

# CD-4 / Quadradisc

Panasonic Technics  
by Panasonic

JVC

RCA

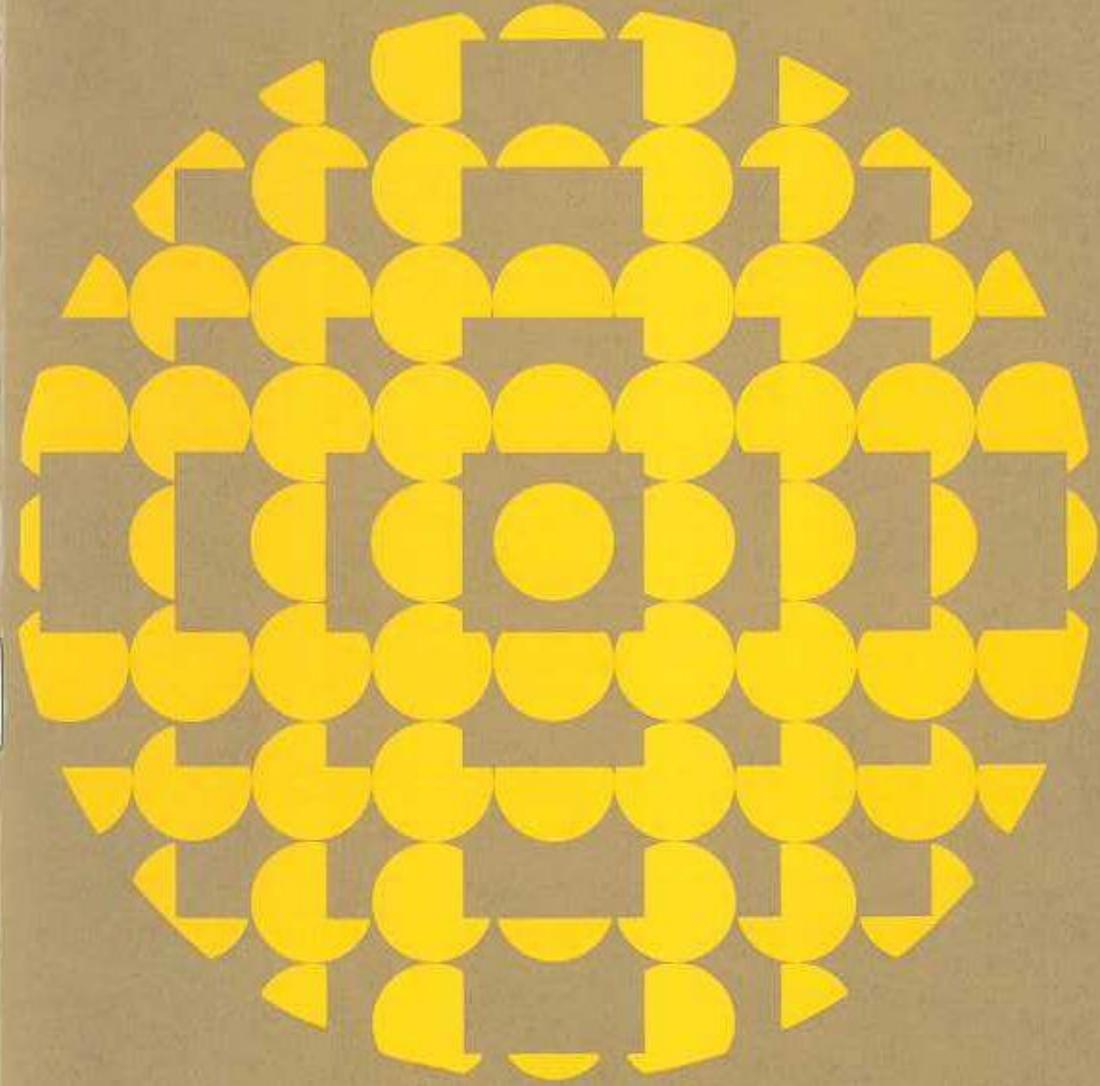
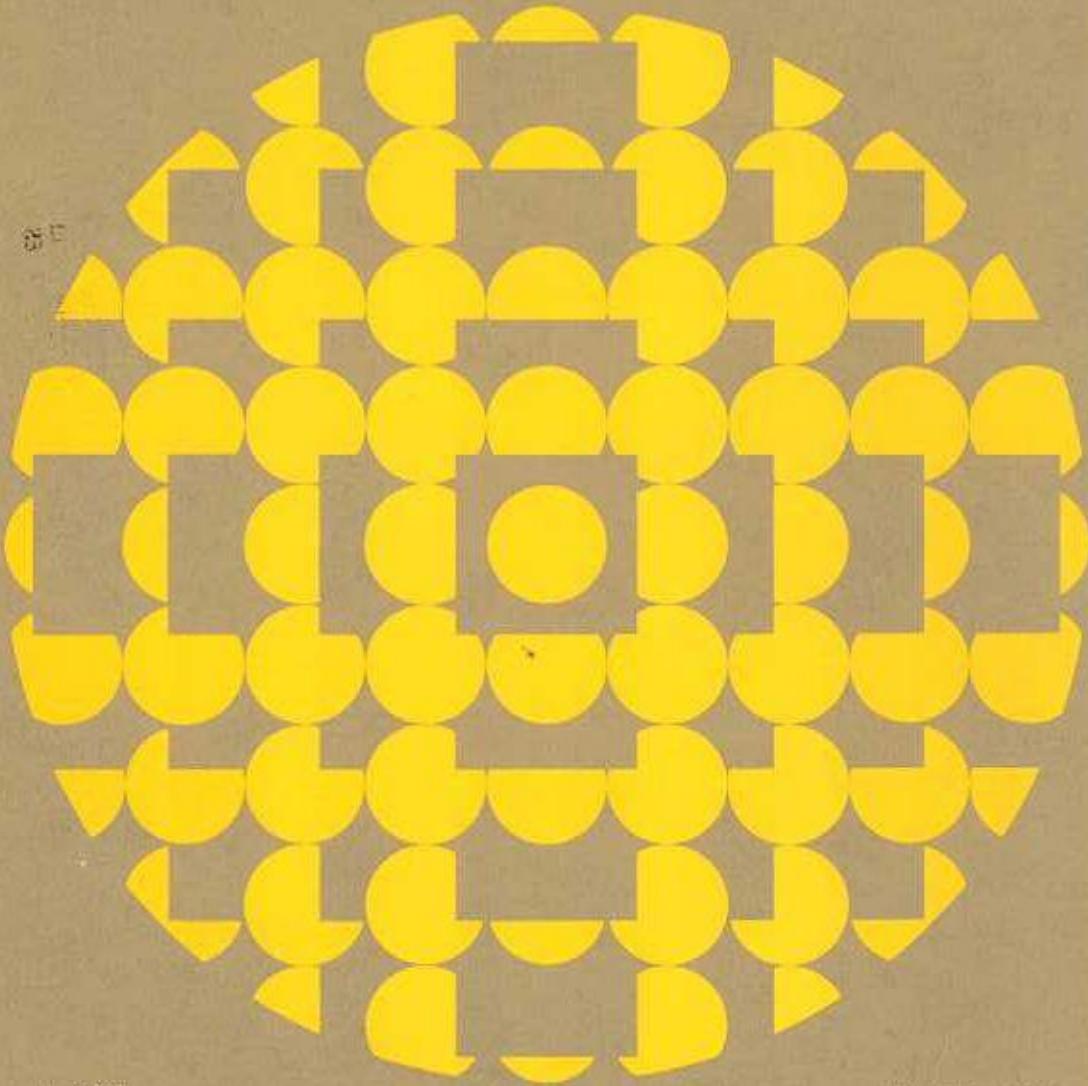


