARRIER LEVEL control on front panel
Channels do not change	Delay feature active	Hold channel change switch in raised/lowered position for at least three seconds

7.0 BILL OF MATERIALS, SCHEMATICS, AND PCB OVERLAYS

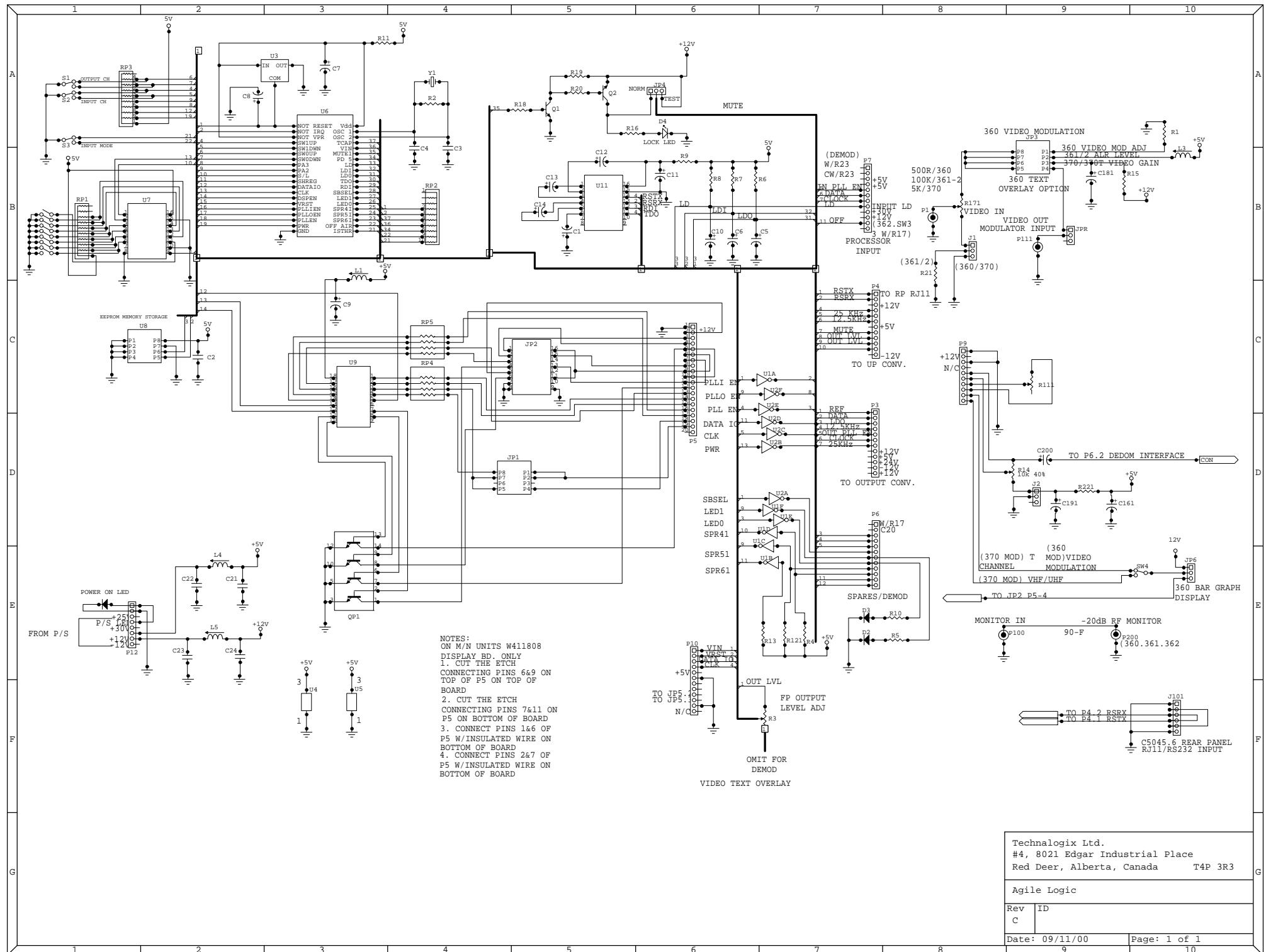
Agile Logic Board Bill of Materials

Last Revision: 09.12.00

Component Reference	Quantity	Identification	Modifier	Package
C1	1	22pF		CAP250D
C10	1	0.47uF		CAP100RP
C11	1	10 uF		CAP100RP
C12	1	22 uF		CAP100RP
C13	1	22 uF		CAP100RP
C14	1	22 uF		CAP100RP
C15	1	22 uF		CAP100RP
C16	1	0.01uF		CAP250D
C17	1	0.01uF		CAP250D
C18	1	47 uF		CAP100RP
C19	1	47 uF		CAP100RP
C2	1	22pF		CAP250D
C20	1			CAP100RP
C21	1	0.01uF		CAP250D
C22	1	0.01uF		CAP250D
C23	1	0.01uF		CAP250D
C24	1	0.01uF		CAP250D
C3	1	22 uF		CAP100RP
C4	1	10 uF		CAP100RP
C5	1	0.47uF		CAP100RP
C6	1	0.47uF		CAP100RP
C7	1	0.01uF		CAP250D
C8	1	0.01uF		CAP250D
C9	1	470 uF		CAP197R
D1	1		RED T1	LED T1-W/HLD
D2	1		T1 W/HLD	LED
D3	1		RED T1	LED T1-W/HLD
DS1	1		8 POS	DPS8W
JP1	1		4 POS HEADER	JP-DUAL4
JP2	1		8 POS HEADER	JP-DUAL8
JP3	1			JP-DUAL4
JP4	1		3PIN	JP3IL
JP5	1		3PIN	JP3IL
JP6	1		3PIN	JP3IL
JP7	1		3 POS	JP3IL
JP8	1		3 IL	JP3IL
L1	1	6 T		COIL 60

