MicTel

Portable Telephone Interface
With Extended Battery Life

by

CircuitWerkes

Operating & Technical Manual

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Manual Revised 04-06-2006 Version 4 Hardware

TABLE OF CONTENTS

INTRODUCTION

Thank you for choosing the CircuitWerkes MicTel.

The CircuitWerkes MicTel is a portable, battery or AC adapter-operable telephone interface that may be used for a variety of applications. In its typical application, the MicTel replaces the handset of the telephone to provide high-quality audio for feeding and receiving information. It can also be used in a number of non-telephone applications. Its audio & battery specifications will provide long life and "Broadcast Quality" audio production. Along with high quality audio, the MicTel features audio limiters in both the send and receive channel. These limiters are user-defeatable and begin working at about +3dBm of output. The limiter works by automatically reducing the gain of the device during high-output, peak audio thereby preventing clipping, output distortion or overdriving the telephone line.

For phone line use, the MicTel requires the use of a telephone with modular **handset** jacks or a telephone with 2.5mm headset connector such as the ones found on most cellular/PCS phones. Single piece telephones (with non-removable handsets) or two piece phones with completely detachable bases will not work with the MicTel. Because there are no industry standards for telephone handset configurations, it is possible that the MicTel will not work with some specific telephone devices. If your MicTel does not seem to work properly using one brand of telephone, try the MicTel on a different telephone device before assuming that the MicTel is broken. All MicTels are checked twice before leaving the factory and field failures are pretty rare. ***Experience has shown that one of the most common problems during new installations is the use of an incompatible phone.***

Your new MicTel has been designed with battery life in mind. The result is that it has been tested and found to operate for up to 36+ hours on a single set of fresh 9V, alkaline batteries. These tests were made with the MicTel feeding human speech audio down a phone line at nominal phone line levels of –10dBm and a moderately loud headphone level in a pair of Sony MDR-7506, semi-professional, headphones. Although the MicTel is designed to be stingy with power internally, how you use the MicTel will determine the effective battery life, which can vary significantly. For example, driving a bridging load from the line level outputs requires much less power than driving a terminating load does because much of the power is transferred to the load. Also, driving a 10 Ohm headphone requires far more power than does driving a 75 Ohm headphone like the MDR-7506. The efficiency of the headphones can also have a bearing on battery life. If your headsets are inefficient "walkman" style headphones, you will need more output to achieve the same sound level as someone using a better set. In addition to the loading and headphone issues, the type of audio that the MicTel is handling can have an effect. Human speech is less dense than processed music, so you can expect that playing compressed music down the line will result in somewhat less battery life than would otherwise result from nominal speech. Finally, we recommend installing fresh alkaline batteries prior to every critical use and we do not recommend using either rechargeable or standard dry cells.

The low battery warning should be taken seriously. Using alkaline batteries, under nominal conditions, the low battery indicator will illuminate about an hour before total battery failure. If the load is greater or the battery performance is less than nominal, the indicator may give less warning. Disregarding the low battery warning may cause your MicTel to quit at a critical moment.

We encourage you to refer to these instructions first if you have any questions or problems regarding the use of the MicTel. If you cannot find an answer, please contact:

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CONTROLS - INPUTS AND OUTPUTS

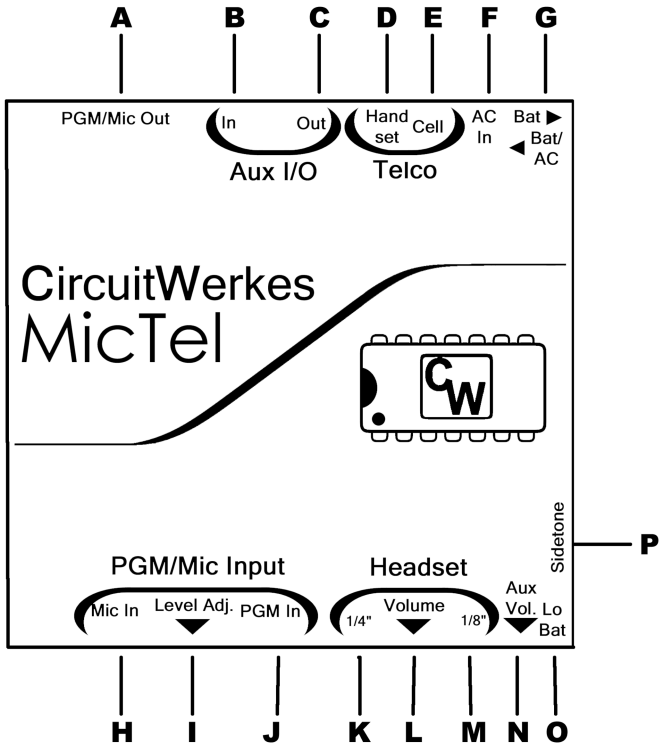


Figure 1

A PGM/MIC OUT. This is a balanced line level main output. Connect this XLR output to the input of your recording device to record information from the MicTel mixed output. Maximum output level is +10dBm.

B AUX. I/O IN. This high quality balanced line level ¼" jack input is used for mixing another audio source with the receive telephone audio or it can be used as a straight through amplifier/buffer/limiter without the telephone.

C AUX I/O OUT. This ¼" jack output provides a high quality, balanced line level output from the send amplifiers for feeding other audio sources as a broadcast loop.

D HAND SET. This RJ-9 modular jack connects MicTel to a standard telephone. Unplug the handset of your modular telephone and plug MicTel in its place.

