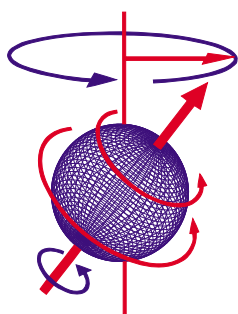# Installation / Operation Manual

CinemaVision

Resonance Technology, Inc.

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www.mrivideo.com

Innovative MRI-Compatible Entertainment Systems
Advanced Functional MRI Systems

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1. Introduction

Congratulations on your purchase of the CinemaVision Audio/Video system for patient comfort. This device represents more than 40 years of development and state-of-the-art engineering. We are confident this product will give you the tools you need for comforting the patient while undergoing MRI scans.

This installation/operation manual outlines how to properly install and operate the system.

Thank you for choosing to purchase this system from Resonance Technology, Inc., the leader in fMRI and MRI patient comfort systems.
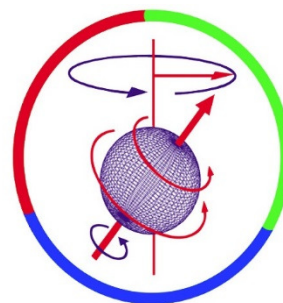
Suggestions on how to improve this system are always welcome.

Sincerely,

Mokhtar Ziarati
President and CEO

Resonance Technology Inc.

2. Safety Information

At Resonance Technology, Inc., patient safety is our top priority. Please review this section completely as its contents are vital to the safety of the installer, the clinician/operator, and the patient.

2.1. Important Warnings for Patient and Operator Safety

> **WARNING**
> **Prior to every use, inspect all system components that come in contact with the patient. Discontinue product usage immediately if any damage is evident or presents other potential hazards. Use of damaged components may cause injury to the clinician or the patient.**
> Examples of hazardous damage include but is not limited to the following:
> - Protective lenses missing from the video goggles
> - Cracked housing on video goggles or audio headset
> - Microphone boom separated from headset housing (exposing wires)
> - Cable padding torn, exposing cable inside
> - Any damage potentially exposing wires to the patient

2.2. Precautionary Patient Conditions

Precautionary conditions are to be observed with patients who use the system continuous in excess of 3 hours or more.

Eye Disease / Eye Injury / Glaucoma

If the patient has been diagnosed with or is susceptible to eye disease, eye injuries, or glaucoma, instruct the patient to consult their doctor before using the video goggles. Use of this product by individuals with conditions such as glaucoma is not recommended.

Heart Disease / High Blood Pressure

If the patient has a history of heart disease or high blood pressure, instruct the patient to consult their doctor before using this system. If during viewing any increased anxiety is experienced, stop using this product immediately and instruct the patient to rest. If the symptoms persist after resting, instruct the patient to consult their doctor before continuing using this product.

Seizures

If the patient has a history of temporary spasms, unconsciousness, or epileptic seizures from light stimulation, instruct the patient to consult their doctor before using this system. Use of this product by such individuals may cause spasms, unconsciousness, or seizures. If the patient experiences such symptoms, stop using the product immediately and instruct the patient to consult their doctor.

Sickness / Headache / Nausea

If during use, the patient experiences any of the following symptoms, stop using this product immediately and rest. These symptoms may indicate misuse or overuse of the product or that you should not use the product for health reasons. If the following symptoms persist after rest, consult your doctor.
- Sore eyes, eye fatigue, or double vision
- Headache
- Inability to focus on the screen
- Stiff or sore shoulders or neck

For patient safety, the patient video goggles turn off automatically after six hours of continuous use. Read this user manual for instructions on how to reset the video goggles to continue viewing video images.

<u>Motion Sickness from using the Video Goggles</u>

Some patients may experience motion sickness, headache, or nausea from viewing visual paradigms or video programs, especially those with intense action and movement. If the patient experiences any of these symptoms, stop using the product immediately. To avoid personal injury or injury to others, do not operate a motor vehicle nor do anything that requires concentration until these symptoms disappear.

<u>Loud Sound Volume</u>

Avoid using audio headset with high volume for the patient as hearing expert's advice against continuous loud and extended audio play. If the patient experiences a ringing in their ears, reduce the audio headset volume. The patient is advised to consult their health doctor for further advice.

2.3.　　Use Restrictions

<u>Shelf-Life and System Maintenance Service Schedule</u>

The CinemaVision System comes with a one year original manufacturer warranty and a shelf life of two years from the date of installation. Optional extended warranty may be purchased for this system. With patient safety in mind, Resonance Technology, Inc. recommends periodic maintenance service for this CinemaVision System every six months after the one year original warranty period.

<u>Restrictions on Using Non-Resonance Technology, Inc. Components with the CinemaVision system</u>

The original manufacturer's warranty will be voided if any non-Resonance Technology, Inc. Power Supply is used to provide power the CinemaVision Transducer. The original manufacturer's warranty will be voided if other non-Resonance Technology, Inc. approved components are connected to the CinemaVision system. In addition, Resonance Technology, Inc. cannot be held responsible or liable for any unauthorized use of this equipment. If you have any questions about how to operate this system, please read this user manual or call Resonance Technology, Inc. customer service at (818) 882-1997 or email <u>support@mrivideo.com</u>.

2.4.　　MRI Environment Hazards

Installation of materials inside the MRI suite must be done with extreme caution and only by authorized personnel. Care must be taken to keep ferromagnetic materials such as tools, filter plates, screws, etc. at least three meters (approximately 10 feet) away from the energized magnet. Absolutely no work should be done near the filter panel when a scan is in progress.

All cabling inside the MRI environment should either be connected or terminated properly. Failure to do so may result in skin burns related to RF energy. All cables should be run straight and never looped, as this may also cause serious skin burns inside the MRI room.

In addition, no persons with ferromagnetic prosthetic devices such as pacemakers or joint replacements should enter the MRI suite at any time. Extremely high magnetic forces have the potential to dislodge ferrous items at high velocities that can result in serious injury or death.

Only system components explicitly designated for use in the MRI suite should be placed inside the MRI suite. Components not designated for use inside the MRI suite may present a projectile hazard and can become airborne, causing property damage, serious bodily injury, or death. Please refer to the installation block diagram to determine which components belong inside the MRI suite.

Resonance Technology, Inc. will not be held liable for any injuries or property damage which may occur as the result of improper use or installation of this product. By agreeing to this notice, users certify that they are familiar with basic safety procedures in an MRI room environment and that they have read and understand these safety precautions.

For questions regarding installation procedures or this manual, Resonance Technology, Inc. technical support staff may be reached Monday through Friday 8 a.m. to 5 p.m., Pacific Standard Time at (818) 882-1997, or by email at <u>support@mrivideo.com</u>.

2.5.   General Warnings for Electronic Products

Electric shock

Failure to observe all operating and maintenance instructions may cause damage to this product and may result in property damage and/or injury or death from electric shock, fire, or other cause.

To avoid the risk of electric shock or fire hazard, a multi-outlet power strip or extension cord should not be connected to the video monitor socket outlet on the CinemaVision controller. This socket outlet should only be used to power the CinemaVision video monitor provided with the system.

Do not disassemble this product.

Only Resonance Technology, Inc. trained and authorized personnel should perform all required service for this product. Failure to comply with this warning may result in property damage, injury and/or death from electric shock, fire, or other cause.

Avoid exposing this product to extreme environments.

This product may be damaged by high temperatures, direct sunlight exposure, by dropping this product, or by other mechanical shock. Do not expose this product to rain or excessive moisture. Avoid these conditions as the video goggle lenses may become damaged and may result in eye fatigue to the patient.

Unplug this product when not in use for long periods of time.

Always unplug this product when not in use for extended periods of time or during MRI maintenance. Leave connected if used daily. In addition, to prolong the life of the video goggle, use the Technologist Remote to turn off the power to the video goggle at night or when not in use. Note that if the system is not used for 2 hours, it will hibernate and you may have to press the Tech Remote TALK button to wake up the system.

2.6.   Labeling Used to Indicate Device Safety

Type BF Applied Part

Devices that have conductive contact with the patient or have applied parts that are fixed in medium or long term contact with the patient.

MR-Safe Device

Device considered **safe** for use anywhere inside the magnet room.

MR Conditionally-Safe Device

Device considered **safe** in the MR room **under certain conditions**.

MR Unsafe Device

Device considered **unsafe** for use in the MR room. These items should not be taken inside the MR room due to being a projectile hazard in the magnetic field.