L2	1	6 T		COIL 60
L3	1	6 T		COIL 60
L4	1	6 T		COIL 60
L5	1	6 T		COIL 60
P1	1		4 PIN	SMB
P10	1		10 POS	DIPIL10
P11	1		4 PIN	SMB
P12	1		8 POS	CONN1L8
P2	1		RT ANG F	FCONN
P3	1		12 POS	CONN IL12
P4	1		12 POS	CONN IL12
P5	1		ON DISPLAY BDS	CONN IL19
P6	1		12 POS	CONN IL12
P7	1		12 POS	CONN IL12
P8	1		4 PIN	SMB
P9	1		10 PIN	CONN10IL
Q1	1		2222	TRANS2222
Q2	1		2907	TO18C
QP1	1		4-2222A	DIP14C
R1	1	10 MΩhm		RES1-8
R10	1	1 kΩhm		RES1-8
R11	1	5 kΩhm		POT1
R12	1	10 KΩhm		RES1-8
R13	1	10 KΩhm		RES1-8
R14	1	1 kΩhm		RES1-8
R15	1	6.8 kΩhm		RES1-8
R16	1	1 kΩhm		RES1-8
R17	1	500 Ωhm		POT1
R18	1	10 KΩhm		RES1-8
R19	1	5.6 kΩhm		RES1-8
R2	1	4.7 Ωhm		RES1-8
R20	1	10 KΩhm		RES1-8
R21	1	91 Ωhm		RES1-8
R22	1	10 Ωhm		RES1-8
R23	1	5 kΩhm		POT1
R3	1	5 kΩhm		POT1
R4	1	10 kΩhm		RES1-8
R5	1	1 kΩhm		RES1-8
R6	1	68 kΩhm		RES1-8
R7	1	68 kΩhm		RES1-8
R8	1	68 kΩhm		RES1-8
R9	1	4.7 Ωhm		RES1-8
RP1	1	10 kΩhm		DIPIL11
RP2	1	10 kΩhm		DIPIL11

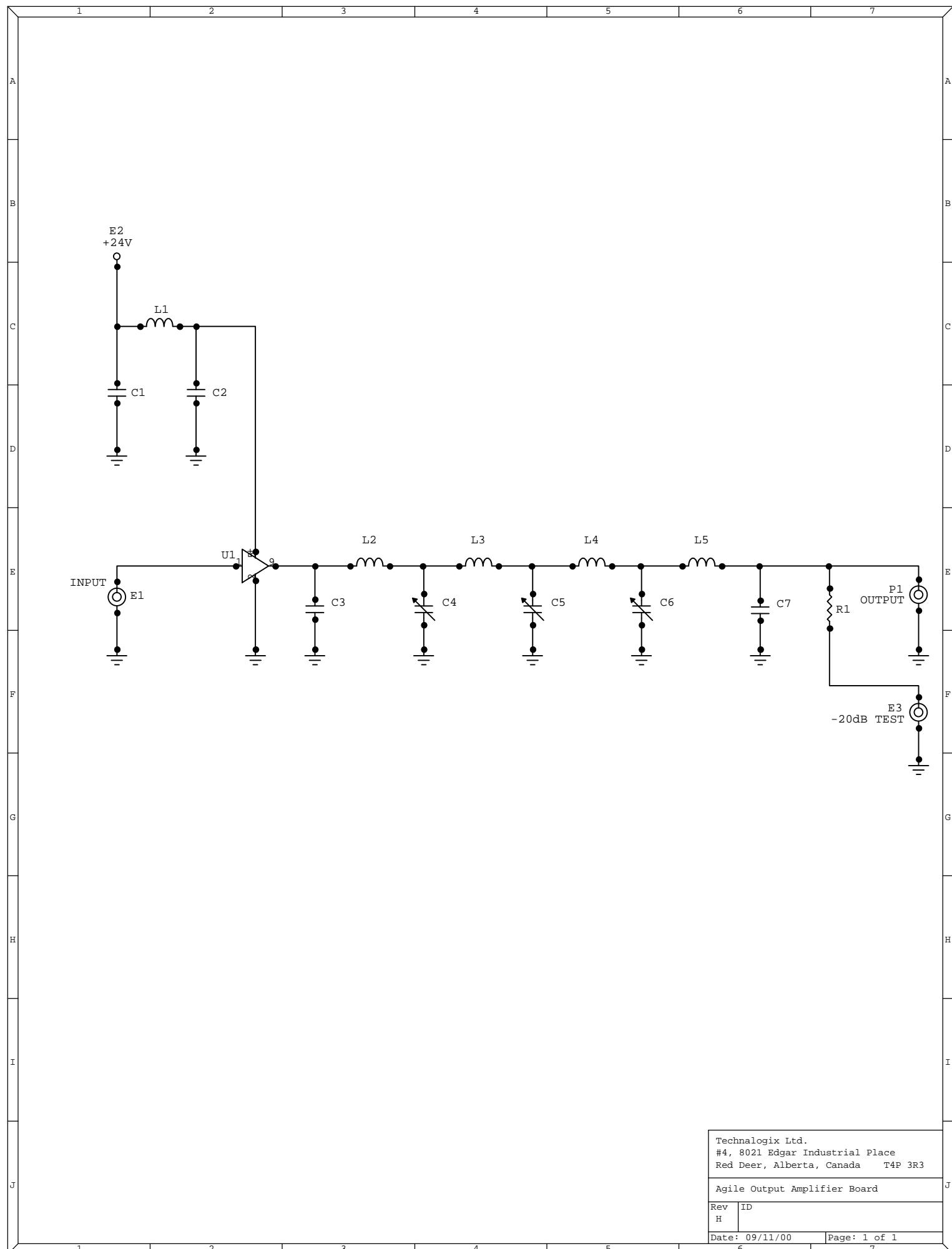
RP3	1	10 kΩhm		DIP11
RP4	1	150 Ωhm		DIP IL8
RP5	1	150 Ωhm		DIP IL8
SW1	1		PADDLE	SW1
SW2	1		PADDLE	SW1
SW3	1		ROCKER	SW1
SW4	1		ROCKER	SW1
U1	1		MC74HC165	DIP16C
U2	1		IC34064	REGTO92
U3	1		68705C8	DIP40C
U4	1		74H04	DIP14C
U5	1		74H04	DIP14C
U6	1		MC14499	DIP18C
U7	1		DS232	DIP16C
U8	1		X2402	DIP8C
Y1	1	4MHz		XTAL



Agile Output Amplifier Bill of Materials

Last Revision: 09.12.00

Component Reference	Quantity	Identification	Modifier	Package
C1	1	0.1uF		1206
C2	1	0.1uF		1206
C3	1	2.7 pF		1206
C4	1	3-10pF	VCAP	CGKG27
C5	1	3-10pF	VCAP	CGKG27
C6	1	3-10pF	VCAP	CGKG27
C7	1	2.7 pF		1206
E1	1		E-COAX	
E2	1	12 V		EPAD
E3	1		E-COAX	
E5	1	GND		EPAD
I1	1			1206
L1	1			IND400
L2	1	10 nH		1210
L3	1	12 nH		1210
L4	1	12 nH		1210
L5	1	10 nH		1210
P1	1			FCONN-S
U1	1		AMP6342	