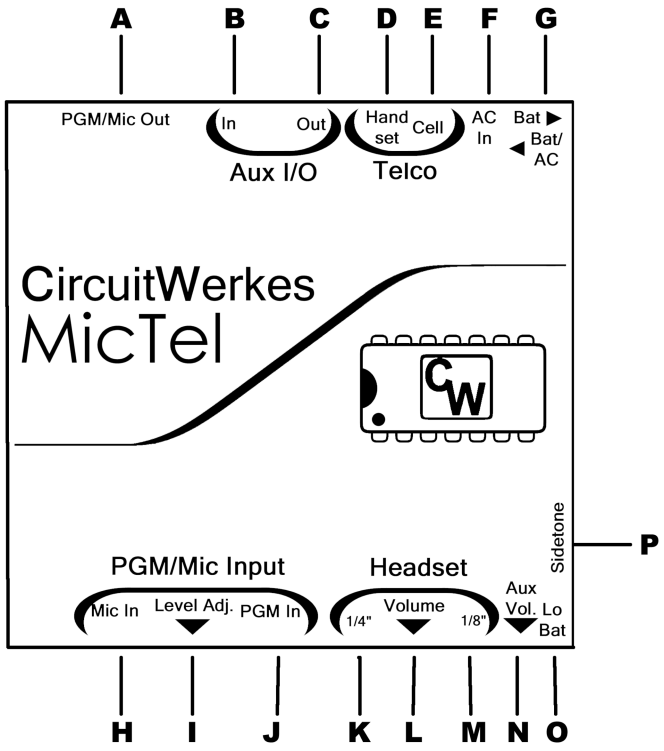
E CELLPHONE. This 2.5" mini jack lets you connect the MicTel to a cellular phone headphone/mic jack.

F AC IN. This is the external power connector if using a wall transformer for power. Place the "Bat" - "Bat/AC" switch to the Bat/AC position.

G BATTERY / A.C. This power source switch selects the power mode you choose, or turns the unit off when not in use. The power switch selects between Bat / AC mode (wall transformer with battery backup), Bat mode (9 volt battery operation), and OFF (in center position). Use the Bat mode when only batteries are used.

CONTROLS - INPUTS AND OUTPUTS

Figure 2



H MIC IN. This female XLR provides connection for your microphone.

I LEVEL ADJ. This knob controls the level of your 'Mic In' and 'PGM In' sources.

J PGM IN. This balanced ¼' input jack is provided for feeding another line-level audio source down the phone line and/or out to the PGM/Mic Out.

K HEADSET OUTPUT ¼". Your headset or speaker plugs into this ¼" jack.

L HEADSET CONTROL . This knob controls your headset volume.

M HEADSET OUTPUT 1/8". Your headset or speaker plugs into this 1/8" jack.

N AUX. VOL. This knob controls the Aux I/O balanced audio output.

O LO BAT. The low battery indicator will illuminate when your battery level has approximately 15 to 45 minutes of operational life remaining.

P SIDETONE. Provides an adjustment for a mix of MIC/PGM audio and telephone audio.

INSTALLING BATTERIES

BAT mode
Two 9 volt batteries are required for operating the MicTel in the BAT (battery) mode. CircuitWerkes recommends installing two alkaline (same brand) batteries. When desiring to run the MicTel specifically on batteries, please operate the MicTel in the BAT mode rather than the BAT/AC mode. This will optimize the battery life.

BAT/AC mode
The MicTel can be run from the supplied 15 VDC wall adapter with no batteries installed.

However, to ensure uninterrupted service using the MicTel in the Bat/AC mode, having batteries installed might be the way to go. You can plug your 15VDC adapter into its power source and if you should lose that power source, for whatever reason, your MicTel will sense the DC loss and the batteries will automatically pick up the load transparently.

To install the batteries, open the chassis by removing the screw on the bottom plate battery door. The battery terminals will be readily visible. Plug both batteries into the terminals and close the chassis. Replace the bottom plate and secure the screw.

OFF Mode
The MicTel is off when the Bat / Bat/AC switch is in the center position.

CONFIGURATION JUMPERS

All the MicTel's jumpers can be accessed through the battery compartment. The MicTel's jumpers fall into four main catagories: 1. Input Type, 2. Input Level, 3. Limiter Mode, or 4. Sidetone mode. Each of these settings will be discussed below in the following sections. The tables below can be used as a quick reference for jumper functions.

1. Main and Aux. Input Configuration Set Jumpers

Jumper #	1-2	2-3	On	Off
JP21 (main chan)	Balanced Aud In	Unbal Stereo In	N/A	Unbal Mono In
JP20 (aux. Chan)	Balanced Aud In	Unbal Stereo In	N/A	Unbal Mono In
JP22 (mic input)	N/A	N/A	Unbalanced Pin 2 Grounded	Balanced

2. Main Channel Program Audio Input Level Set Jumper

Jumper #	1-2	2-3	On	Off
JP3	0dBm input	-10dBm input	N/A	-20 dBm input

Configuration Jumpers Continued

3. Limiter Mode Jumpers

Jumper #	1-2	2-3
JP11 (main chan)	Limiter On	Limiter Off
JP4 (aux. Chan)	Limiter On	Limiter Off

4. Sidetone Mode Jumper

Jumper #	1-2	2-3	On	Off
JP10	Mic/Line audio is mixed with aux chan. audio	Mic/Line audio is ONLY heard in headphones	N/A	Sidetone Disable

Input Type:

Many types of audio equipment have different input and output connection schemes. In order to make the MicTel as versatile as possible, input configuration jumpers allow you to set the MicTel for the best match to your existing equipment. The input jumpers may be especially useful if your MicTel is replacing an existing piece of equipment such as the Gentner Microtel where the input and outputs were unbalanced.

The main microphone input mode is selected by jumper J22. You can use the mic input either balanced (J22 off) or unbalanced with J22 on. When J22 is on, Mic Input pin 2 is grounded.