THE

# CD-4

HANDBOOK

A discrete point of view about the quadraphonic evolution



# It's time to choose again.

To the audio industry's great credit, critical choices made during the astonishing evolution of high fidelity sound have always been made using uncompromised accuracy of reproduction and greatest creative flexibility as the final standards of judgement. The first saleable home equipment, for instance, was big and bulky—a difficult marketing problem, to say the least. But that was the only way the industry knew how to provide uncompromised state-of-the-art accuracy and greatest creative flexibility—so big and bulky it was.

When it inevitably came time to choose a single industry method of producing a stereo disc, the system chosen represented the greatest possibility for utmost accuracy and flexibility through two totally separate channels with the lowest crosstalk of information between them. Once that decision was made, "stereo" soon became a household word everywhere.

Now quadraphonic sound has truly come of age. Hardware production and sales are riding a consistently increasing sales curve. Quadraphonic software releases and sales are paralleling that curve. New technological advances are occurring almost daily.

The time has come once more for the sound industry to make another evolutionary decision—to what quadraphonic disc system should its combined technological and marketing efforts be directed?

It is a decision that should be made as quickly as possible for the benefit of producer, retailer and consumer alike. A decision that will inevitably determine the future course of high fidelity sound reproduction.

That's basically why we've put this book together. We'd like you, the concerned individual who'll be directly affected by that decision, to fully understand what we believe that choice must be: the CD-4 Compatible Discrete 4-channel disc system—the "Quadradisc." Why? Because Quadradisc is the only genuine 4-channel disc system. Because no other system offers the pure accuracy of reproduction and vast creative flexibility of Quadradisc. And it's just as simple as that.

We invite you to step into the world of the CD-4 Quadradisc. Read about it, learn about it, listen to it. Then critically compare it to any of the other proposed systems.

If history means anything at all, Quadradisc will become the key that opens up the next great dimension in sound.

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# Just for the record.

Not even the fertile and visionary mind of Thomas Alva Edison could have imagined the full scope of what he'd started when he first captured sound on a tiny tin foil cylinder. In less than a single century, that initial permanent "record" of sound reached the ears of the world and changed the life style of its people. It became the sound of an ever-expanding industry from which millions make their living. The sound of the rich gift of music and entertainment we find at our fingertips today.

Like any developing thing, Edison's amazing little cylinder was destined to go through a lot of changes. First it was flattened into a disc made of wax. This provided a much easier recording medium to work with, and eliminated much of the background noise inherent in the cylinder. Wax soon gave way to the durability of shellac, and the 78 RPM record Grandma used to play on her windup was born.

Then came microgroove. Now an entire symphony could be recorded on one disc with far better fidelity than ever before. Equipment manufacturers quickly created mechanical and electronic

gear equal to the task. The "LP" ushered in the era of "high fidelity." The 45 RPM single play "doughnut" made its entrance in the early fifties, and hundreds of musical performers rose to stardom or melted into obscurity on its revolutions. But the next real milestone in the art of sound reproduction was the creation of a thing called "stereo". Up until then, everything was recorded on a single track and played back through a single channel—just as though you had only one ear. But with the development of multi-track tape equipment, sound was no longer limited by the unavoidable flatness of monaural reproduction. The ability to record and reproduce 2-channel source material raised the curtain on an immensely wider stage of musical realism and creativity.

Yet stereo sound didn't make its big impact until a stereo disc system was standardized. The "stereo LP", with a totally separate channel

pressed into each wall of its tiny grooves, was a great new tool for creative technician and artist alike. Multi-channel recording techniques provided far greater accuracy and depth in the final 2-channel master. New disc raw materials and pressing techniques were developed that increased durability, expanded frequency response and assured the kind of complete channel separation necessary for each speaker to reproduce a proper sound field. FM stations rapidly adapted to stereo multiplex broadcasting—a system in which two separate channels are sent out on the carrier and sub-carrier of a radio wave. Equipment manufacturers once again rose to the occasion, and a whole range of home gear designed to take full fidelity advantage of the higher quality source material soon appeared on the shelves of the local hi-fi store. After a few years of learning what this new tool could do, the technician and the artist formed a creative alliance that turned on the world to a two-eared era of electronic imagination. It was the birth

of a musical dimension that only the alliance of artistry and technology could have fostered.

Today, another dimensional word has burst into the world of sound. "Quadraphonic." 4-channel sound. Sound that surrounds. Sound that lifts the listener up and drops him right in the middle of things. Sound with a whole new experience of involvement. **Sound that many experts believe is a greater advancement over stereo than stereo was over monaural.**

But there was an intrinsic problem with quadraphonic sound reproduction. With tape, everything was easy. Simply record four separate channels on the tape, and play it back through four separate channels—the discrete recording process now being used on quadraphonic tapes and cartridges. But what about the prime vehicle of sound for the home listener—the record? There were only two walls on the groove, and quadraphonic sound demanded four channels of information,

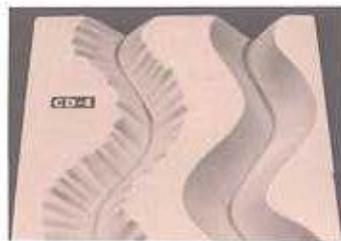


The first and simplest solution was to take four channels of recorded material, scramble it in a predictable pattern into two channels, then unscramble it into four channels again with special electronic circuitry in the playback equipment. This "matrix" method worked to a degree. The enhancement it provided to otherwise straight stereo source material was clearly audible, and as a stereo enhancer, matrix 4-channel reproduction should provide the home listener with a lot of musical pleasure in the future. But even with the best electronic matrix unscramblers ever devised, something was always lost in the 4-2-4 translation. The result was loss of the defined separation necessary for accurate reproduction of the 4-channel master tape. The only real solution was to find a way to put four totally isolated, completely separate channels on an LP disc. Somehow.