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#4, 8021 Edgar Industrial Place
Red Deer, Alberta, Canada T4P 3R3

Agile Output Amplifier Board

Rev	ID
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Date: 09/11/00 Page: 1 of 1

Agile Up Converter Board Bill of Materials

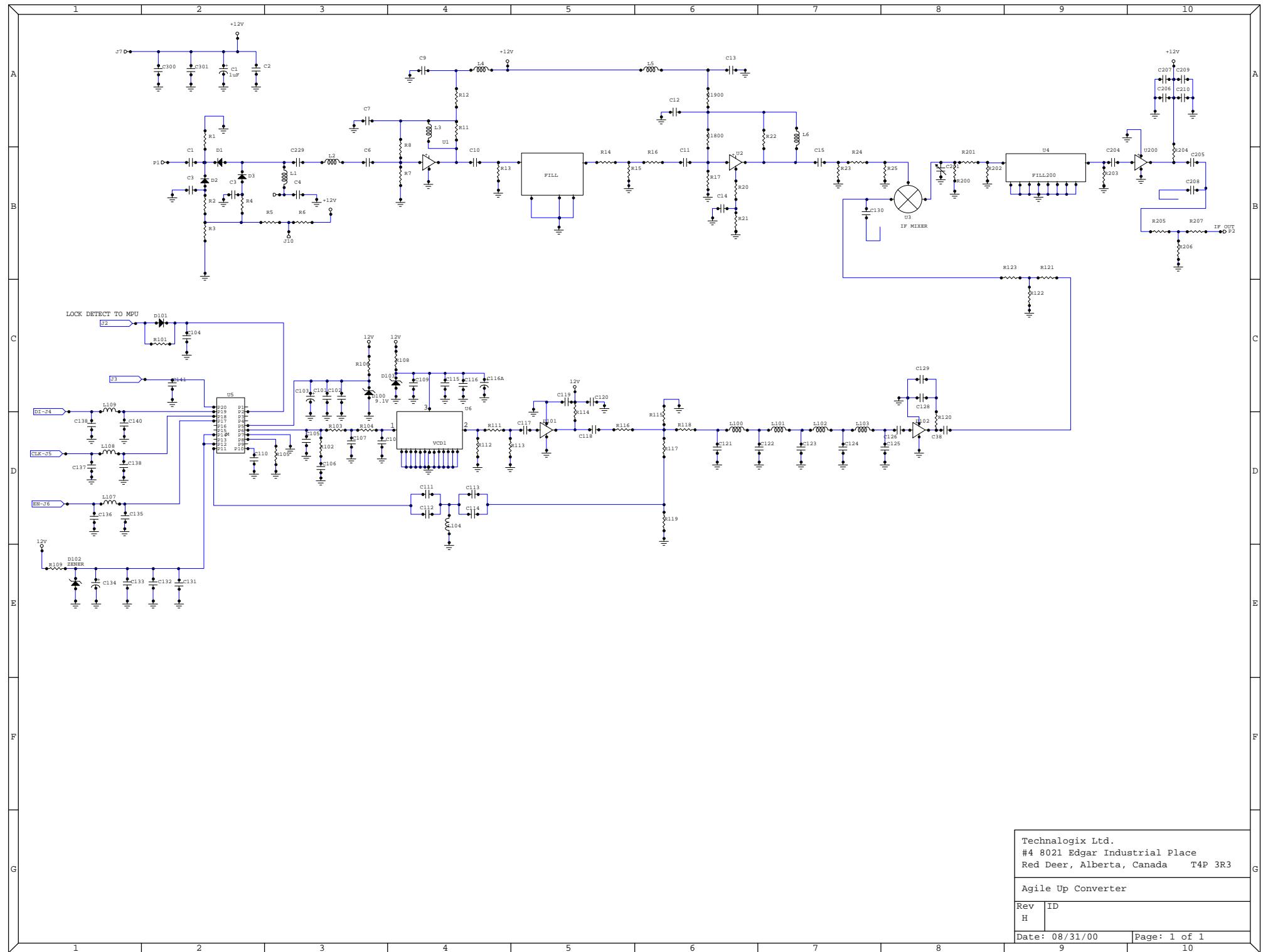
Last Revision: 09.13.00

Component Reference	Quantity	Identification	Modifier	Package
C1	1	(VALUE)		1206
C10	1	(VALUE)		1206
C101	1	(VALUE)		1206
C102	1	(VALUE)		1206
C103	1			CAP100RP
C104	1	(VALUE)		1812
C105	1	(VALUE)		1206
C106	1	(VALUE)		1206
C107	1	(VALUE)		1206
C108	1	(VALUE)		1206
C109	1	(VALUE)		1206
C11	1	(VALUE)		1206
C110	1	(VALUE)		1206
C111	1	(VALUE)		1206
C112	1	(VALUE)		1206
C113	1	(VALUE)		1206
C114	1	(VALUE)		1206
C115	1	(VALUE)		1206
C115	1	(VALUE)		1812
C116	1	(VALUE)		1206
C116A	1			CAP100RP
C117	1	(VALUE)		1206
C118	1	(VALUE)		1206
C119	1	(VALUE)		1206
C12	1	(VALUE)		1206
C120	1	(VALUE)		1206
C121	1	(VALUE)		1206
C122	1	(VALUE)		1206
C123	1	(VALUE)		1206
C124	1	(VALUE)		1206
C125	1	(VALUE)		1206
C126	1	(VALUE)		1206
C127	1	(VALUE)		1206
C128	1	(VALUE)		1206
C129	1	(VALUE)		1206
C13	1	(VALUE)		1206
C130	1	(VALUE)		1206
C131	1	(VALUE)		1206
C132	1	(VALUE)		1206
C133	1	(VALUE)		1812
C134	1			CAP100RP
C135	1	(VALUE)		1206