The line level inputs for both the main channel and aux input channel give you a choice of three input modes. They are: Standard Balanced audio, Unbalanced Stereo audio or Unbalanced Mono audio. Jumper J21 sets the main channel, line level, input audio mode. When J21 is jumpered to 1-2, it is the default, balanced audio mode. When jumpered to 2-3 the input is set for unbalanced stereo inputs and when the jumper is removed, the MicTel is configured for unbalanced, mono input audio. Jumper J20 configures the auxiliary channel's input in the same way as J21 does for the main channel.

Main Line Level & Aux. Input Connections

Figure 1a

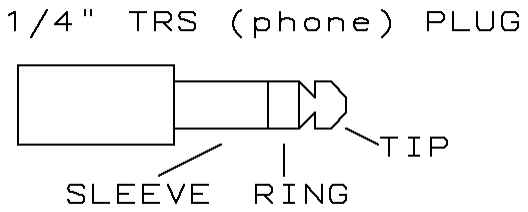
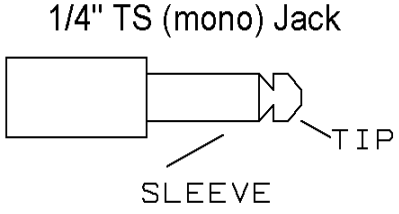
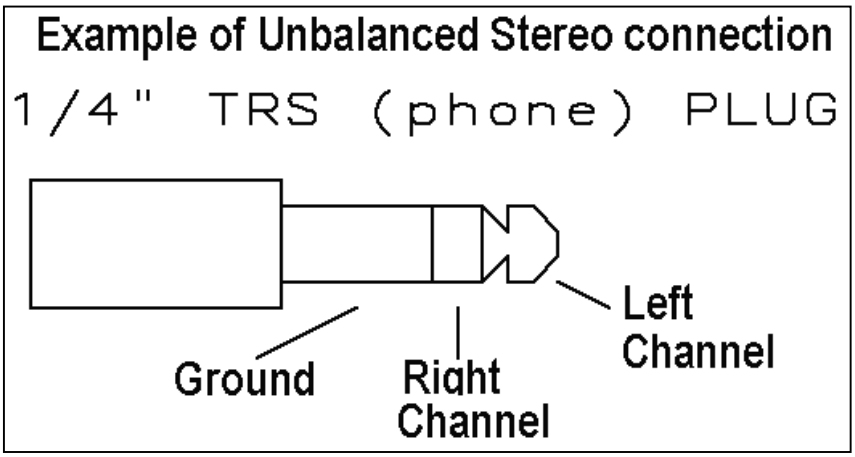


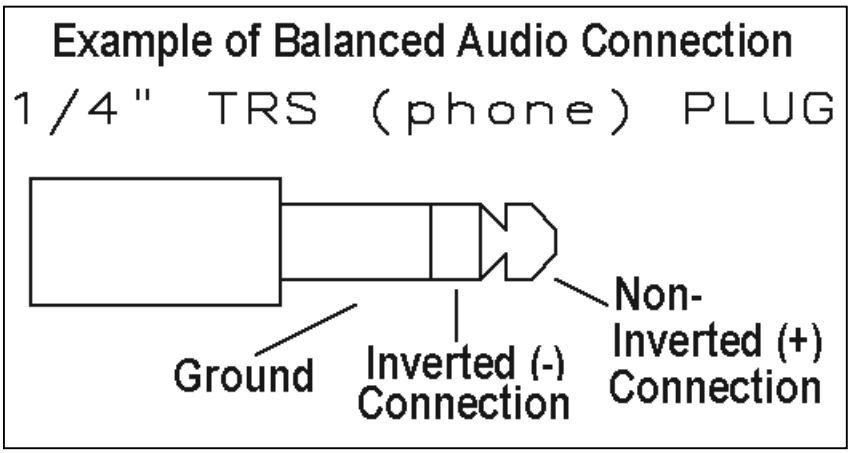
Figure 1b



¼" jacks come in two varieties: Tip, Ring & Sleeve (TRS) or Tip & Sleeve (TS or Mono). TRS jacks are preferred for both input and output connections to the MicTel, however TS jacks can be used for MicTel inputs, particularly if the MicTel input jumpers are configured for unbalanced, mono operation. TS jacks should not be used for the MicTel's aux output as this will short out one of the balanced output drivers resulting in increased battery drain and possible overheating of the driver circuit at high output levels.



When connecting up external equipment to the MicTel, it is important to know if your equipment is balanced or unbalanced and if it is stereo or mono. In most cases of field or home studio use, the equipment will be unbalanced stereo or mono. If you are using a headphone output to drive the MicTel, it will almost always be unbalanced. Referring to the ***"Main and Aux. Input Configuration Set Jumpers"*** chart, you would set either J20 or J21 to position 2-3 for unbalanced stereo operation.



If you are connecting commercial broadcast equipment to the MicTel, the audio may be mono, balanced. This is the default setting for the MicTel. Note that if your audio source is unbalanced stereo but the jumpers are set for balanced audio, you will probably hear almost nothing or very low audio with an echo effect. This is the result of phase cancellation when similar audio is fed to both leads of a balanced input. If your audio level seems low or sounds peculiar, try changing the associated input jumper to unbalanced stereo to see if that makes a difference. If the problem seems to clear up, then you have found the solution, but if the problem seems worse, then you will need to change the jumper back to the 1-2 position or you can try removing the jumper completely.

Input Level

Jumper J3 lets you set the main channel's line-level input to match the output level of whatever device will be driving it. If your source audio is 0dBm (typical broadcast audio level), set the jumper for 1-2. If the input audio is in the –10dBm range which is typical of consumer & semi-pro audio, set the jumper to the 2-3 position. If the input audio will be –20 or less, remove J3. The factory default is set for 0dBm in (1-2 jumpered).