2.7.   Medical Device Safety Approvals

The CinemaVision System has the following safety certifications:

3. Installation Materials

Your CinemaVision system comes complete with all the necessary components to complete the system installation at your facility. The following checklist is provided for materials verification purposes:

Part Number	Quantity	Photo	Description	MR Safe	Installation Location
RTC-551-010-000-002	1		CinemaVision Controller Unit	(MR - not safe)	Control Room
RTC-650-040-000-000	2		Small Speakers	(MR - not safe)	Control Room
RTC-551-070-124-000	1		Video Goggle with Rubber Mask and Strap	MR	Magnet Room
RTC-650-067-000-000	1		Slim Softshell Headset with Microphone	MR	Magnet Room
RTC-550-050-000-000	1		CinemaVision Transducer	MR	Magnet Room
RTC-650-050-005-000	1		CinemaVision Transducer Power Supply	(MR - not safe)	Equipment Room
RTC-650-030-000-000	1		15" LCD Monitor with power supply	(MR - not safe)	Control Room
RTC-650-020-000-000	1		Technologist Remote Control	(MR - not safe)	Control Room
RTC-CV	1		Installation / Operation Manual (This manual)	MR	Control Room
RTC-650-070-060-000	1		Set of Corrective Lenses, optional (Offered Upon Request)	MR	Stored/ Control Room
RTC-650-050-182-000	1		Transducer Mounting Plate (specific to your magnet type)	MR	Magnet Room
RTC-ALS-HEC	50		Headset Earpiece Covers	MR	Stored/ Control Room
RTC-ALS-TWR	50		Tie Wraps	MR	Control Room
RTC-ALS-TWH	20		Tie Wrap Holders	MR	Control Room
RTC-651-000-453-000	1		Custom Headrest (for 8-channel coil) to fit audio headset	MR	Magnet Room
RTC-650-300-605-000	1		9-pin D-Sub Filter	MR	Penetration panel
RTC-ALS-HDH	2		Headset Hooks	MR	Magnet Room
RTC-550-010-477-000	1		Control Room Camera	(MR - not safe)	Control Room
RTC-650-020-606-000	4		Batteries (AAA)	(MR - not safe)	Control Room
RTC-650-010-235-002	1		Remote Control for DVD Player	(MR - not safe)	Control Room
RTC-101-108-001-000	1		8-Channel MR Laser Link Cable	MR	Installed From control room to magnet room
RTC-101-245-001-001	1		Transducer DC Power cable – 15 meters (~50')	MR	Magnet Room
RTC-101-210-001-001	1		Transducer DC Power cable – 3 meters (~10')	MR	Equipment Room
RTC-101-306-003-000	2		Hospital Grade AC Power Cord	(MR - not safe)	Equipment Room/ Control Room
RTC-101-303-003-000	1		Power Cord Male/Female (for monitor)	(MR - not safe)	Control Room

4. Room Layout Overview for Installation

WARNING: Absolutely no ferromagnetic tools should be brought inside the MRI Suite!

While no tools, other than tie wraps, are required to install the system in the MRI suite, absolutely all ferromagnetic tools remain outside of, and away from the door leading to, the MRI suite.

Below is a typical MRI setup. Your individual installation may vary somewhat, but it will generally be spaced into three areas: Control Room, Computer/Equipment Room and MRI Suite or Magnet Room.
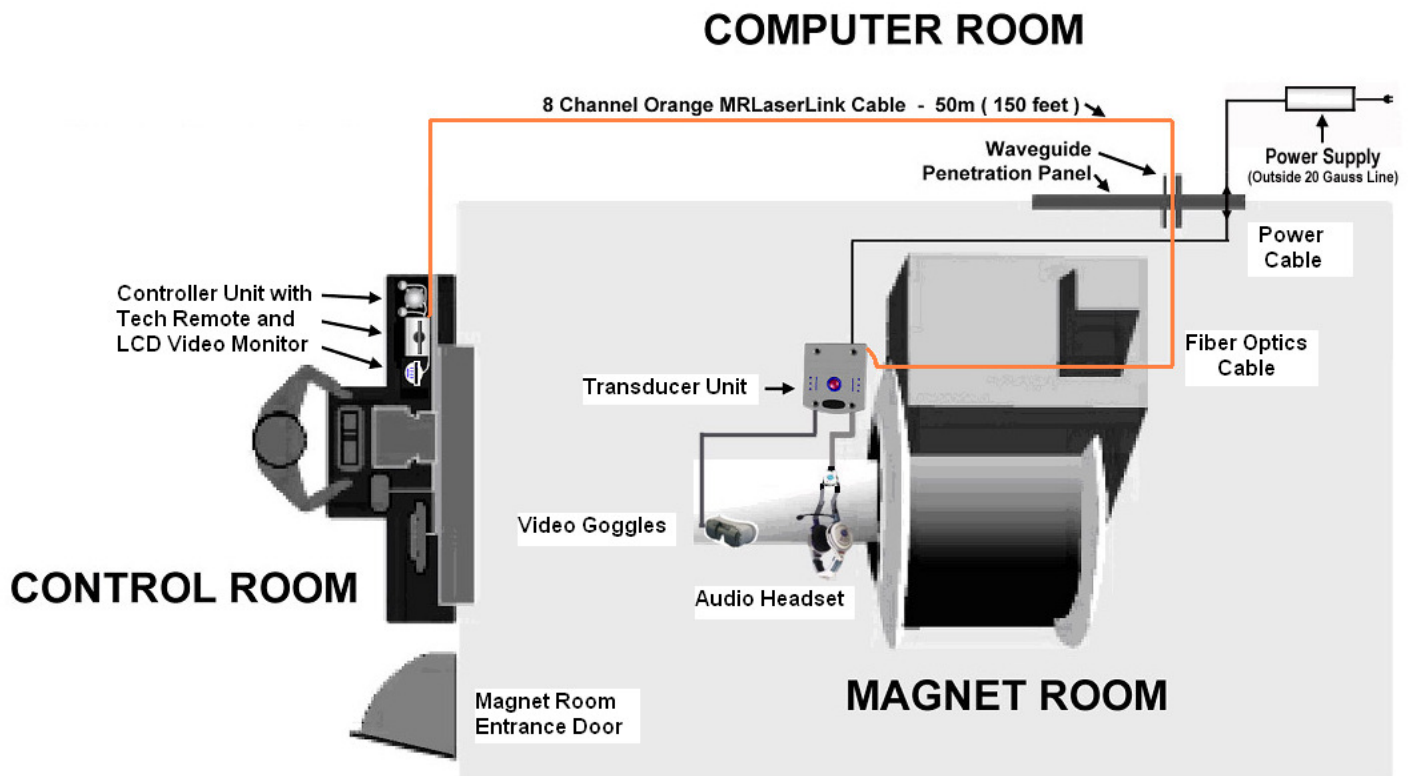
The Control room setup consists of placement and connection of the CinemaVision Controller, Technologist Remote Control, and LCD video monitor. Additional auxiliary audio/video sources such as an iPod®, iPhone®, MP3 player, satellite receiver, or external DVD player may be connected.*

The Magnet room setup includes a single Laser Link cable bundle that will be connected from the CinemaVision Controller unit through the filter panel wave-guide to the CinemaVision Transducer in the Magnet Room. With the exception of the audio headset and visor goggles, all the Magnet Room components of the CinemaVision must be installed to the side of the magnet shroud also the transducer power cable should never in parallel with magnetic coil. Additionally, these components should be placed in an area not heavily trafficked to keep them from being damaged.

* "iPod" and "iPhone" are registered trademarks of Apple Inc.

Magnet Room

Control Room

LCD Video Monitor

Audio Headset

Control Room Camera

Video Goggles

Tech Remote

Patient Monitoring Camera (Optional)

A/V Console

8-channel Fiber Optic Cable (50m / 150')

Penetration Panel

Equipment Room

RTC

Fiber Optics Wave Guide

Transducer

Transducer Power Supply

Transducer Power Cable (15m / 50')

Transducer Power Cable (3m / 10')

Must be placed outside the magnet's 20-Gauss line

9pin D-sub connection at the Filter panel plate

5. Installation Procedure

The installation procedure consists of four major phases:
- Installing the MR Laser Link Cable and Transducer Power Supply Cables
- Magnet Room Component Interconnection
- Equipment Room Component Interconnection
- Control Room Component Interconnection

Before you begin the installation, determine the location where the transducer will be installed. It should be a secure area next to the magnet and away from traffic. Please refer to the photo below for typical placement:
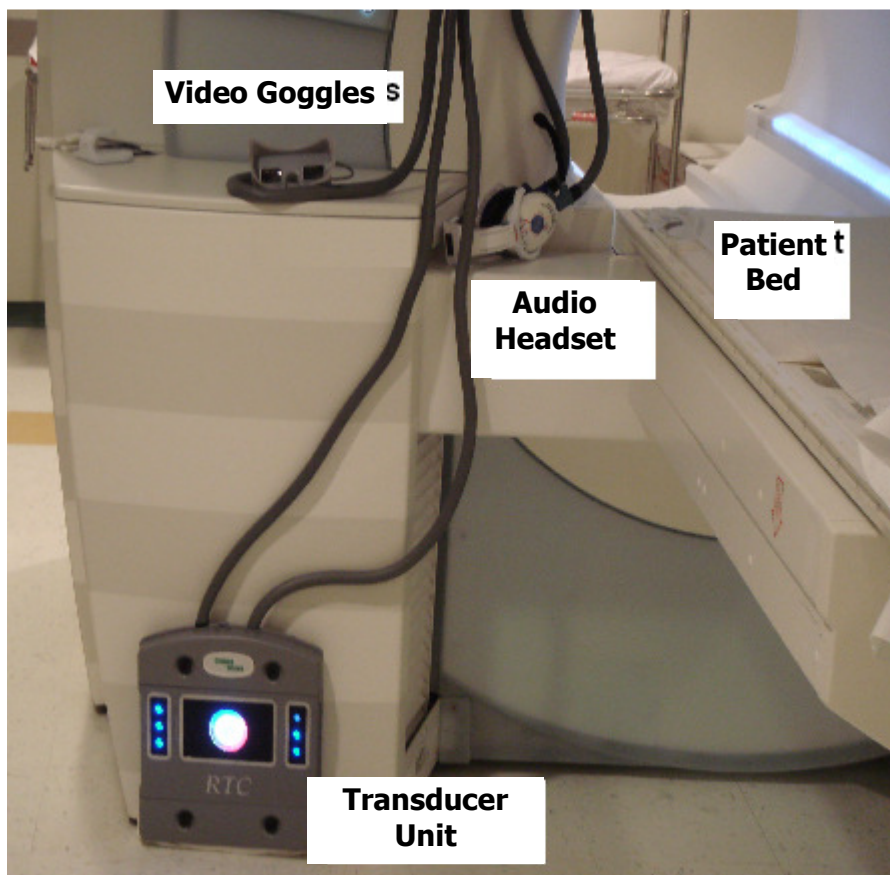
5.1. Installing the MR Laser Link Cable and Transducer Power Supply Cables