The idea captured the fancy of a team of Japanese engineers. Unable to resist the challenge, they put their

full efforts behind the massive research and development program it takes to meet that kind of challenge. Using **compatibility** (ability to perform equally as well on stereo equipment with the equivalent durability of a stereo record) and **discreteness** (the maximum separation of information on each of the four channels) as their basic standards of performance evaluation, they developed the revolutionary CD-4 "Quadradisc." CD-4 means Compatibility and Discreteness on all 4 channels. The first and only quadraphonic system that combines uncompromised accuracy of reproduction and unlimited creative flexibility on a disc. Now it's inevitable.

The sound of the future will have four sides. CD-4 welcomes you to all of them.

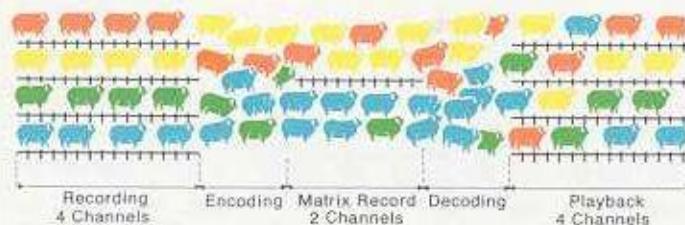


# The quadraphonic multiple choice game.

Whatever initials you christen them with, there are basically only two quadraphonic disc systems on the market—matrix and discrete. Matrix systems may be SQ, QS, or in some other form. The only discrete system is CD-4. Each has its own philosophy

and approach to 4-channel sound reproduction. And each has certain advantages and disadvantages. But before any valid comparison can be made, a firm understanding of the basic techniques of each system is an absolute must. We offer the following capsulized descriptions and detailed illustrations towards that end.

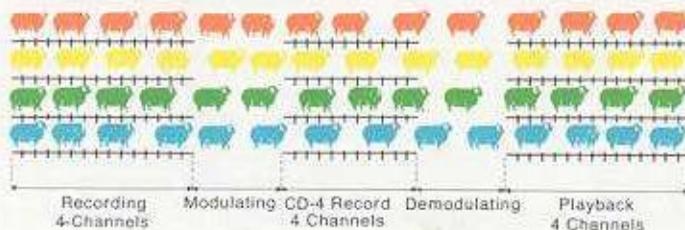
## The 4-2-4 Matrix system



Mixed sound after interchange over each channel.

Four channels of discrete information are mixed (encoded) into two channels, then unmixed (decoded) into four channels during playback. Note the "lane changing" of information that inevitably occurs during the 4-2-4 process.

## The 4-4-4 Discrete System



Pure and unmixed sound from start to finish.

By recording the sum of front and rear channels in the audible region and the difference between front and rear channels as modulated FM signals in the 20-45 kHz region, four discrete channels can be maintained from master tape to loudspeakers—yet remain fully compatible with mono or stereo playback equipment.

## The Matrix System

In theory, the matrix system appears to be the simplest and most logical approach to the quadraphonic disc. Just take four separate channels of information, electronically scramble them together in a predetermined pattern or matrix, and put this 2-channel matrix on a standard stereo disc. Then all you had to do was develop a device that could decode that matrix during playback and restore the sound as closely as possible to the

four discrete tracks of the original master tape.

Sounds easy enough. No major changes necessary in record material, cutting and pressing techniques, or FM broadcasting. Just some extra electronic circuitry, four speakers, and you were ready for the quadraphonic record.

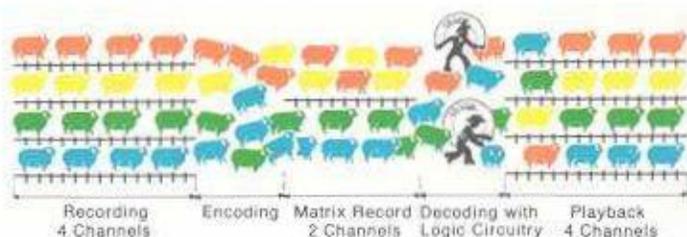
But one problem—and apparently an unsolvable one—flaws the matrix theory. Once those four original

discrete channels are mixed together, there is no known way to recover them exactly as they were. What happens during the "4-2-4" process is a blending of information between channels, sometimes to the point where some channels become nearly indistinguishable from others. This mingling of information is called "crosstalk", and the result is varying degrees of separation loss.