C136	1	(VALUE)		1206
C137	1	(VALUE)		1206
C138	1	(VALUE)		1206
C139	1	(VALUE)		1206
C14	1	(VALUE)		1206
C140	1	(VALUE)		1206
C141	1	(VALUE)		1206
C15	1	(VALUE)		1206
C16	1	(VALUE)		1206
C17	1	(VALUE)		1206
C18	1	(VALUE)		1206
C19	1	(VALUE)		1206
C2	1	(VALUE)		1206
C204	1	(VALUE)		1206
C205	1	(VALUE)		1206
C206	1	(VALUE)		1206
C207	1	(VALUE)		1206
C208	1	(VALUE)		1206
C209	1	(VALUE)		1206
C21	1	(VALUE)		1206
C210	1	(VALUE)		1206
C22	1	(VALUE)		CGKG27
C3	1	(VALUE)		1206
C300	1	(VALUE)		1206
C301	1	(VALUE)		1206
C303	1			CAP275RP650
C4	1	(VALUE)		1206
C5	1	(VALUE)		1206
C6	1	(VALUE)		1206
C7	1	(VALUE)		1206
C8	1	(VALUE)		1206
C9	1	(VALUE)		1206
D1	1		3800	SOT-23
D100	1		DIODEZ	D0214AC
D101	1	9 V		SOT-23
D102	1	9 V		SOT-23
D103	1		DIODEZ	D0214AC
D2	1		3800	SOT-23
D3	1		3800	SOT-23
F1	1			SIP5L
FT200	1	(VALUE)		FIL-TOKO
J1	1			THRU-HOLE
J10	1			THRU-HOLE
J2	1			THRU-HOLE
J3	1			THRU-HOLE
J4	1			THRU-HOLE
J5	1			THRU-HOLE

J6	1			THRU-HOLE
J7	1			THRU-HOLE
J8	1			THRU-HOLE
J9	1			THRU-HOLE
L1	1	(VALUE)		1812
L100	1	(VALUE)		1210
L101	1	(VALUE)		1210
L102	1	(VALUE)		1210
L103	1	(VALUE)		1210
L104	1	(VALUE)		1812
L105	1	(VALUE)		1210
L106	1	(VALUE)		1210
L108	1	(VALUE)		1210
L109	1	(VALUE)		1210
L2	1	(VALUE)		1812
L3	1	(VALUE)		1812
L4	1	(VALUE)		1812
L5	1	(VALUE)		1812
L6	1	(VALUE)		1812
M1	1	(VALUE)		MIXER-RF2
OSC1	1	(VALUE)		MINI14SL
P1	1			FCON-S
P2	1			FCON-S
Q1	1	(VALUE)		MRF559B2
Q2	1	(VALUE)		MRF559B2
R1	1	(VALUE)		1206
R10	1	(VALUE)		1206
R101	1	(VALUE)		1206
R102	1	(VALUE)		1206
R103	1	(VALUE)		1206
R104	1	(VALUE)		1206
R105	1	(VALUE)		1206
R106	1	(VALUE)		RES2010A
R107	1	(VALUE)		RES2010A
R108	1	(VALUE)		RES2010A
R109	1	(VALUE)		RES2010A
R11	1	(VALUE)		1206
R111	1	(VALUE)		1206
R112	1	(VALUE)		1206
R113	1	(VALUE)		1206
R116	1	(VALUE)		1206
R117	1	(VALUE)		1206
R118	1	(VALUE)		1206
R119	1	(VALUE)		1206
R12	1	(VALUE)		1206
R121	1	(VALUE)		1206
R122	1	(VALUE)		1206

R123	1	(VALUE)		1206
R13	1	(VALUE)		1206
R14	1	(VALUE)		1206
R15	1	(VALUE)		1206
R16	1	(VALUE)		1206
R17	1	(VALUE)		1206
R18	1	(VALUE)		1206
R19	1	(VALUE)		1206
R2	1	(VALUE)		1206
R20	1	(VALUE)		1206
R203	1	(VALUE)		1206
R204	1	(VALUE)		RES2010A
R205	1	(VALUE)		1206
R206	1	(VALUE)		1206
R207	1	(VALUE)		1206
R21	1	(VALUE)		1206
R22	1	(VALUE)		1206
R23	1	(VALUE)		1206
R24	1	(VALUE)		1206
R25	1	(VALUE)		1206
R26	1	(VALUE)		1206
R3	1	(VALUE)		1206
R4	1	(VALUE)		1206
R5	1	(VALUE)		1206
R6	1	(VALUE)		1206
R7	1	(VALUE)		1206
R8	1	(VALUE)		1206
R9	1	(VALUE)		1206
U100	1			TSSOP20
U101	1			WW107
U2	1			WW107
U200	1			WW107