The preferred method of routing the fiber optic cable is to run the cable from the control room through the overhead ceiling drop tiles and down into the computer room in front of the filter panel through the Fiber Optics Waveguide. Excess fiber cable can be stored above ceiling tiles. It can then be run alongside the other MRI cables going to the magnet. The cable should end where you intend to locate the transducer.

Note: Care must be taken to ensure the cable is not bent in radius of less than 15cm (90 degrees or right angle) or damage to the optical fibers will occur.

MR Laser Link Cable
r ≥ 90° or right angle
r

MR Laser Link Cable
r ≤ 90° or right angle
r
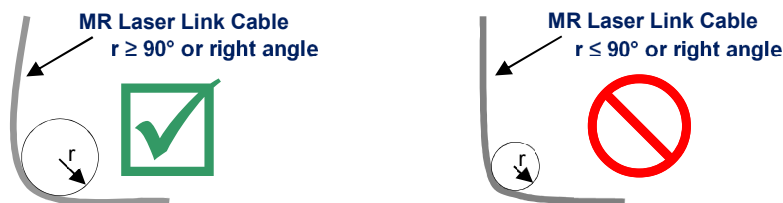
The routing of the transducer power cables will vary somewhat depending on the facility layout and the magnet type. For most facilities and magnets, the typical procedure would be as follows:

5.1.1. Determine the length of cable needed from the location of the transducer to the penetration panel. If the run needed is longer than 3 meters (10 feet), then use the 15-meter (45-foot) transducer power cable in the magnet room. The 3-meter cable will then be used in the computer/equipment room.

5.1.2. If there is a blank filter plate on the penetration panel, and a matching panel with DB-9 cut-out has been provided, install the DB-9 low-pass filter such that the transducer power cables will mate with the filter on both sides. If the filter was pre-installed, you will need to inspect the orientation to ensure the cables will mate. In some cases it may be necessary to remove the filter and re-install it in the opposite direction. Remove the blank filter plate and install the new one containing the DB-9 filter.

If there is not a blank filter plate available, look for an available DB-9 filter that may be installed elsewhere on the penetration panel. If one is available, verify the polarity to ensure the transducer cables will mate. Again, it may be necessary to reverse the direction of the filter.

If no free filters are available, then a new DB-9 cut-out will need to be punched into the penetration panel or plate. Please check with the facility for permission and preference to the filter's location.

5.1.3. Route the transducer power cable that will be used in the magnet room, following a similar path to the fiber optic cable. **Avoid running the power cable close and/or in parallel with the high-energy RF cables for the magnet**, as the RF energy may interfere with reliable operation of the system. Connect the DB-9 connector of the cable to the DB-9 filter.

5.1.4. In the computer/equipment room, choose a site for the transducer power supply that will be convenient to the operator. Route the remaining transducer power cable from the power supply location to the penetration panel. Connect the DB-9 cable to the same DB-9 filter that the other transducer power cable is connected to.

5.2.   Filter Panel Connection

General Electric (GE) Filter Panel Plate: Plug the Female 9 Pin "D" end of the cable that has been run through with the fiber optics from the Control room to the Equipment room. Connect the cable's Female end to the DB9 Filter (mount the DB9 Filter on any available location i.e. J-51) plug found on the GE Filter Panel. Please be sure to use shorter hex stand off on the panel mounted side in order to have a flush connection. RTC can supply the shorter hex nuts in order to have the connection on the filter to be flush.
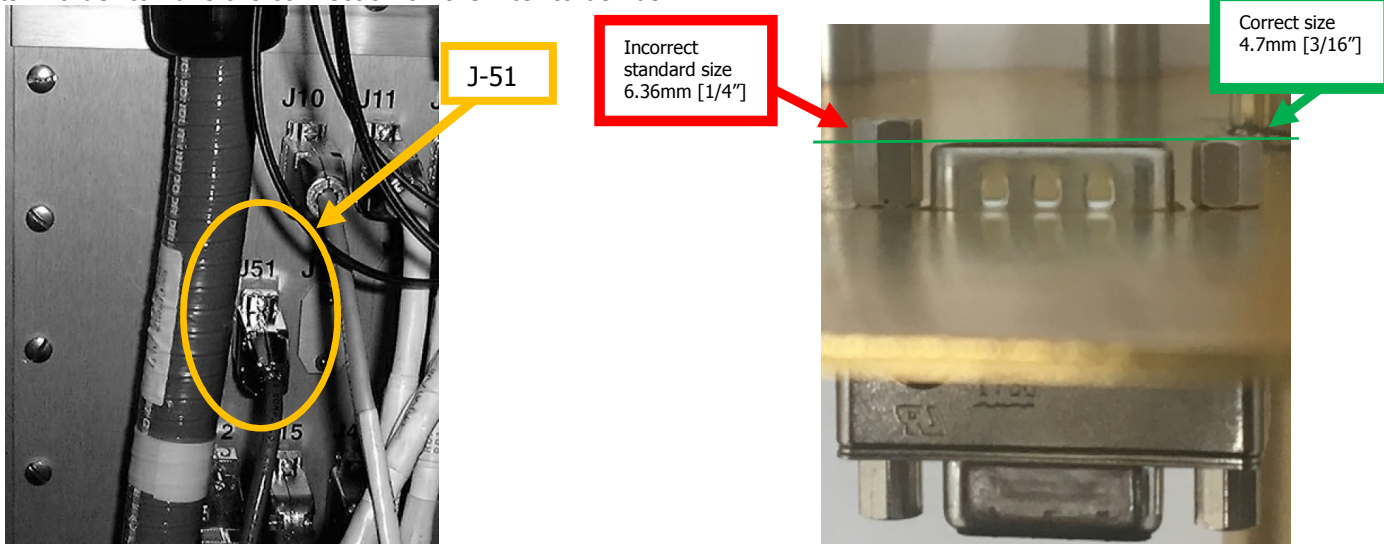
Siemens Filter Panel Plate: For Siemens Magnets, Customer must provide access to an open DB9 slot or location to mount a DB9 filter in order to connect power to the RTC products inside the Magnet Room.
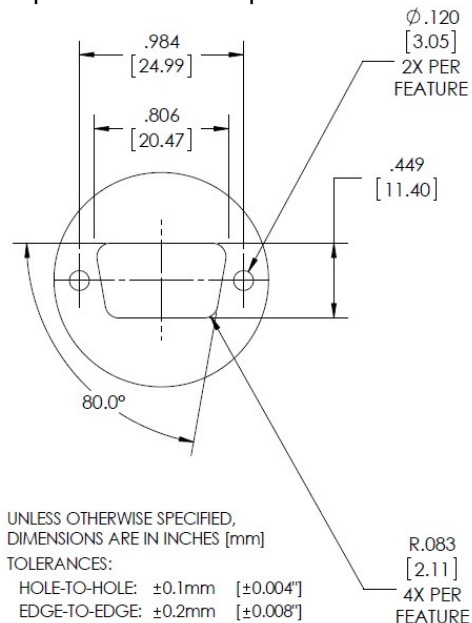
DB9 Filter specifications:

Electrical Specifications: High Performance Connectors

Filter Circuits	Capacitance		3 dB Cut-off Frequency Max. (MHz)	Dielectric Withstanding Voltage	Working Voltage DC -55°C to +125°C	Minimum Insertion Loss - Decibels (dB)							
	Value	Tol.				5 MHz	10 MHz	20 MHz	50 MHz	100 MHz	200 MHz	500 MHz	1 GHz
Pi	4000 pF	+100 -0%	0.8	150V	50V	8	13	20	37	50	64	70	70

Phillips Filter Panel Plate: It is advised to drop the female end of the 2ft 9pin D cable through the filter panel into the MRI room side and to attach it to the male end of the filter before putting back the removed plate.