Unfortunately, even the best matrix decoders with sophisticated phase shift and logic circuitry can't prevent crosstalk, nor can they provide the kind of channel separation we've come to expect from stereo. A decent stereo system has channel separation of around 20-25 dB. But unless your matrix quadraphonic home equipment has full logic circuitry (and less than 20% of the products made today do), channel separation can drop to as low as 3 dB during the matrix decoding process.

That's very close to being monaural sound, and far less than necessary for acceptable reproduction of the quadraphonic sound fields portrayed on 4-channel masters. Where the matrix system really shines, however, is in its ability to enhance

standard stereo records. Anyone who's heard their favorite stereo LP played through a good matrix system will testify to that. For that reason alone, it's an advantage to have matrix circuitry in your quadraphonic playback equipment.



## The Discrete System

The discrete approach to the quadraphonic disc represented an entirely different point of view right from the beginning. Unwilling to accept the limitations of existing technology, discrete-devoted engineers recognized the pure necessity of four completely separate channels on a disc—and then set out to produce one.

First, they looked at the signal being put on the standard 45-45 stereo record groove—up to 18,000 Hertz

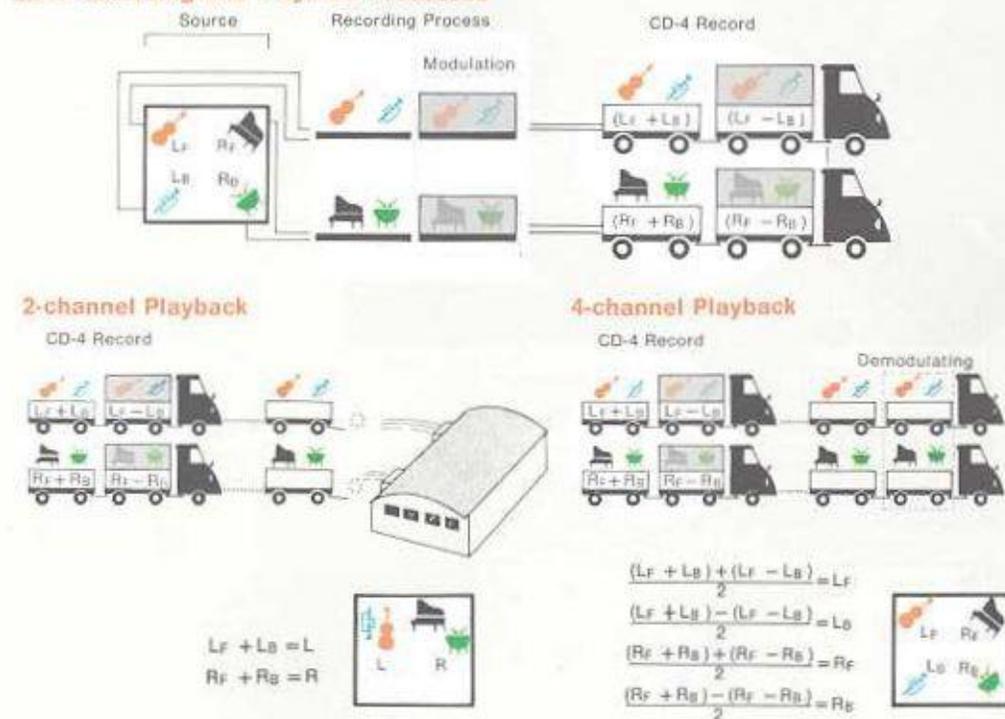
on better records. But why, they reasoned, must that be the upper limit? Available techniques permitted pressing up to 45,000 Hertz on the groove wall. Cartridge technology was such that a cartridge could be produced that would accurately track at such frequencies and higher.

Then why not record the sum of front and rear channels in the normal audible region and the difference between front and rear channels as ultrasonic modulated FM

signals up in the 20-45,000 Hz region? That way, the resulting disc would be fully compatible with existing stereo equipment, yet provide four totally discrete channels of information with the proper playback equipment. Since the two signals are so far apart in the frequency spectrum, the possibility of interference would be eliminated.