750 MHz down Converter Board Bill of Materials

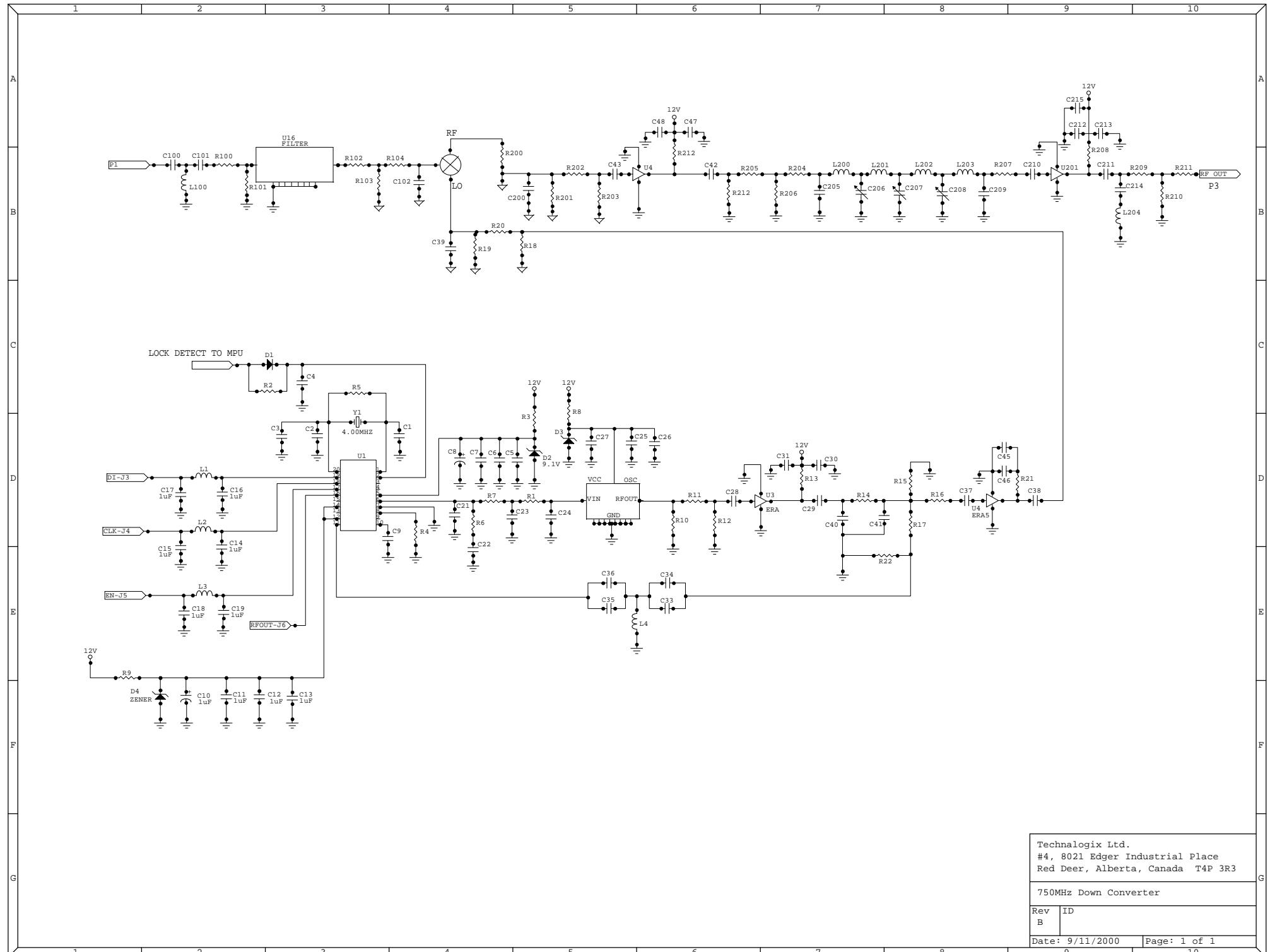
Last revised: 09.13.00

Component Reference	Quantity	Identification	Modifier	Package
C1	1	(VALUE)		1206
C10	1	(VALUE)		1206
C101	1	(VALUE)		1206
C102	1	(VALUE)		1206
C103	1			CAP100RP
C104	1	(VALUE)		1812
C105	1	(VALUE)		1206
C106	1	(VALUE)		1206
C107	1	(VALUE)		1206
C108	1	(VALUE)		1206
C109	1	(VALUE)		1206
C11	1	(VALUE)		1206
C110	1	(VALUE)		1206
C111	1	(VALUE)		1206
C112	1	(VALUE)		1206
C113	1	(VALUE)		1206
C114	1	(VALUE)		1206
C115	1	(VALUE)		1206
C115	1	(VALUE)		1812
C116	1	(VALUE)		1206
C116A	1			CAP100RP
C117	1	(VALUE)		1206
C118	1	(VALUE)		1206
C119	1	(VALUE)		1206
C12	1	(VALUE)		1206
C120	1	(VALUE)		1206
C121	1	(VALUE)		1206
C122	1	(VALUE)		1206
C123	1	(VALUE)		1206
C124	1	(VALUE)		1206
C125	1	(VALUE)		1206
C126	1	(VALUE)		1206
C127	1	(VALUE)		1206
C128	1	(VALUE)		1206
C129	1	(VALUE)		1206
C13	1	(VALUE)		1206
C130	1	(VALUE)		1206
C131	1	(VALUE)		1206
C132	1	(VALUE)		1206
C133	1	(VALUE)		1812
C134	1			CAP100RP
C135	1	(VALUE)		1206

C136	1	(VALUE)		1206
C137	1	(VALUE)		1206
C138	1	(VALUE)		1206
C139	1	(VALUE)		1206
C14	1	(VALUE)		1206
C140	1	(VALUE)		1206
C141	1	(VALUE)		1206
C15	1	(VALUE)		1206
C16	1	(VALUE)		1206
C17	1	(VALUE)		1206
C18	1	(VALUE)		1206
C19	1	(VALUE)		1206
C2	1	(VALUE)		1206
C204	1	(VALUE)		1206
C205	1	(VALUE)		1206
C206	1	(VALUE)		1206
C207	1	(VALUE)		1206
C208	1	(VALUE)		1206
C209	1	(VALUE)		1206
C21	1	(VALUE)		1206
C210	1	(VALUE)		1206
C22	1	(VALUE)		CGKG27
C3	1	(VALUE)		1206
C300	1	(VALUE)		1206
C301	1	(VALUE)		1206
C303	1			CAP275RP650
C4	1	(VALUE)		1206
C5	1	(VALUE)		1206
C6	1	(VALUE)		1206
C7	1	(VALUE)		1206
C8	1	(VALUE)		1206
C9	1	(VALUE)		1206
D1	1		3800	SOT-23
D100	1		DIODEZ	D0214AC
D101	1	9 V		SOT-23
D102	1	9 V		SOT-23
D103	1		DIODEZ	D0214AC
D2	1		3800	SOT-23
D3	1		3800	SOT-23
F1	1			SIP5L
FT200	1	(VALUE)		FIL-TOKO
J1	1			THRU-HOLE
J10	1			THRU-HOLE
J2	1			THRU-HOLE
J3	1			THRU-HOLE
J4	1			THRU-HOLE
J5	1			THRU-HOLE

J6	1			THRU-HOLE
J7	1			THRU-HOLE
J8	1			THRU-HOLE
J9	1			THRU-HOLE
L1	1	(VALUE)		1812
L100	1	(VALUE)		1210
L101	1	(VALUE)		1210
L102	1	(VALUE)		1210
L103	1	(VALUE)		1210
L104	1	(VALUE)		1812
L105	1	(VALUE)		1210
L106	1	(VALUE)		1210
L108	1	(VALUE)		1210
L109	1	(VALUE)		1210
L2	1	(VALUE)		1812
L3	1	(VALUE)		1812
L4	1	(VALUE)		1812
L5	1	(VALUE)		1812
L6	1	(VALUE)		1812
M1	1	(VALUE)		MIXER-RF2
OSC1	1	(VALUE)		MINI14SL
P1	1			FCON-S
P2	1			FCON-S
Q1	1	(VALUE)		MRF559B2
Q2	1	(VALUE)		MRF559B2
R1	1	(VALUE)		1206
R10	1	(VALUE)		1206
R101	1	(VALUE)		1206
R102	1	(VALUE)		1206
R103	1	(VALUE)		1206
R104	1	(VALUE)		1206
R105	1	(VALUE)		1206
R106	1	(VALUE)		RES2010A
R107	1	(VALUE)		RES2010A
R108	1	(VALUE)		RES2010A
R109	1	(VALUE)		RES2010A
R11	1	(VALUE)		1206
R111	1	(VALUE)		1206
R112	1	(VALUE)		1206
R113	1	(VALUE)		1206
R116	1	(VALUE)		1206
R117	1	(VALUE)		1206
R118	1	(VALUE)		1206
R119	1	(VALUE)		1206
R12	1	(VALUE)		1206
R121	1	(VALUE)		1206
R122	1	(VALUE)		1206