Exposed Filter Panel
Bay (Bottommost)

Underside of Panel

Bottom View

Remove any blank
plate, punch a 9
pin "D" hole and
install filter as
shown below.

Up

Down

Male (Computer Room)

Female (Magnet Room)

Remove screws from underside of cover
and carefully remove cover, exposing
filter bays.
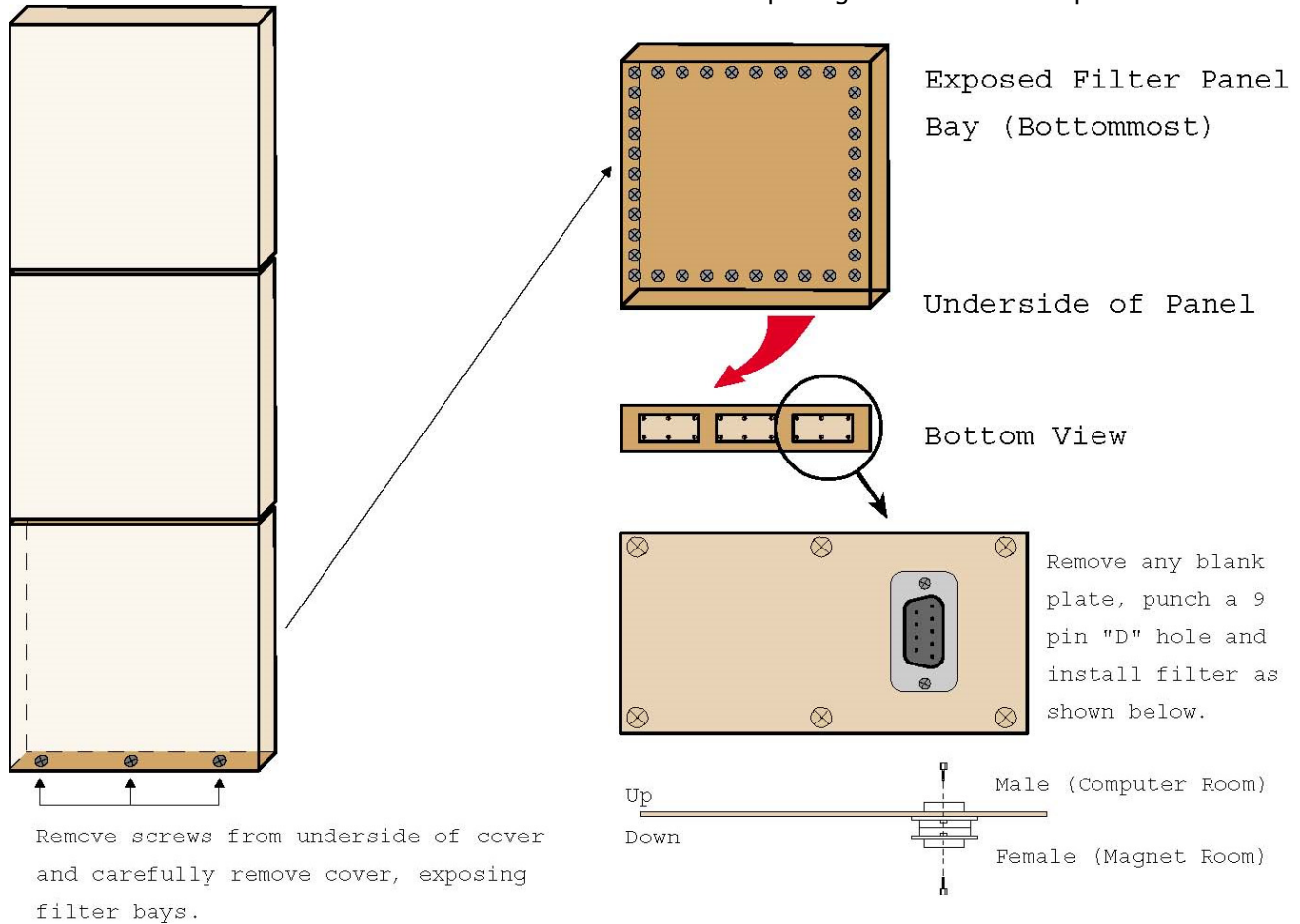
5.3.   Magnet Room Component Interconnection

5.3.1.   Remove both upper and lower cable covers from the transducer.

5.3.2.   Unravel all the fiber optic cables from the plastic coil. Select the red (#1), green (#2), blue (#3), black (#4), and brown (#5) connectors. Put the unused fibers back into the plastic coil. Remove the plastic dust caps from the five selected fiber optic connectors. Keep the dust caps for future use whenever cables might be removed for service.

5.3.3.   Remove the dust caps on all the fiber optic connectors on the transducer. Matching the fiber optic connector colors with the labels on the transducer, align the ridge on the cable connector with the notch of the transducer's connector. Insert the fiber optic cable connector until fully seated, then gently turn the ring clockwise until it stops (approximately one quarter turn). Perform the same procedure on the remaining fiber optic cables.
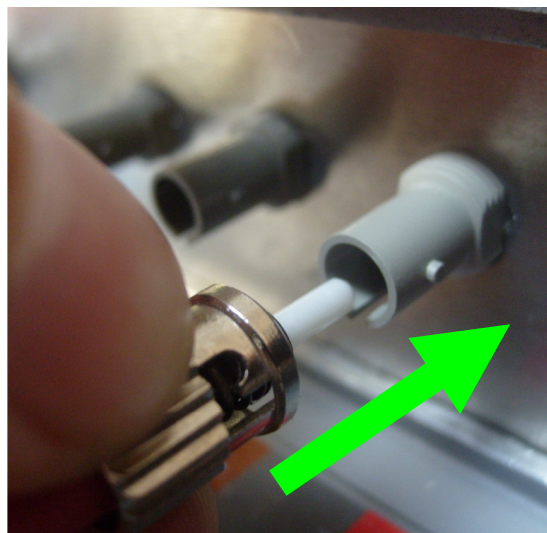
5.3.4.   Secure the fiber optic bundle strain relief to the transducer housing. Make sure all of the individual fiber optic cables have a smooth bend radius. The fiber optics can be damaged if bent too tightly. Fold the protective tape over the fiber optic cables.

Put the spare unused fiber cables back in the plastic coil.

Rubber grommet used to secure the fiber optics bundle

Protective film

5.3.5.   Connect the Power Supply cable to the Transducer. Route the cable to one of the round notches near where the fiber optic bundle exits the housing.

5.3.6.   Carefully pull up the preinstalled protective cable cover film over these connections, making sure not to pinch any of the cables under the screw posts.
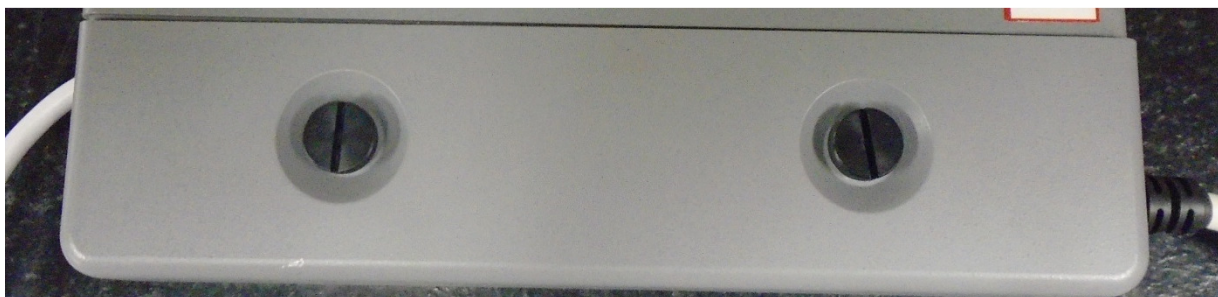
5.3.7.   If the patient monitoring camera option is included, please perform the following steps. If not, skip to Step 5.2.8.

The MRI/CAM 2020 patient monitoring camera option of the CinemaVision system allows doctors and technologists to monitor patients undergoing MRI scans. This color camera is MRI-safe and installed inside the magnet room typically on the wall behind the magnet.
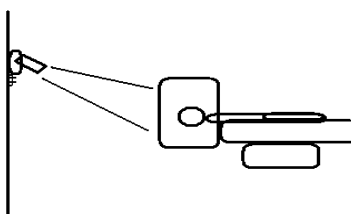
5.3.7.1. Use the included non-magnetic screws to attach the patient camera to the back wall behind the magnet.

WARNING: Never use any metal screws that might be attracted by the magnet as they may become projectiles and cause serious injury or death to anyone inside the magnet room. Remember that the magnetic field is always present.