Then all that was needed was some good FM demodulation circuitry in the playback equipment—the kind that's

### CD-4 Recording and Playback Processes

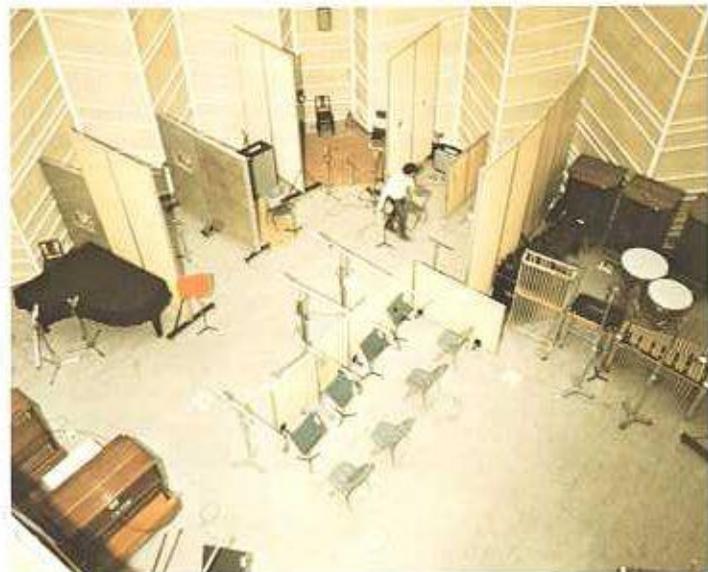


been used in FM stereo multiplexing for years—and a stylus capable of delivering the ultrasonic frequency response required.

Utilizing this new concept, the artist, engineer and record producer would for the first time be able to use

the unlimited creative freedom afforded through the discrete channel medium—and the listener would be able to hear everything that creative freedom had to offer with absolute accuracy—all in an amazing new disc.

The result was Quadradisc.



# Will the real 4-channel disc please stand up?

A lot of new developments had to take place before the CD-4 discrete Quadradisc process could become a viable concept in the quadraphonic marketplace. A tribute to today's audio technology, all of those necessary developments have

been accomplished with the uncompromising concern for accuracy and artistic freedom that has been the very foundation of the discrete disc philosophy.

One of the basic requirements of the Quadradisc, for

instance, was to provide the consumer with a product that had at least equivalent durability and performance life of its stereo counterpart. Record companies soon came up with new materials that were significantly harder with lower noise characteristics

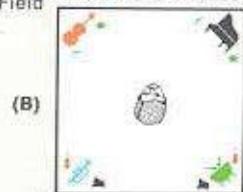
## The Quadraphonic Sound Field

A clear look at the type of sound fields created by discrete and matrix systems. Diagram A represents the exact sound field produced by the original 4-channel master tape. Diagram B shows the crosstalk inevitable in a matrix system.

A Discrete Quadraphonic Sound Field



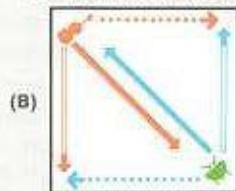
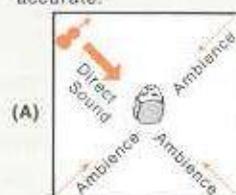
A Matrix Quadraphonic Sound Field



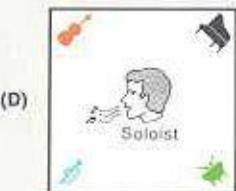
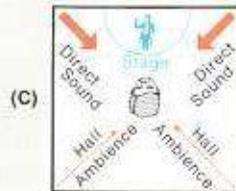
## Quadradisc Effects

Some illustrations of the effect flexibility and accuracy possible only with Quadradisc.

- (a) A direct sound may be assigned to a single channel, while the remaining three may be used for its natural ambience. Since crosstalk is absent in the discrete system, the effect is totally accurate.
- (b) "Panning" (the ability to move the location of a sound within the sound field) is possible in any direction—even overhead. Absence of crosstalk makes these movements as clear and precise as the original 4-channel master tape.



- (c) The "stage-hall" relationship—particularly important in classical music—remains pure and uncolored because of discreteness. The orchestra always remains up front, while rear speakers provide necessary natural ambience.
- (d) A soloist can be placed in the center of the room, while four totally separate instruments or groups of instruments appear in each corner—a unique discrete listening experience.



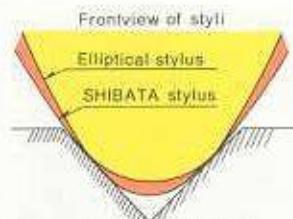
than ever before possible. This new Quadradisc compound actually adds to performance longevity up to 50% and will soon be used for producing top quality stereo records.

Several cartridge manufacturers designed and now produce fine ultra-broadband cartridges fully capable of reaching the upper limits of

the quadradisc—and beyond. A whole new shape in styli—the Shibata type—was conceived and perfected.