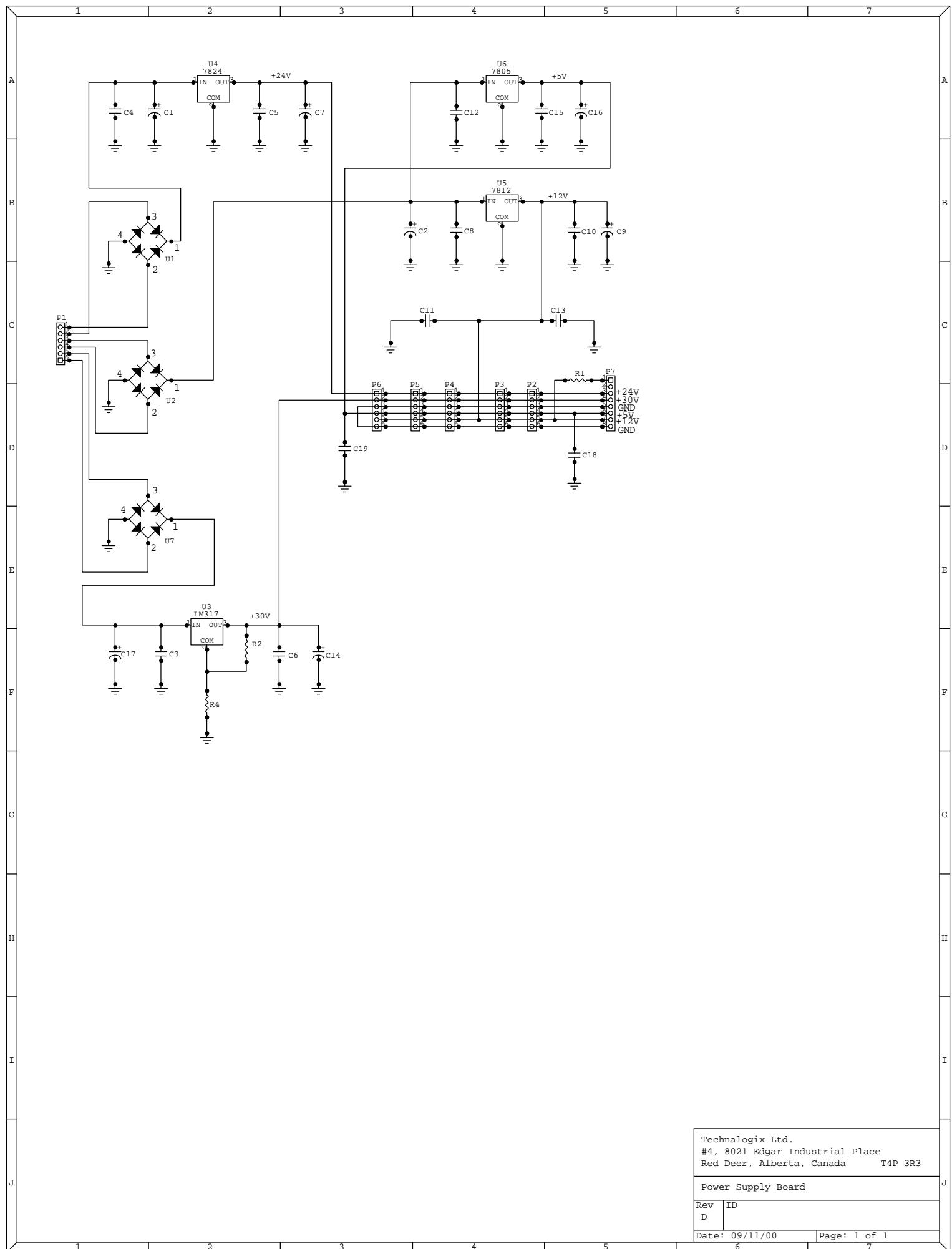
R123	1	(VALUE)		1206
R13	1	(VALUE)		1206
R14	1	(VALUE)		1206
R15	1	(VALUE)		1206
R16	1	(VALUE)		1206
R17	1	(VALUE)		1206
R18	1	(VALUE)		1206
R19	1	(VALUE)		1206
R2	1	(VALUE)		1206
R20	1	(VALUE)		1206
R203	1	(VALUE)		1206
R204	1	(VALUE)		RES2010A
R205	1	(VALUE)		1206
R206	1	(VALUE)		1206
R207	1	(VALUE)		1206
R21	1	(VALUE)		1206
R22	1	(VALUE)		1206
R23	1	(VALUE)		1206
R24	1	(VALUE)		1206
R25	1	(VALUE)		1206
R26	1	(VALUE)		1206
R3	1	(VALUE)		1206
R4	1	(VALUE)		1206
R5	1	(VALUE)		1206
R6	1	(VALUE)		1206
R7	1	(VALUE)		1206
R8	1	(VALUE)		1206
R9	1	(VALUE)		1206
U100	1			TSSOP20
U101	1			WW107
U2	1			WW107
U200	1			WW107



Power Supply Board Bill of Materials

Last Revised: 09.12.00

Component Reference	Quantity	Identification	Modifier	Package
C1	1	4700	35 V	CAP400RPHORZ
C10	1	0.1 uF		CAP250
C11	1	0.1 uF		CAP250
C12	1	0.1 uF		CAP250
C13	1	0.1 uF		CAP250
C14	1	1000	50 V	CAP275RP650
C15	1	0.1 uF		CAP250
C16	1	4700	16 VDC	CAP275RP650
C17	1	1000	50 V	CAP275RP650
C18	1	0.1 uF		CAP250
C19	1	0.1 uF		CAP250
C2	1	4700	35 V	CAP400RPHORZ
C3	1	0.1 uF		CAP250
C4	1	0.1 uF		CAP250
C5	1	0.1 uF		CAP250
C6	1	0.1 uF		CAP250
C7	1	2200	35 V	CAP275RP650
C8	1	0.1 uF		CAP250
C9	1	10000	25 VDC	CAP400RPHORZ
P1	1			CONHDR6
P2	1			CONHDR6
P3	1			CONHDR6
P4	1			CONHDR6
P5	1			CONHDR6
P6	1			CONHDR6
P7	1			CONHDR8
R1	1	2 kΩhm		RES400
R2	1	240 Ωhm		RES400
R4	1	5.6 kΩhm		RES400
U1	1			BRIDGE
U2	1			RBRDG-RECT-403M
U3	1		LM317	T0-220-AB
U4	1		7824	T0-220-AB
U5	1		7812	T0-220-AB
U6	1		7805	T0-220-AB
U7	1			DIP6-2