5.3.7.2. Connect the Twin-Ax camera power/signal cable to the camera, and route the cable to the penetration panel. From the Penetration Panel, Connect the signal to a Transceiver box to run the camera signal to the Control room to the System Monitor.
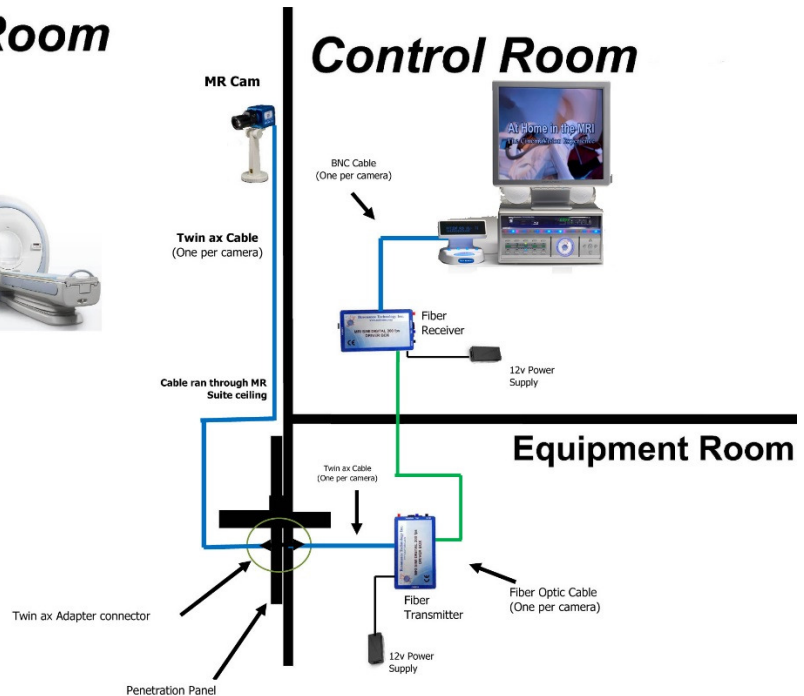
WARNING: Avoid creating loops in the cable as it may cause MRI image noise. Also, make sure to route the cable away from walkways inside the magnet room.

5.3.8. After making sure the Transducer is powered off. Connect audio headset and video goggle to transducer. Each latching connector should "click" on both sides when fully seated. If the headset connection is equipped with a DB-9 connector, make sure the screws on the sides of the connector are secure.

5.3.9. Carefully install the cable cover, making sure to align all cables with their respective exit notches in the housing, and making sure no cables are pinched while installing the cover.

5.4.   Equipment Room Component Interconnection

5.4.1. Place the Transducer power supply into the location chosen in Step 5.1.4. **This location must be outside of the 20-Gauss line.**

5.4.2. Connect the round transducer power cable connector to the power supply. Make sure the ring on the connector is secure.

5.4.3. Make sure the power supply's switch is set to the "OFF" position. Connect a hospital-grade AC power cable to the AC inlet connector, and to an available AC outlet in the computer/equipment room.
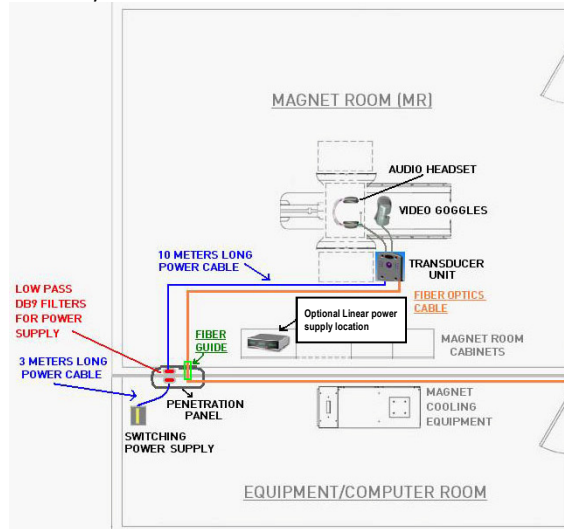
5.5. Control Room Component Interconnection

The photo below depicts a typical control room setup.

The photo below shows an overview of the CinemaVision A/V Console rear panel.
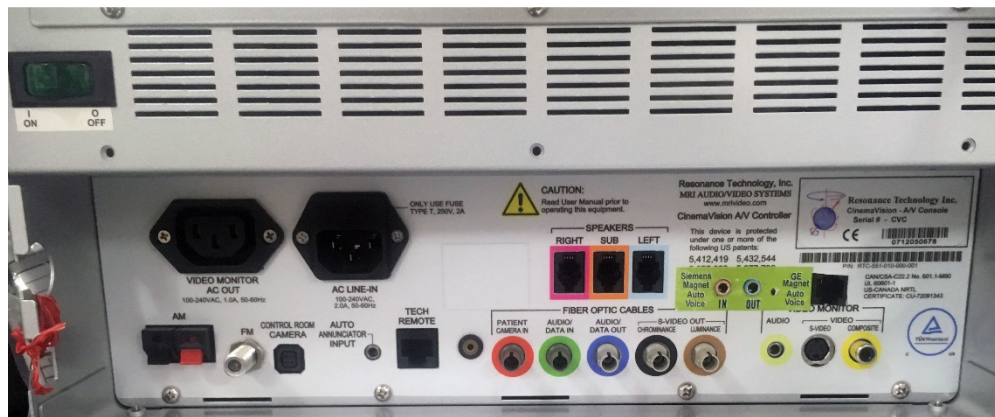
5.5.1. Unravel all the fiber optic cables from the plastic coil. Select the red (#1), green (#2), blue (#3), black (#4), and brown (#5) connectors. Put the unused fibers back into the plastic coil. Remove the plastic dust caps from the five selected fiber optic connectors. Keep the dust caps for future use whenever cables might be removed for service.

5.5.2. Remove the dust caps on all the fiber optic connectors on the controller. Matching the fiber optic connector colors with the colored rings on the controller, align the ridge on the cable connector with the notch of the controller's connector. Insert the fiber optic cable connector until fully seated, then gently turn the ring clockwise until it stops (approximately one quarter turn). Perform the same procedure on the remaining fiber optic cables.

To connect or disconnect the fiber optic cables, press in connector before turning

5.5.3. Connect the S-video and composite video (RCA) cables from the VIDEO MONITOR section to the LCD monitor.

5.5.4. Connect the monitor power supply to the LCD monitor and to the VIDEO MONITOR AC OUT connector.

5.5.5. Connect the Tech Remote Control to the TECH REMOTE connector.

5.5.6. Connect the Control Room Camera to the CONTROL ROOM CAMERA connector. Please note the connector only fits one way. The rib on the connector points to the left.

5.5.7. Connect the Audio Speaker cables.

5.5.8. **Make sure the Controller power switch is in the off position**. Connect the Hospital Grade Power Cord to the Controller and an available active AC power outlet.

5.5.9. Insert the strain relief of the fiber optic cable into the square notch in the side panel, using the side which is the most convenient for the layout of the desk area. Place the other cables into the round notches, using the side which is the most convenient. The photo below shows a typical arrangement.
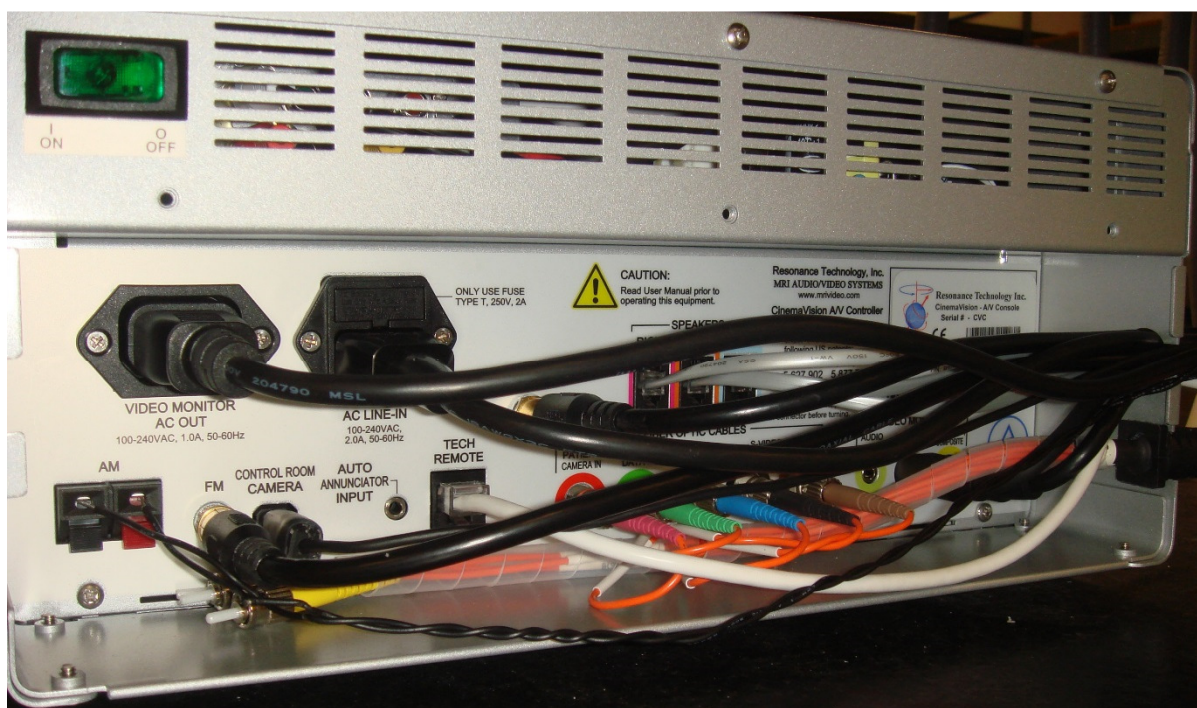
5.5.10. Power on the LCD Monitor and then power on the Controller.