Limiter Mode:

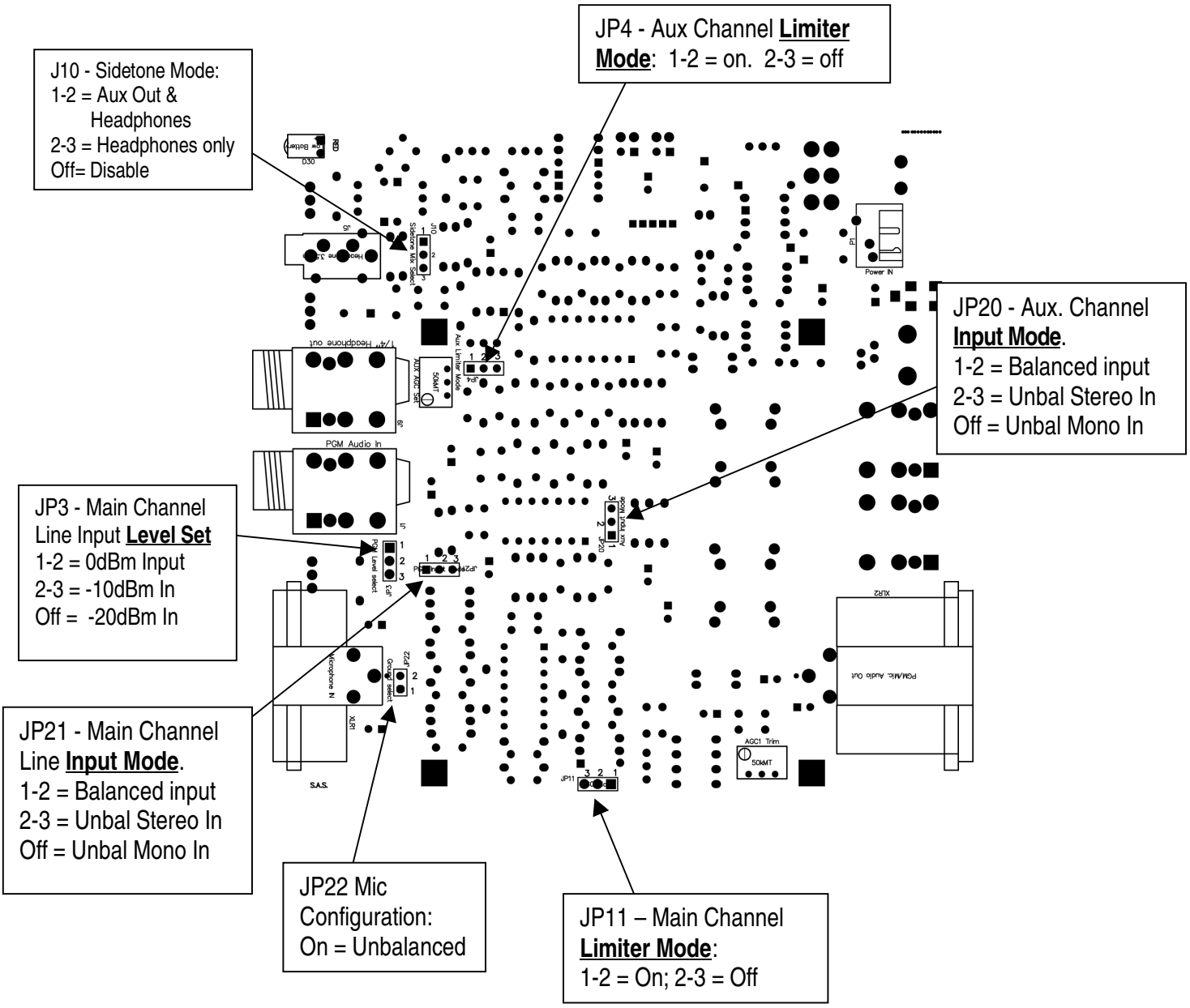
The MicTel is equipped with fast acting audio limiters in both the main and auxiliary audio channels. The limiters' job is prevent distortion that can happen when a loud audio passage occurs while the MicTel is outputting at near its maximum level. This is common during live sporting events or even during telephone interviews. Whenever the MicTel is overdriven, the limiter instantly reduces the output gain, preventing clipping distortion in the MicTel's output. The limiter is designed to be transparent to low amplitude signals and only effects audio whose peak amplitude exceeds +5dBm as measured at the MicTel's outputs. Jumper J11 controls the main channel's limiter. When the jumper is set to 1-2, the limiter is engaged. When the jumper is moved to the 2-3 position, the limiter function is bypassed. J4 controls the aux channel limiter. When the jumper is set to 2-3, the limiter is engaged. When the jumper is moved to the 1-2 position, the limiter function is bypassed. Note that the relative control functions are reversed for J4 & J11. The MicTel is shipped with the limiters enabled.