Tuner Processor Board Bill of Materials

Last Revised: 09.13.00

Component Reference	Quantity	Identification	Modifier	Package
C1	1	0.47 uF		1206
C100	1	0.001 uF		1206
C100	1	0.01 uF		1206
C101	1	0.1 uF		1206
C11	1	0.47 uF		1206
C13	1	0.1 uF		1206
C14	1	0.1 uF		1206
C15	1	0.01 uF		1206
C16	1	0.01 uF		1206
C17	1	0.1 uF		1206
C18	1	0.1 uF		1206
C19	1	0.01 uF		1206
C2	1	0.47 uF		1206
C20	1	0.01 uF		1206
C21	1	0.1 uF		1206
C22	1	8.2 pF		1206
C23	1	12 pF		1206
C24	1	3-10 pF		CGKG27
C25	1	15 pF		1206
C26	1	10 pF		1206
C27	1	120 pF		1206
C28	1	120 pF		1206
C29	1	4.5-20 pF		CGKG27
C3	1	0.47 uF		1206
C30	1	0.001 uF		1206
C36	1	27 pF		1206
C37	1	56 pF		1206
C38	1	27 pF		1206
C39	1	0.1 uF		1206
C4	1	0.01 uF		1206
C40	1	0.01 uF		1206
C41	1	47 uF		CAP100RP250
C42	1	0.01 uF		1206
C43	1	0.47 uF		1206
C44	1	0.1 uF		1206
C45	1	10 pF		CAP100MPR
C46	1	0.1 uF		1206
C47	1	4.7 pF		1206
C48	1	0.01 uF		1206
C49	1	0.001 uF		1206
C5	1	0.01 uF		1206
C50	1	0.001 uF		1206

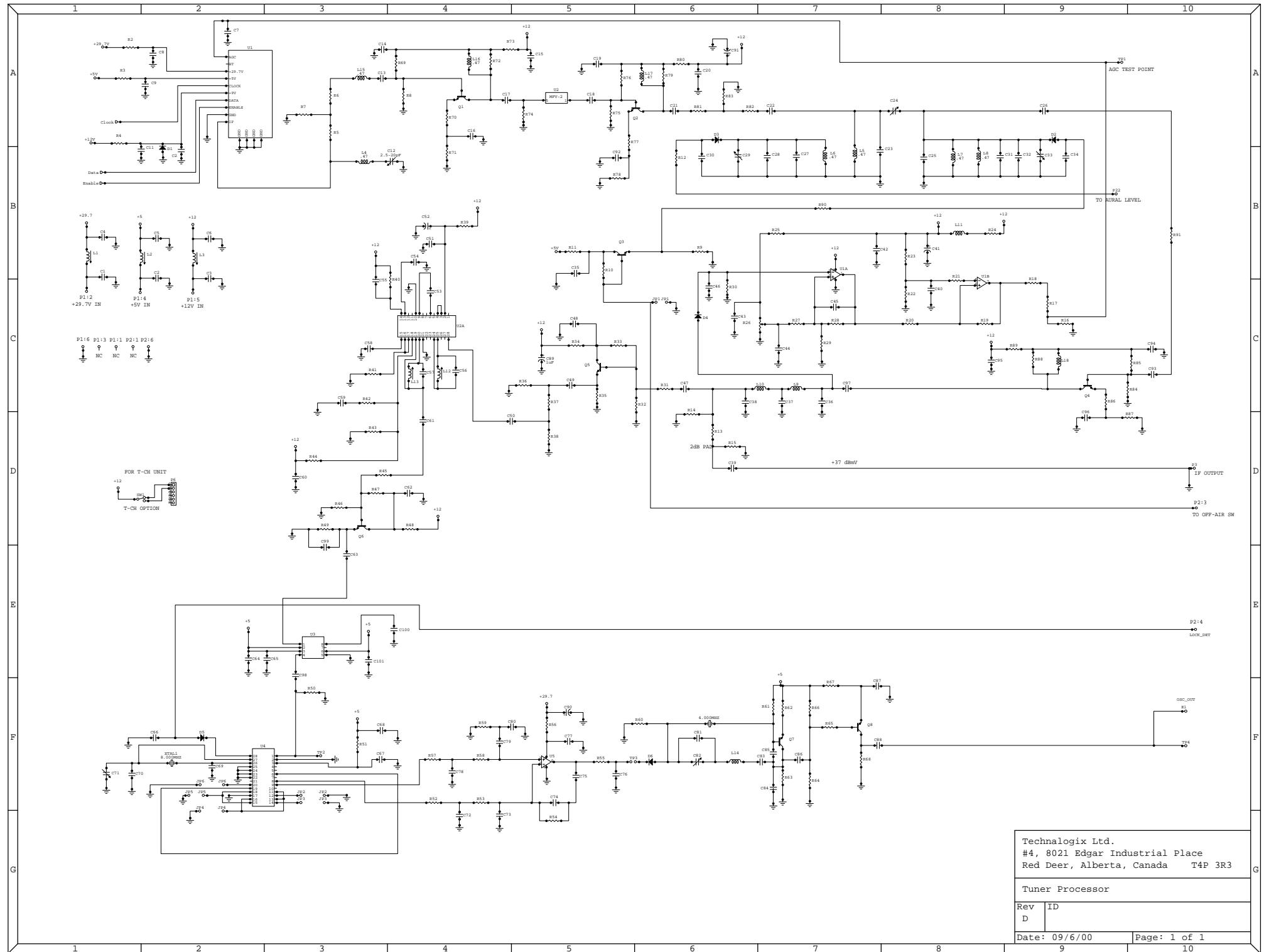
C51	1	0.01 uF		1206
C52	1	47 uF		CAP100RP250
C53	1	0.001 uF		1206
C54	1	0.47 uF		1206
C55	1	0.1 uF		1206
C56	1	22 pF		1206
C57	1	47 pF		1206
C58	1	0.01 uF		1206
C59	1	0.1 uF		1206
C6	1	0.01 uF		1206
C60	1	0.1 uF		1206
C61	1	4.7 pF		1206
C62	1	0.01 uF		1206
C63	1	0.1 uF		1206
C64	1	0.1 uF		1206
C65	1	100 pF		1206
C66	1	0.1 uF		1206
C67	1	0.1 uF		1206
C68	1	0.01 uF		1206
C69	1	68 pF		1206
C7	1	0.47 uF		1206
C70	1	33 pF		1206
C71	1	4.5-20 pF		CGKG27
C72	1	0.01 uF		1206
C73	1	0.1 uF		1206
C74	1	100 pF		1206
C75	1	0.01 uF		1206
C76	1	0.01 uF		1206
C77	1	0.1 uF		1206
C78	1	0.01 uF		1206
C79	1	0.01 uF		1206
C8	1	0.47 uF		1206
C80	1	100 pF		1206
C81	1	12 pF		1206
C82	1	3-10 pF		CGKG27
C83	1	2.2 pF		1206
C84	1	39 pF		1206
C85	1	39 pF		1206
C86	1	0.01 uF		1206
C87	1	0.01 uF		1206
C88	1	0.001 uF		1206
C89	1	470 uF		CAP200RP
C9	1	0.47 uF		1206
C90	1			CAP275RP650
C91	1	470 uF		CAP200RP
C92	1	0.01 uF		1206
C93	1	0.1 uF		1206