5.5.11. Power on the Transducer Power Supply, usually located in the computer room. (Exact location will vary depending on installation and magnet type.) The logo rings on the CinemaVision Controller and Transducer should start rotating within 30 seconds of both units being powered up.

5.5.12. Use the included plastic tie wraps to secure all cables connected to the back of the CinemaVision Controller to prevent accidental disconnection.

5.5.13. Install the rear cable cover once all functions are verified to be working.

5.6. GE Auto Voice Installation

5.6.1. The GE Auto Voice has an interface box in order to interface the A/V Controller to the MRI signal. Remove the cable from GE OSG J7 and connect to the Interface box "J7-In". And connect a cable from "J7-Out" back to the GE OSG J7 location. The CV Controller receives the signal from interface box via interlink cable which connects to the controller back panel.

Interface Box Top View

Remove Cable from GE OSG J7 and Connect to Interface Box

Connect from Interface Box to GE OSG J7

Connect Interface Box to back of Controller via Interlink cable

Interface Box Outputs

Connect Interface Box to back of Controller via Interlink cable

Output connection from Interface Box to GE OSG J7
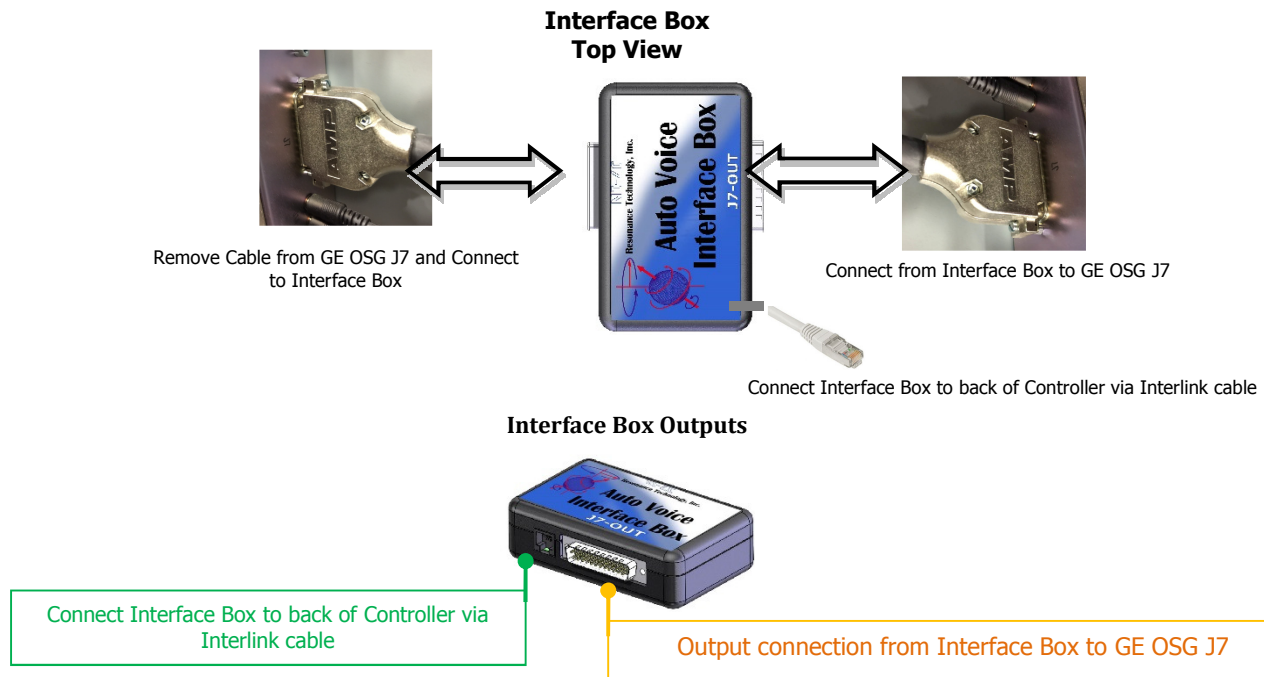
5.7. Siemens Auto Voice Connection

5.7.1. Remove the (LINE OUT) mini stereo audio cable from the back of the Siemens computer and plug it into the back of the AV console marked input using a mini stereo extension cable. From the back of the controller, plug a mini stereo cable (male-male) to output signal to plug back onto the Siemens computer marked audio out.

5.8.   Canon Auto Voice Connection

5.8.1. Remote the LINE OUT mini stereo audio cable from the back of the computer and plug it into the mini stereo extension cable in order to plug it into the back of the AV Console (green label marked "IN")

5.8.2. From the Back of the AV Controller, plug a mini stereo cable (male-male) to the Green label "OUT" signal to plug back into the computer marked audio out.

5.8.3. Be sure to test Auto Voice from Canon MRI System to make sure audio command signal is redirected to the RTC headset.

"LINE OUT" Mini Stereo From Computer

Mini Stereo Extention Cable

Step 1: Remove "LINE OUT" cable from MR Computer to connect to Extention cable

Step 2: Connect Extention cable to back of AV Console "IN" Location

MRI Computer

AV Console Back Panel

Step 3: Connect Mini Stereo M-M Cable from AV Console "OUT' plug back to the MR Computer.

Mini Stereo M-M Cable

6. Operation

Below is a description of the CinemaVision control room components. The Controller converts the selected audio and video source signals into optical signals that the MR Laser Link cables route to the Transducer unit inside the magnet room. The Transducer unit recreates the signals and routes the audio and video signals to the audio headset and video goggles.

LCD Video Monitor to view the selected video source.

Tech Remote unit allows control of all system features

CinemaVision Controller unit

6.1.   CinemaVision System Features

- Fiber optic link cable for audio, video, and data/voice communication between CinemaVision Controller in the control room and Transducer in the magnet room
- Technologist Remote Control with a highly visible display to select all system features
- 15-inch LCD monitor and speaker system with subwoofer to view and hear the selected control room audio and video sources
- Built-in DVD player with the ability to play DVD video, standard CD audio, MP3 audio, MPEG video, photo CD, etc.
- Auxiliary input jacks allow a variety of external audio/video sources, such as iPod®, iPhone®, satellite receiver, internet radio, etc.*
- Independent audio/video source selection for the control room and magnet room
- Control room camera so patient can see the clinician/technologist or parent(s) (for pediatric scans) during the MRI scan session
- Patient stereo headset with communication microphone and patient-controlled alert button
- LCD video goggles for patient to view video images. Image presented to patient is the equivalent to viewing a 62-inch screen at a distance of 5 feet, giving the impression of being in a private movie theater.
- (Optional) Patient monitoring with the use of an MRI-safe video camera located inside the magnet room in an area where the technologist may not have a clear line of sight through the control room window.

* "iPod" and "iPhone" are registered trademarks of Apple Inc.

6.2.   Front Panel Controls

Eject DVD drive

Play/Pause movie

Power ON/OFF

- Built-in Blu-Ray DVD Player -
Blu-Ray DVD Player; Button functions are Tray Eject, Play/Pause, and Power. It is highly recommended to use the DVD player remote when trying to navigate the DVD settings or menu options. Blu-Ray Player needs to be turned on separately from the AV Console.

- Camera (Optional) -
Operator - Allows operator to see patient on monitor.
Patient - Allows patient to see operator in Visor.

- Operator Selectors –
Enables operator to independently select audio/video source for what is seen in control room

- Patient Selectors -
Enables operator to independently select audio/video source for what is seen in the patient visor

- Audio Meters –
Show relative volume level for the patient headset.

- Logo Ring -
Indicates the unit is operating properly when outer ring lights flash in a rotating pattern.

- Front Panel Arrow keys -
See table below for functions

Front Panel Arrow Key Functions:

Selection	Up (↑) Key	Down (↓) Key	Left (←) Key	Right (→) Key	Center (O) Key
Camera	[No function]	[No function]	[No function]	[No function]	[No function]
DVD	[No function]	[No function]	[No function]	[No function]	[No function]
AUX	[No function]	[No function]	[No function]	[No function]	Toggle between S-Video & Composite Video Inputs

AUXILIARY VIDEO INPUTS OPERATION: Allows connections of an external audio or video device via S-Video or Composite connections (on the side of the controller). In order to use the Auxiliary Video Inputs in the CinemaVision system proceed as follows:

Step 1: Be sure that the AUX Selection on the front panel is highlighted in order to get the AUX setting in the Tech Remote System Menu.

Step 2: Plug in the AUX Components on the side of the CinemaVision Controller.