SideTone Mode:

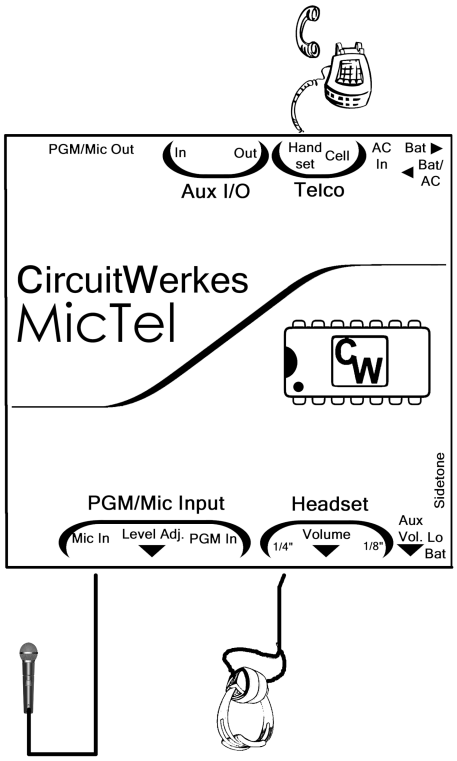
When audio from the main input such as the microphone is mixed with the incoming telephone audio, this is called sidetone. Sidetone can be useful because it gives the MicTel user control over the relative mix levels of the incoming telco audio and their own microphone. For example, if you are doing an interview with a caller, that caller might sound louder in the output than your own microphone does. This is because the phone system employs something called a hybrid. The hybrid's job is to separate your send audio from that caller's receive audio. In a regular telephone, this prevents feedback from the transmitter to the receiver of your phone handset. As a result of the hybrid, the level of your own audio that you receive back from the phone system can be substantially less than the incoming caller's audio. The sidetone function lets you compensate for this by increasing the amount of send audio that is heard at the aux audio output port or the headphones. A second possible benefit of the sidetone is that the send audio that is mixed with the receive audio is not frequency limited by the phone system, making the send audio sound more natural as the sidetone level is increased. Jumper J10 controls the sidetone and works in conjunction with the sidetone trimmer control. When Jumper J10 is removed, sidetone audio is disabled. When J10 is on the 1-2 position, the sidetone is mixed with the aux channel audio and its level is adjustable from all the way off to fully on by the use of the sidetone trimmer control. Sidetone audio will be present at both the Aux. audio output and the headphones. When J10 is on the 2-3 position, the sidetone is mixed only with the headphone audio & does not appear in the Aux audio output. This allows the talent to hear more natural sounding audio without it being present in the mix. The factory default is 1-2 jumpered.

CONFIGURATION JUMPER LOCATOR

(as viewed from the bottom side of the PCB through the battery door)



OPERATION - GENERAL USE



This diagram illustrates the basic use of the MicTel for feeding your voice to a remote location. The headset allows you to hear your own voice as well as any feedback from the other end of the call. This setup can be used for feeding audio to a remote location like doing a live remote broadcast. It can also be used when you are being interviewed via telephone. You will have better sounding audio by using your studio quality mic. You can also feed recorded audio to the interviewer via the PGM In jack (figure 4) and you can make your own recording of the interview (figure 8).

Figure 3

Before making connections, see “Installing Batteries” on page 4.

1. Unplug your telephone handset cord at the handset and plug the modular jack into the Hand set jack on the back of the MicTel using Figure 3 for reference.

2. Plug your microphone into the Mic In XLR connector.

3. Plug your headphones into the Headset jack.

4. Select BAT/AC or BAT operation to turn the unit on.

5. Adjust the microphone level using PGM/Mic Input Level Adjust knob.

6. Adjust the Headset level by using Volume Level Adjust knob.

You now have the equivalent of a telephone handset and may use your phone for normal calls, including dialing out. In this configuration, you have the added advantage of a good microphone and headset.

OPERATION - AUDIO FEEDING

This figure shows a simplified hookup for sending both live mic and pre-recorded audio down the phone line. The illustration uses a tape player, but the source audio can be anything with a line out or headphone out jack. To set the right volume level, first adjust the Mic level control for your voice when talking into the microphone. Then, using the headphone volume control of the tape player, adjust the playback level of the recording to match your mic level. Do not adjust the MicTel's Level Adj control when playing back recordings or you will affect your mic level, too.

Be sure to set jumper JP21 to match your equipment's output. Position 2-3 is unbalanced stereo operation like you might get from a PC sound card or a stereo Walkman. If your source audio is unbalanced mono, remove JP21. If your source has a professional balanced output, move JP21 to the 1-2 position.

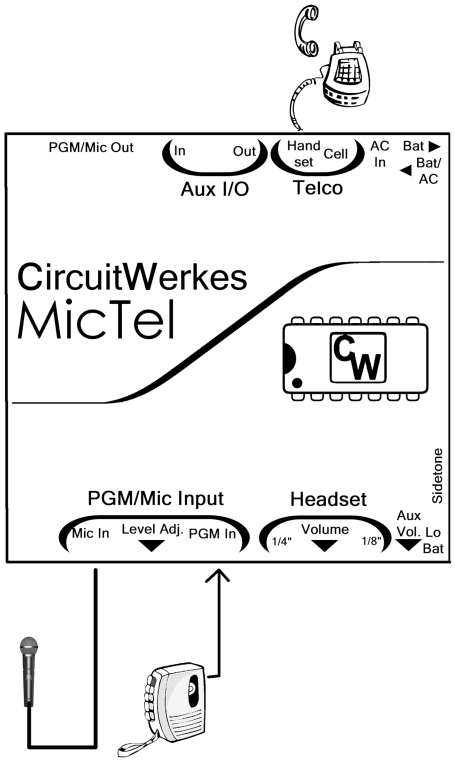


Figure 4

Before making connections, see "Installing Batteries" on page 4.