This new super-stylus meant greatly increased frequency response and significantly decreased record wear. Extra-precision cutting, mastering and pressing techniques were required and implemented—another

quality advancement that will eventually spill over into stereo products. Demodulation systems were designed that deliver four discrete channels of sound equivalent in separation to some of the finest stereo recordings—without adding noise or coloration of its own to the signal.



A new shape in styli that means greater wall area contact and ultra-sonic frequency response—yet with less wear force on the record than an elliptical stylus. Other styli with the same Shibata stylus effect have been developed.



The effect of tracking force (2 grams) on a disc using a SHIBATA stylus.



The effect of tracking force (2 grams) on a disc using a conventional elliptical stylus.

Now the CD-4 Quadradisc is the potent force it deserves to be in the audio marketplace. Artists and producers who've used the system extol its virtues and proclaim it a creative tool destined to spawn new vistas of musical involvement. More and more

record companies are producing their top talent on CD-4 Quadradiscs. More and more hardware manufacturers are including CD-4 demodulation circuitry in their 4-channel products, less and less are providing the more costly full logic-

matrix circuits.

Will the real—and only—4-channel disc please stand up?

Thank you. Quadradisc.

# Getting hooked on CD-4.

Getting hooked on CD-4 is a lot easier than it may sound.

Begin with a basic 4-channel playback system—a good turntable, a 4-channel receiver (or amplifier), and four speakers closely matched in efficiency that please your listening preferences. Add to the turntable one of the many excellent cartridges designed

for CD-4 disc reproduction, preferably with the Shibata or equivalent stylus. Now add a CD-4 demodulator, externally or built into the turntable or quadraphonic receiver.

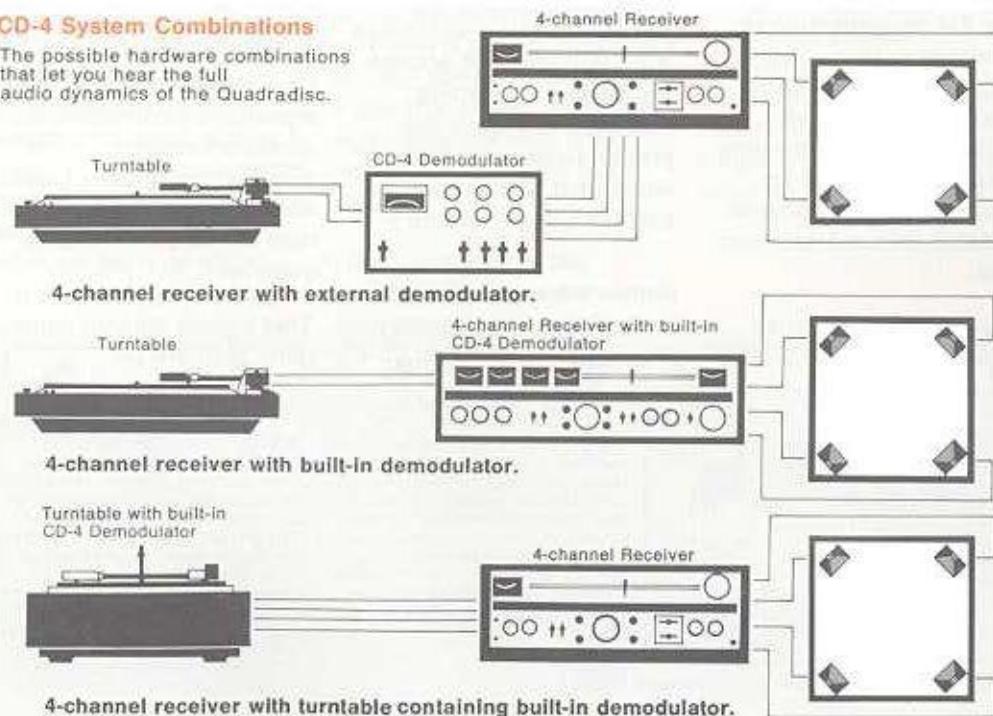
Now pick out some of your favorite musical artists from the evergrowing Quadradisc list. Then take them home, listen to them, and as one Quadradisc reviewer so graphically stated, hear "a

sonic diamond that really sparkles!"

If you haven't already experienced the indescribable surround of sound provided by the CD-4 Quadradisc, we can only suggest that you ask your favorite hi-fi dealer to demonstrate it to you. If his equipment is properly arranged, it won't take long to convince you that we're now living in the year of 19CD-4.