C94	1	0.01 uF		1206
C95	1	0.01 uF		1206
C96	1	0.01 uF		1206
C97	1	0.1 uF		1206
C98	1	0.1 uF		1206
C99	1	56 pF		1206
D2	1		DIODEZ	D0214AC
D3	1		3800	SOT23
D4	1		2800	SOT23
D5	1	914		SOT-23
D6	1		BV109	SOT23
E1	1			E-PIN
E2	1			EPAD
F1	1			SF28S
GND	1			EPAD
JP2	1			1206
JP3	1			1206
JP4	1			1206
JP5	1			1206
JP6	1			1206
L1	1	0.47 uH		IND400
L10	1	0.33 uH		1812
L11	1	0.47 uH		1812
L12	1	13.5 T		COIL 500
L13	1	8.5 T		COIL 500
L14	1	150 uH		IND500
L15	1	0.33 uH		1812
L16	1	0.47 uH		1812
L17	1	0.47 uH		1812
L18	1	0.47 uH		1812
L2	1	0.47 uH		IND400
L3	1	0.47 uH		IND400
L5	1			COIL-S
L6	1			IND400C
L7	1			COIL-S
L9	1	0.33 uH		1812
P1	1			CONHDR6
P2	1			CONHDR8
P3	1			FCONN-S
P4	1			CONHDR6
Q1	1			T317-01B
Q2	1			T317-01B
Q4	1			T317-01B
Q5	1		2369	SOT23
Q6	1		2369	SOT23
Q7	1		2222	SOT-23
Ω	Ω	Ω	Ω	Ω

R1	1	4.7 Ωhm		1206
R12	1	1.5 kΩhm		1206
R13	1	18 Ωhm		1206
R14	1	680 Ωhm		1206
R15	1	680 Ωhm		1206
R16	1	3.9 kΩhm		1206
R17	1	2 kΩhm		1206
R18	1	430 Ωhm		1206
R19	1	100 kΩhm		1206
R2	1	0 Ωhm		1206
R20	1	10 kΩhm		1206
R21	1	10 kΩhm		1206
R22	1	12 kΩhm		1206
R23	1	7.5 kΩhm		1206
R24	1	4.7 Ωhm		1206
R25	1	4.7 kΩhm		1206
R26	1	1 kΩhm		ST53YJ
R27	1	10 kΩhm		1206
R28	1	10 MΩhm		1206
R29	1	3.3 kΩhm		1206
R3	1	0 Ωhm		1206
R30	1	10 MΩhm		1206
R31	1	100 Ωhm		1206
R32	1	10 kΩhm		1206
R33	1	10 kΩhm		1206
R34	1	4.7 Ωhm		1206
R35	1	560 Ωhm		1206
R36	1	220 Ωhm		1206
R37	1	56 Ωhm		1206
R38	1	220 Ωhm		1206
R39	1	4.7 Ωhm		1206
R4	1	27 Ωhm	1/2 WATT	RES2010A
R40	1	51 kΩhm		1206
R41	1	3.3 kΩhm		1206
R42	1	100 Ωhm		1206
R43	1	33 kΩhm		1206
R44	1	68 kΩhm		1206
R45	1	100 Ωhm		1206
R46	1	10 kΩhm		1206
R47	1	10 kΩhm		1206
R48	1	4.7 Ωhm		1206
R49	1	560 Ωhm		1206
R5	1	39 Ωhm		1206
R50	1	2 kΩhm		1206

R51	1	4.7 Ω hm		1206
R52	1	470 k Ω hm		1206
R53	1	470 k Ω hm		1206
R54	1	680 k Ω hm		1206
R55	1	4.7 k Ω hm		1206
R56	1	4.7 Ω hm		1206
R57	1	470 k Ω hm		1206
R58	1	470 k Ω hm		1206
R59	1	680 k Ω hm		1206
R6	1	39 Ω hm		1206
R60	1	39 k Ω hm		1206
R61	1	100 k Ω hm		1206
R62	1	4.7 Ohm		1206
R63	1	680 Ohm		1206
R64	1	560 kOhm		1206
R65	1	5.6 kOhm		1206
R66	1	100 kOhm		1206
R67	1	4.7 Ohm		1206
R68	1	1 kOhm		1206
R69	1	2 kOhm		1206
R7	1	51 Ohm		1206
R70	1	12 Ohm		1206
R71	1	82 Ohm		1206
R72	1	220 Ohm		1206
R73	1	75 Ohm		1206
R74	1	1 kOhm		1206
R75	1	1 kOhm		1206
R76	1	2 kOhm		1206
R77	1	4.7 Ohm		1206
R78	1	82 Ohm		1206
R79	1	220 Ohm		1206
R8	1	1 kOhm		1206
R80	1	75 Ohm		1206
R81	1	4.7 Ohm		1206
R82	1	4.7 Ohm		1206
R83	1	91 Ohm		1206
R84	1	1 kOhm		1206
R85	1	2 kOhm		1206
R86	1	12 Ohm		1206
R87	1	82 Ohm		1206
R88	1	220 Ohm		1206
R89	1	75 Ohm		1206
R90	1	1.5 kOhm		1206
R91	1	75 Ohm		1206
R92	1			RESTRIMT
R93	1	10 kOhm		1206

R94	1	6.8 kOhm		1206
R95	1	1 kOhm		1206
R96	1	2 kOhm		1206
R97	1	0 Ohm		1206
R98	1	18 Ohm		1206
R99	1	51 Ohm		1206
SW1	1			SWSPDT1
TP1	1			EPAD
TP2	1			EPAD
TP3	1			1206
TP4	1			EPAD
TUNER	1		EVN56D45G3	TUNER2
U1	1			SO8
U2	1		LM1823N	DIP28
U3	1			FPT-08-M01
U4	1			SO-28L
U5	1			SO8
Y1	1			XTL49
Y2	1			XTL49



**Thank you
for choosing
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