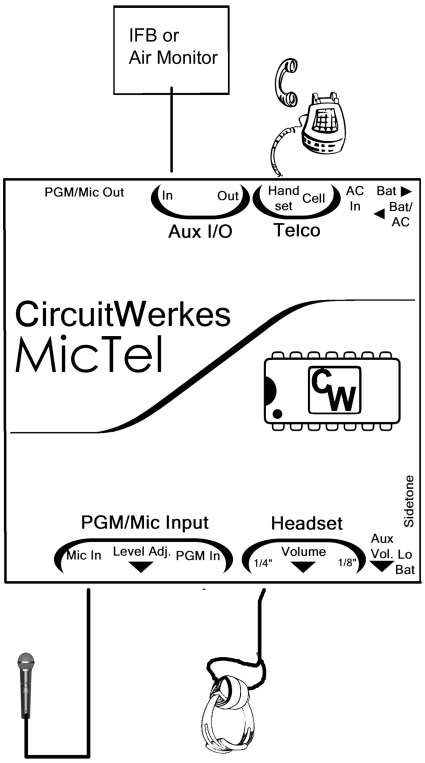
1. Set up MicTel as described in "General Usage" (page 9) and shown in Figure 4.

2. Patch the output of your cassette recorder to the PGM In plug on the MicTel.

3. Select BAT / AC or BAT operation to turn the unit on.

In this configuration, your mic audio may be mixed with tape audio, if desired. Output tape level will be controlled at your tape recorder. Other playback devices besides a tape recorder can be substituted including CD player, MP-3 player, etc.

OPERATION - SIMULTANEOUS OFF-AIR MONITORING AND PROGRAM INTERRUPT (IFB)



When doing a live telephone remote, it is often necessary to hear IFB or the over-the-air signal so that you can get your cues. This configuration feeds your voice down the phone line, but lets you hear incoming audio from an air monitor or from an IFB. The IFB or monitor audio will be heard in your headphones, if jumper JP10 is in either the 1-2 or 2-3 position. The default position is 1-2 shorted.

To get proper audio from your IFB input you should set jumper JP20 to match your equipment's output type. The 2-3 position is unbalanced stereo operation like you might get from a PC sound card or a stereo Walkman. If your source audio is unbalanced mono, remove JP20. If your source has a professional balanced output, move JP20 to the 1-2 position.

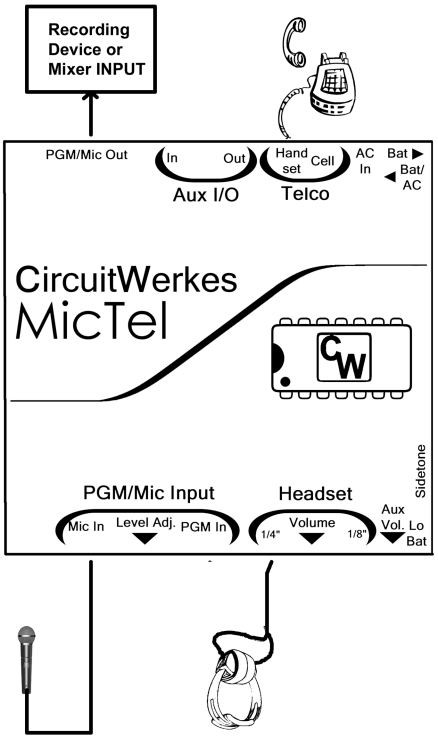
Figure 5

Before making connections, see "Installing Batteries" on page 4.

1. Set up your MicTel as described in "General Use" (page 9) and shown in Figure 5.
2. Plug the output of a transistor radio, two-way radio, etc., to the MicTel's Aux I/O "In" connector.
3. Select BAT/AC or BAT operation to turn the unit on.

In this configuration you will be able to hear both the telephone audio and the audio coming from your auxiliary source.

OPERATION - FEED A LOOP (DAR, VTR, TAPE, ETC.)



This configuration is used for voicing a recording while receiving direction via the telephone. The *caller audio will not appear on the recording* but the caller can hear your voice as it is being recorded and you can hear directions provided by the caller.

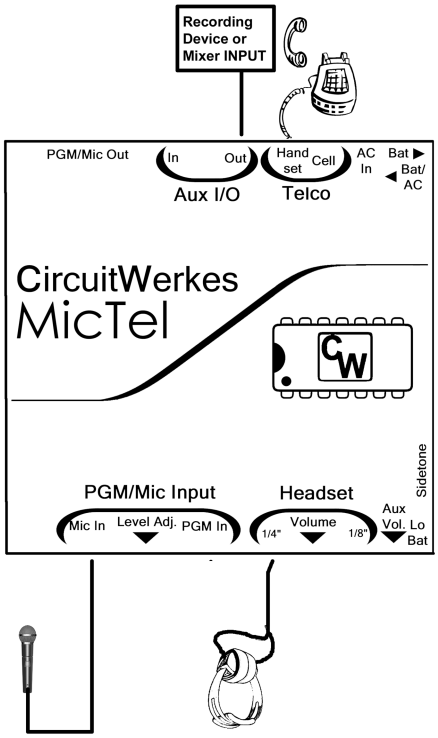
Figure 6

Before making connections, see "Installing Batteries" on page 4.

1. Set up your MicTel as described in "General Use" (page 9) and shown in Figure 6.
2. Plug the Aux I/O Out on the MicTel to the input of the desired loop (VTR, Tape, etc.).
3. Select BAT/AC or BAT operation to turn the unit on.
4. Set the Level Adj. control for the desired output level.

In this configuration you will be able to feed both the telephone line and your auxiliary source.

OPERATION - TO RECORD INTERVIEWS (BOTH SIDES OF A PHONE CONVERSATION)



This configuration is used for recording both sides of the telephone conversation such as would be done for a live interview. Note that the recording device (tape recorder, Digital Audio Recorder, PC, etc.) is connected to the **AUX Output** –not the PGM Output.

The Aux Output contains both the local mic and the caller's audio mixed together. The setting of Jumper J-10 & the sidetone control setting will affect the mix.