Proper S-Video Connections	Proper Composite Video Connections
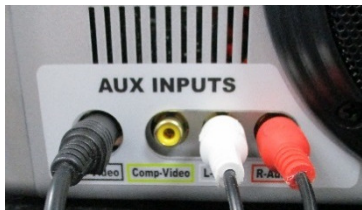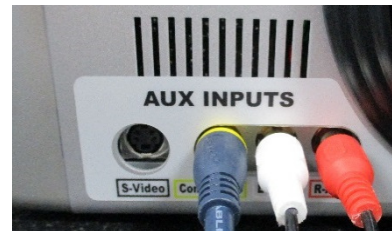
Step 3: Softly Press the Tech Remote wheel on the far side right in order to access the System Menu and scroll down to "Menu: AUX Input" and softly press the wheel in order to change selection. System default settings is "Automatic" in order to automatically detect either S-Video or Composite, but might not work properly if both (S-Video and Composite) are plugged in at the same time.

Step 4: Select either S-Video, Composite or automatic; then softly press the Menu wheel to confirm selection. The option is usually blinking before selection is made. The Remote display should look like the photos below when selecting the input.
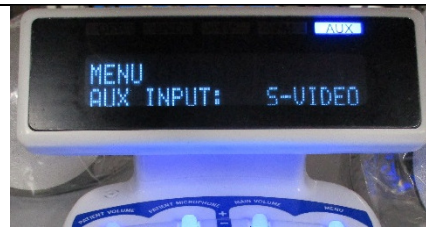
Automatic	S-Video	Composite

Note: When CinemaVision Controller is powered off/on and/or remote reset is completed the AUX input might return to the System default setting of "Automatic".

6.3.   Technologist Remote Control

Wheel #1 - Controls the patient headset audio level.

> Scrolling the wheel up increases the headset volume.
> Scrolling the wheel down decreases the headset volume.
> Scrolling the wheel down while pressing down on the Menu wheel (#4) mutes the headset.
> Scrolling the wheel up while pressing down on the Menu wheel (#4) un-mutes the headset. (Previous volume setting is resumed.)

Wheel #2 - Controls the Patient Microphone audio level.

> Scrolling the wheel up increases the patient microphone volume.
> Scrolling the wheel down decreases the patient microphone volume.
> Scrolling the wheel down while pressing down on the Menu wheel (#4) mutes the microphone.
> Scrolling the wheel up while pressing down on the Menu wheel (#4) un-mutes the microphone. (Previous volume setting is resumed.)

Wheel #3 - Controls the system audio level.

> Scrolling the wheel up increases the control room volume.
> Scrolling the wheel down decreases the control room volume.
> Scrolling the wheel down while pressing down on the Menu wheel (#4) mutes the control room speakers.
> Scrolling the wheel up while pressing down on the Menu wheel (#4) un-mutes the control room speakers.
> (Previous volume setting is resumed.)

Wheel #4 - Controls the system settings:

> Clicking the wheel enters the system menu.
> Scrolling the wheel up or down rotates through the system functions.
> To select a desired menu function, press down on the wheel.
> To select sub-menu functions scroll the wheel up/down and press down again.

Technologist Remote Control with built-in microphone volume adjustment – Push and hold the talk button then scroll up or down the adjustment wheel #1. This adjustment is to change the tech remote built-in microphone volume that the patient will hear during the two-way channel communication.

The Tech Remote Control system functions are as follows:

Menu Functions	Option	Description of Function
Communication Mode	Auto Manual*	Selects the Type of Connection between Controller and Patient.
Patient Microphone Time	Set time	The set time the patient microphone will stay on after the release of the talk button can be set to 3-30 Seconds or Always on.
Full Duplex	Off On*	Enables patient microphone in the Control Room even when Talk button is pressed, so both patient and technologist can speak and hear each other at the same time. Turn this off if there is a problem with feedback.
Auto Voice Volume	Set level #	Used to control the level on volume of the Auto Voice to be present in the Audio headset when the commands are given.
Patient A/V	DVD* AUX Camera TV Radio	Selects the Audio/Video for the Patient. Please note: TV and Radio functions are disabled/no-longer working.
Control Room AV	DVD* Aux Camera TV Radio	Selects the Audio/Video for the Control Room. Please note: TV and Radio functions are disabled/no-longer working.
DVD Control (if DVD is the selected source for Patient or Control Room)	Play Exit Previous Next Pause Stop	Controls the Functions of the DVD player. Please note: Functions disabled with Blu-Ray Player installed.
AUX Input (AUX must be selected in order to pop up in the menu selection)	AUTOMATIC S-Video Composite	Controls which of the connections is used on the AUX inputs on the side of the controller.
Patient Volume Balance	Bar Graph	Used to balance the Audio on the Patient Headset.
Tech Camera	Manual Auto*	If set to "Auto", control room camera is automatically connected to patient video when Talk button is pressed. Patient video changes back to previous source when Talk button is released
System Power	On* Off	Controls the Power Supplied to CinemaVision Controller and Transducer.
Visor Power	On* Off	Controls the Power Supplied to the patient video visor.
Clock Set	00:00 AM/FM MM/DD/YYYY	Operator can manually change the date or time through this sub menu option
Clock format	12hr* 24hr	Selects on how the time will be displayed.
Date Format	MM/DD/YYYY* DD/MM/YYYY YYYY/MM/DD	
System Information	A/V Console Transducer Tech Remote	Displays hardware version, firmware version, and serial number of selected device.
Exit Menu	Exit Menu	Exits menu.

*Default Settings

Please Note: To reset the system to the original Factory Default Settings, perform the following:
1. Adjustment Wheel #1 - Set Patient Audio to **1**
2. Adjustment Wheel #2 - Set Patient Microphone to **2**
3. Adjustment Wheel #3 - Set System Audio to **3**
4. Press and hold the **Talk** button for **15 seconds**. Wait for the display to count down to zero.
5. Release the **TALK** button and wait for the system to re-synchronize. Both the CinemaVision Controller and Transducer front panel logo lights should have color lights rotating once synchronized.

6.4.   Auto Voice Volume adjustment

Auto voice volume adjustment can be made in the scroll down menu. By pressing the menu button and scrolling down to the menu option "AUTOVOICE VOL". Then press the menu button to enter into the adjustment option and use the menu scroll wheel to adjust the level on the volume for the auto voice and press menu button to set volume level.

Menu Display of the Autovoice Volume   Adjustment volume level window

6.5.   Optional Patient Monitor Camera Setup

Patient Camera Controls:

The patient camera model MRI/2020 comes with automatic Iris control and manually adjusted Focus and Zoom controls.

Adjusting the Focus lens control:

When adjusting the focus for the camera lens, rotate the control to get the best picture clarity.

Adjusting the Zoom lens control:

The Zoom control is used to magnify the specific target the lens is focused on. You may have to re-adjust the focus when changing this setting.

6.6. Patient Setup

6.6.1. Overview

Make sure all cables have been connected securely to the Transducer in the Magnet Room and that the system components do not impede any walkways. Ensure that the Transducer is not placed directly in front of the bore of the magnet. Before placing the Video Goggles and Headphones on the patient, make sure that the microphone audio levels on the Control Room Tech Remote Control have been set to a comfortable level. (See System Operation section on page 18 for level adjustments) Place the Video Goggles and Headphones over the patient's ears and eyes and adjust the headband **(NOTE: the pivot should not be rotated more than 15°)** and visor bands if necessary. Position the headset microphone about 1 inch (2.5 cm.) away from the patient's mouth. Your patient is now ready for your scan procedure.

> Warning: Although all of the audio and video signals present in the CinemaVision system have absolutely no high-voltages that might harm the patient, Resonance Technology, Inc. recommends to never touch the patient when handling any powered component of the CinemaVision system including the Transducer.

6.6.2. Audio Setup

Make sure the system level output on the Tech Remote Control is set to approximately mid- level. (See System Operation section on page 18 for level adjustments)
The patient headset output level can also be adjusted from the Tech Remote Control. For safety, always notify the patient when making volume level adjustments to the patient audio headset.

6.6.3. Video Setup

Select the desired audio / video source (Camera, DVD, AUX, etc.) for both the patient and operator using the selector switches on the front panel of the CinemaVision Controller.

> Caution: Please do not make any changes to the DVD player "setup menu." Any changes to these default settings will result in loss of video and/or audio. Please Call Technical Support if you experience any problems with your CinemaVision System.
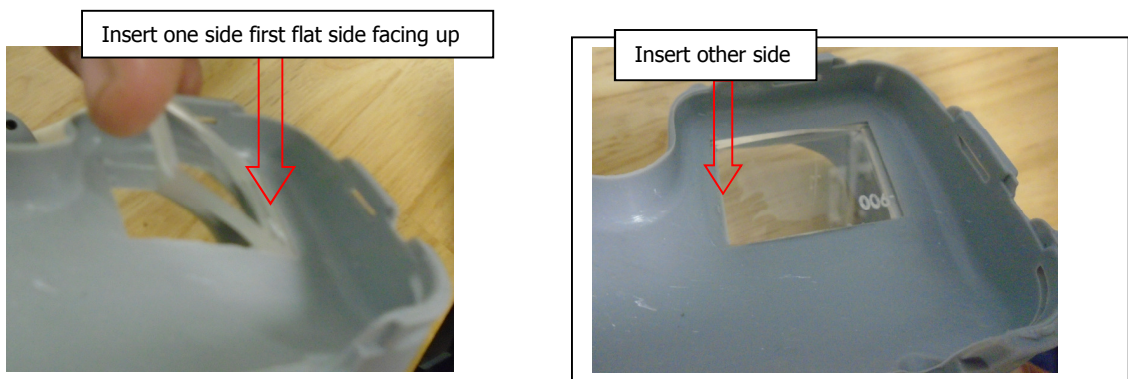
6.6.4. How to utilize the corrective lenses

Remove Rubber mask from visor.