Remember that the MicTel's output is balanced, mono. Connecting the output directly to an unbalanced, stereo input of a recorder will result in zero audio if the left and right channels are summed to mono at any time, either during or after recording. You can compensate for this by recording only the left or right channel. Alternately, you can resolve this situation by using a splitter cable (that breaks the left and right audio into separate connectors) and then only using the left or the right channel audio feed while leaving the other feed floating (loose).

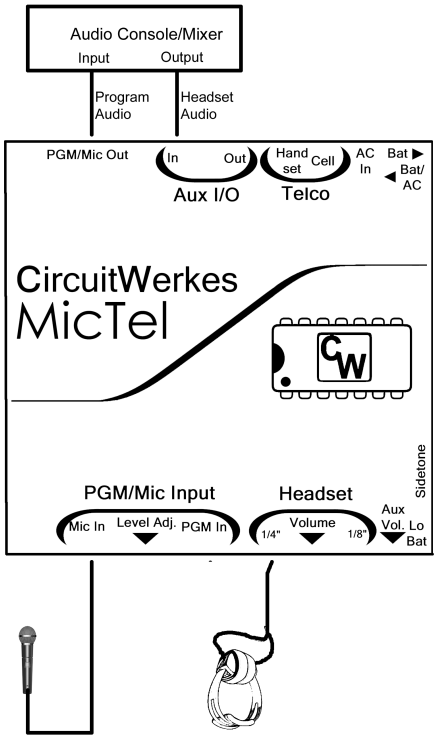
Figure 8

Before making connections, see "Installing Batteries" on page 4.

1. Set up your MicTel as described in "General Use" (page 9) and shown in Figure 8.
2. Patch the Aux I/O Out of MicTel to the input of your recorder.
3. Select BAT/AC or BAT operation to turn the unit on.
4. Adjust the Aux Vol control for the desired output level.

Note: The Headset volume level control adjusts your headset volume only and will not affect actual levels coming from the telephone line.

OPERATION - USING MICTEL AS A MIC-TO-LINE DRIVER OR HEADSET AMP



In this configuration, the MicTel is used as a remote amplifier and is connected to a larger console, perhaps in a press box at a stadium or in another studio or venue. The MicTel user is feeding a line level back to the master mixer and is receiving an IFB feed from the main mixer so that the MicTel talent can hear the cues from the main studio. This configuration can be varied, by using a mix-minus feed from the main studio, so that the MicTel user or guest can be asked direct questions from the main studio during an interview.

Be sure to set JP20 as described in figure 5.

Figure 9

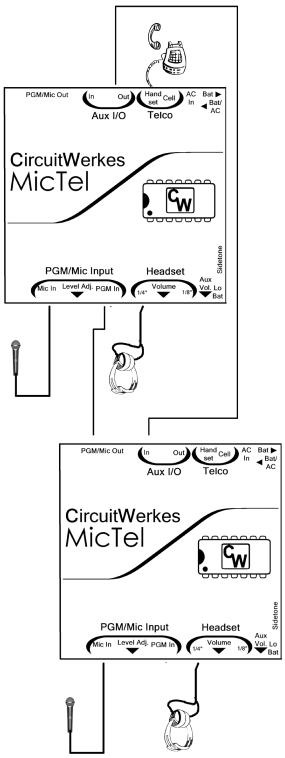
Before making connections, see “Installing Batteries” on page 4.

1. Plug the microphone into the Mic XLR jack.
2. Plug the headsets into the Headset jack.
3. Connect audio source to the Aux I/O In of the MicTel.
4. Feed the program audio by connecting the Aux I/O out (or the PGM out) to your console, speaker, etc.
5. Select BAT/AC or BAT operation to turn the unit on.

OPERATION - TWO-TALENT SPORTS OR REMOTE SETUP

Figure A

Figure B



The two-MicTel setup lets two announcers work a remote. Each talent will have their own mic level control and headphone volume control. Each talent will be able to hear the other as well as any questions or cues that are received from the phone line.

In this configuration, the MicTel in Figure A is the master and controls the send level for both MicTels. The Figure A MicTel's aux level control also determines the level received at the headphones of the Figure B MicTel.

Figure 10

NOTE: This requires two MicTel units.

Before making connections, see "Installing Batteries" on page 4.

1. Set up MicTel "A" for general use as shown in Figure 10.
2. Patch the Aux I/O Out on MicTel "A" to the Aux I/O In on the MicTel "B".
3. Patch the PGM/Mic Out on MicTel "B" to the PGM In on MicTel "A".
4. Connect mic and headsets to MicTel "B" as shown in figure 10. The two units will now talk to each other and will feed audio down one telephone line.
5. If an additional feed source such as a tape is desired, plug it into the Aux I/O In on MicTel "B".
6. Select BAT/AC or BAT operation to turn the unit on.

In this configuration you will be able to hear both the telephone audio and the audio coming from your auxiliary source.

OPERATION - CELL PHONE

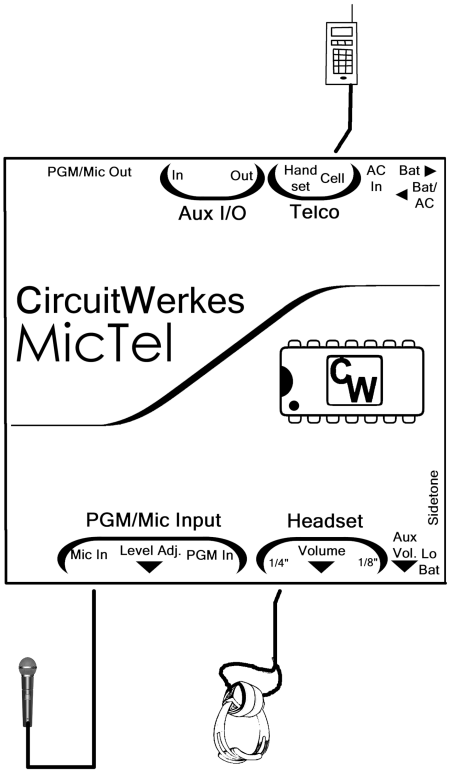


Figure 11

Before making connections, see “Installing Batteries” above on page 4.