Pull back Mask tabs

Undo Velcro Strap
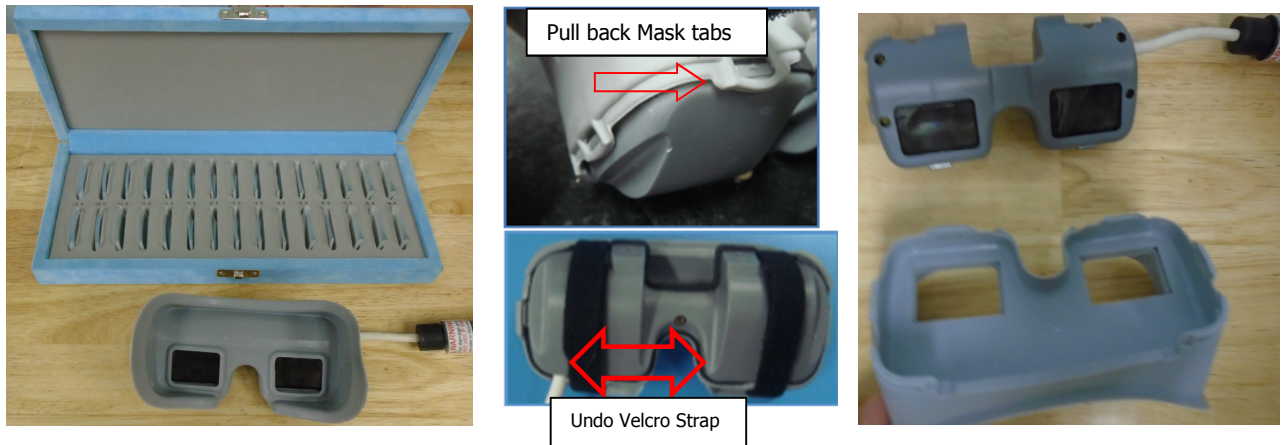
Insert the corrective lenses onto the mask.

Insert one side first flat side facing up

Insert other side

Put the rubber mask back onto the visor.

6.6.5. How to fit the Video Goggles into the 8-channel head coil

6.6.5.1. With the patient's head half-way in the 8-channel head coil, slide the Video Goggles under the center part.

Slide the Video Goggles under the Head coil center part

6.6.5.2. Fit the patient's head all the way into the coil and slide the Video Goggles down to fit the patient's eyes.
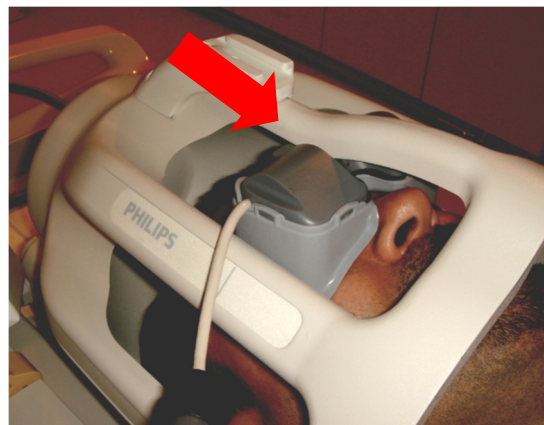
Place the patient's head all the way into the 8-channel head coil

6.7.   Cleaning

For cleaning and disinfecting purposes, Resonance Technology, Inc. recommends using alcohol-free, non-flammable, and non-corrosive cleaning wipes such as SaniZide Plus® wipes on the video goggles, mask, and audio headset components. Daily cleaning of these items is recommended.

7. Troubleshooting

If the problem arises inside the Magnet Room area:

NOTE: Turn off the Transducer Power Supply to prevent damage to the system components, when plugging in or unplugging the power supply cable, headset, and/or video goggles.

If there is a problem with the system audio or video check the following on the Transducer by taking off the top and bottom covers:

Unscrew black thumbscrews located at the arrow by turning it counterclockwise by hand.
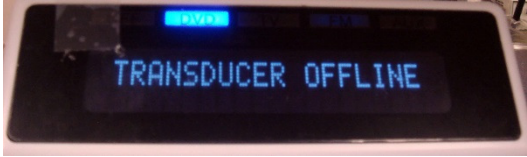
Transducer Troubleshooting Checklist
- Check if color and number properly match the fiber optic link cable and the Transducer.
- Check for any damage that might have taken place on the MRI Fiber Link Cable
- Check Headset Connection for proper connection for Audio
- Check Visor Connection for proper connection for Video
- Check the Transducer Power Cable is Properly connected

After closing the Transducer and turning on the Transducer power supply:

Check if power is being supplied to the Transducer by checking for lights on the Transducer housing. Logo should rotate clockwise and all six LEDs should be blue.

Problem	Diagnosis	Visual Details
None	All cables connected properly and unit is receiving Power	All Round indicator lights are blue and the logo is spinning with the colors Green, Red and Blue.
Problem	Diagnosis	Visual Details

Problem	Diagnosis	Visual Details
No communication from the Headset. Headset Microphone and Patient Alert not working.	Green fiber optic connection might be disconnected or broken	No color on the Logo (above) Tech Remote message (below)
Headset not functioning properly. No audio and microphone not working on Headset	Blue fiber optic connection might be disconnected or broken	No color on the Logo. Left middle light is Red.
Only Black/White image on the Patient Visor	Black fiber optic connection might be disconnected or broken	The Transducer indications will look normal
No Video on the Patient Visor	Brown fiber optic connection might be disconnected or broken	INPUT VIDEO SIGNAL. Message present on the Visor (above). No color on the Logo and Left top light is Red (below).

Patient camera (located in MRI) no streaming video feed to CinemaVision Controller	Red fiber optic connection might be disconnected or broken	The Transducer indications will look normal
Patient not receiving Audio or Video. The Transducer not staying on or working intermittently	The Transducer can be going out of sync* with the controller.	Transducer lights turn on and off

Technical Problems:

- If the system hangs up or doesn't respond to Remote Control or Controller commands, power down the complete system, leave off for approximately 10 seconds, then power up again.
- If the system still does not respond, check to see if the Transducer and Controller is syncing* with one another.
  *Syncing is when the logo on the Transducer and the controller lights up and properly rotates clockwise.
- If the system still does not respond, please contact Resonance Technology, Inc. for assistance.

8. Specifications

Measurements of System Components:

CinemaVision Controller Input/Output Power Ratings:

- **AC Inlet:**
  Voltage Input: 100-240 VAC @ 50-60 Hz
  Maximum Current: 2A
  Fuses Power Rating: 250 V @2A

- **AC Outlet**   (Only the Video Monitor provided with this system should be connected to the AC outlet):
  Voltage Output: 100-240 VAC @ 50-60 Hz
  Maximum Current: 1A

CinemaVision System Shipping/Storage Environment Conditions:

- **Operating Temperature Range:**

  10°C - 40°C

- **Relative Humidity**

  30-75 %

- **ATM Pressure Exposure**

  700 – 1060 hPa

Below is the Medical Device Safety Test Certificate for the CinemaVision System:

TÜVRheinland®
Precisely Right.

Worldwide

TUVdotCOM Services - HOME » All Product Certificates » Certificate No. 72091343

Certificate No. 72091343

Certificate Type:	US + Canadian NRTL certificate
Certificate Holder:	**Resonance Technology, Inc.** 18121 Parthenia Street Northridge
Certificate Number:	CU 72091343
Certified Product:	Medizinisch- technische Geräte (Patient Audio / Video Management System) Model designation: CinemaVision
Fulfilled Standards:	CAN/CSA-C22.2 No. 601.1-M90 UL 60601-1:2003 R4.06 The standard(s) listed here reflect the status at the time of the release of this certificate.
Date of Issue:	15 October 2009

9. Support Information

If you have any questions regarding the CinemaVision system use or installation, please don't hesitate to call Resonance Technology, Inc. Customer Service Department. Service and technical support staff may be reached Monday through Friday 8 A.M. to 5 P.M., Pacific Standard Time (USA) at +1 (818) 882-1997, or e-mail to support@mrivideo.com.

Resonance Technology, Inc. Product Recycling Program:

Resonance Technology Inc. actively supports the protection of the environment by efficiently recycling all our electronic products. Our everyday pollution prevention activities reduce the need for electronic waste to go into landfills. At Resonance Technology Inc. we are committed to our customers, our communities and to everyone's environment.   In light of the above, Resonance Technology, Inc. recommends that all our customers return their undesired, obsolete, or unused Resonance Technology, Inc. equipment to the following address for recycling:

Resonance Technology, Inc.
Attn: Product Recycling Program
18121 Parthenia Street
Northridge, CA. 91325

Notes