1. Plug your Cell telephone Headset/Mic cord into the 2.5” mini cell jack on the back of the MicTel using Figure 3 for reference and the other end into the Headset/Mic jack of your cell phone.

2. Plug in your microphone into the Mic In XLR connector.

3. Plug your headphones into the Headset jack.

4. Select BAT/AC or BAT operation to turn the unit on.

5. Adjust the microphone using PGM/Mic Input Level Adjust knob.

6. Adjust the Headset level by using Volume Level Adjust knob.

You now have the equivalent of a telephone handset and may use your phone for normal calls, including dialing out. In this configuration, you have the added advantage of a good microphone and headset. Note that the cell phone volume control has an effect upon the received audio level.

SPECIFICATIONS *(SUBJECT TO CHANGE WITHOUT NOTICE)*

- Physical Dimensions: 6" L x 2-1/8" H x 5-1/16" W
- Weight: approx. 1.5 lbs without batteries.
- Power Supply Requirements: 12-16VDC or AC @ 200mA minimum. Polarity insensitive
  OR
- Two (2) 9V Alkaline Batteries, Battery life nominally 20-35 hours, depending on usage.
- Indicators: LED Low Battery Warning. Gives 15 to 45 minute battery life warning.
- Connectors:
  - Microphone — XLR – F (Balanced Input)
  - PGM/Mic Out — XLR - M (Balanced Line level)
  - PGM In — ¼' TRS (Balanced Line level)
  - Headset — ¼" and 1/8" Unbalanced
  - Aux I/O In & Out — ¼" TRS (Balanced Line level)
  - Handset — RJ-9
  - Cellular — 2.5" mini TRS (tip = send, ring = rcv)
  - Power jack — One standard 5.5mm barrel with 2.1mm id
- Audio Amplifier:

Input	Level	Impedance
Mic	-60dBm	>300 Ohms balanced
PGM	-10 dBm	>10k Ohms balanced
Aux I/O In	-10 dBm	>10k Ohms balanced
Output	**Level**	**Impedance**
Headset	+4 dBm	8 Ohms min
Mic/PGM Out	+10 dBm (50Hz - 14kHz)	600 Ohms
Aux I/O Out	+10 dBm (50Hz - 15kHz)	600 Ohms
Handset Transmit	-3 dBm Max (300Hz - 3kHz)	600 Ohms

  - Distortion Less than .5%
- Limiter:
  - Threshold Level = +3 to +5dBm at MicTel's Output
  - Slope = .2dB of output per 1dB rise at input
  - Maximum compression = 20dB
  - Maximum distortion at 10dB of limiting = less than 1%
- Power:
  - Two 9Volt Alkaline batteries or 12-16Vdc external power w/auto-switched backup
  - Nominal current consumption
  - 55mA at full output
  - 22mA at idle current

WARRANTY

CircuitWerkes, Inc. (Manufacturer) warrants that this product is free of defects in both materials and workmanship. Should any part of this equipment be defective, Manufacturer agrees, at its option, to:
A. Repair or replace any defective part free of charge (except transportation charges) for a period of two years from the date of the original purchase, provided the owner returns the equipment to the Manufacturer at the address set forth below or stated at time of RMA issue from Manufacturer. No charge will be made for parts or labor during this period:
B. Furnish replacement for any defective parts in the equipment for a period of two years from the date of original purchase. Replacement parts shall be furnished without charge, except labor and transportation.

This warranty excludes assembled products not manufactured by Manufacturer whether or not they are incorporated in a Manufacturer product or sold under a Manufacturer part or model number.

THIS WARRANTY IS VOID IF:
A. The equipment has been damaged by negligence, accident, act-of-God or mishandling, or has not been operated in accordance with the procedures described in the operating and technical instructions; or,

B. The equipment has been altered or repaired by other than Manufacturer or authorized service representative of Manufacturer; or,

C. Adaptations or accessories other than those manufactured or provided by Manufacturer have been made or attached to the equipment which, in the determination of Manufacturer, shall have affected the performance, safety or reliability of the equipment; or,

D. The equipment's original serial number (if applicable) has been modified or removed.

NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE, APPLIES TO THE EQUIPMENT, nor is any person or company authorized to assume any warranty for Manufacturer or any other liability in connection with the sale of Manufacturer's products.

Manufacturer does not assume any responsibility for consequential damages, expenses or loss of revenue or property, inconvenience or interruption in operation experienced by the customer due to malfunction in the purchased equipment. No warranty service performed on any product shall extend the applicable warranty period.

In case of unsatisfactory operation, the purchaser shall promptly notify Manufacturer at the address set forth below in writing, giving full particulars as to the defects or unsatisfactory operation. Upon receipt of such notice, manufacturer will give instructions respecting the shipment of the equipment, or such other matters as it elects to honor this warranty as above provided. This warranty does not cover damage to the equipment during shipping and Manufacturer assumes no responsibility for such damage. All shipping costs shall be paid by the customer.

Repair or Service Information
In the event of the need for service or repair, call CircuitWerkes at (352) 335-6555 for a Return Merchandise Authorization number (RMA). Then carefully package the unit along with a note of the problem and send it to the address below. Be sure to include your contact information (address - not PO Box - telephone numbers) and best time to call.

This warranty extends only to the original purchaser and is not assign-able or transferable.

CircuitWerkes ● 2805 NW 6th Street ● Gainesville, FL 32609
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