## CD-4 System Combinations

The possible hardware combinations that let you hear the full audio dynamics of the Quadradisc.



# CD-4 is in the air.

As it was during the initial development of stereo, the FM broadcasting medium is lagging behind the rest of industry in its commitment to 4-channel. This is not to fault the FM broadcasters, however. To the contrary, it is prudent policy on their part.

The reasons are simple when looked at through the perspective of the station owners and operators. Although some stations utilize tape source material, most FM programming is derived from disc. That means the purchase and installation of special quadrasonic broadcasting equipment designed to utilize the source material available on quadrasonic discs.

But before the FM broadcaster is willing to commit

himself to the expenditure and format alterations required to make the changeover to 4-channel transmission, he must be totally satisfied with the answers to some very important questions. For instance, will there be enough quadrasonic source material to fill his huge appetite?

What will the standard quadrasonic disc process be? What kind of equipment will he need to assure good quality quadrasonic transmission and how expensive is it? Will there be enough people in his listening audience who have the proper 4-channel receiving equipment to make this a profitably wise venture?

Some of these questions have already been answered. The rapidly expanding library

of quadrasonic software and the increasing sales of quadrasonic hardware will assure him of material to play and an adequately large audience to listen to it.

Other questions, however, still remain unanswered—but not for long. A long series of comparative tests using the discrete disc and all of the newly developed discrete 4-channel transmitting systems is in its final stages. It is felt by most broadcasters that once the results of this test are fully compiled, an FCC decision on the standard method of quadrasonic broadcasting would be less than a year away.

One final observation. It is significant to note that **all systems being tested are discrete**, using CD-4 Quadradiscs and discrete 4-channel tape as the prime source material.

That should tell you something is in the air.

## The Discrete Broadcasting System

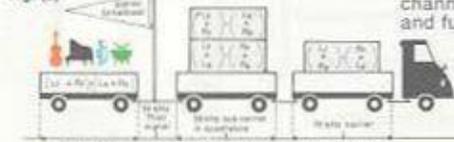
Fig. (1) shows the stereo FM method of broadcasting used today, with the main base signal carrying the sum of left and right channels, and the subcarrier providing the difference between left and right channels. This method allows for two discrete channels of stereo information and full monaural signal as well.

Fig. (2) illustrates the proposed discrete quadrasonic broadcasting system. Here the main signal carries the sum of all channels (mono) while an "in phase" subcarrier provides standard stereo reproduction. A second subcarrier and a "quadrature" subcarrier deliver the remaining information needed to broadcast discrete 4-channel information and reproduce it exactly as it appears on the tape or Quadradisc source material at the station.

Fig. (1)



Fig. (2)



# Suggested speaker placement for CD-4 listening.

Your room furnishings were probably arranged before you joined the ranks of quad high fidelity music listeners. Here are some tips and insight to get the most from your new listening experience. First remember that each set-up is as unique and personal as the individuals who listen to it. Don't be afraid to experiment. Moving a speaker toward a corner increases the bass, just as in stereo. If you hear too much bass for your taste move the speaker away from the corner, or get it up off the floor by placing it on the

stand or mounting it on the wall.

The first step is to decide where you will sit for your most serious listening—perhaps a favorite chair or sofa. Then locate the front speakers directly across from the listening sofa just as you would if the system were only a stereo. Now place the rear speakers in back of you if possible, remembering to keep the rear left on the same side as the front left.

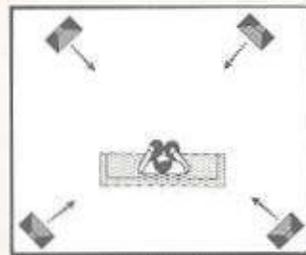
It often occurs that the desired listening seats are

on a sofa which is against a wall, making it impossible to move the speakers in back of you. In this case if you simply put the speakers against the wall on each side of the couch, you will be literally listening to the back of the speaker. This is hardly ideal. Hanging the speakers up high toward the ceiling or putting them at the extreme left and right with a slight angle will improve the depth of sound.

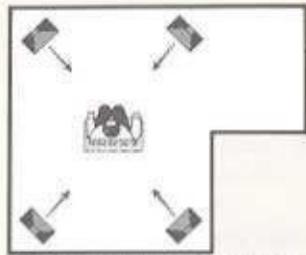
Although quad requires a little more attention to speaker placement than stereo, the end listening result will be a much larger listening area than you can hope for from stereo.



The ideal location of speakers and listeners. The serious listener may insist on being at the center, even if furniture must be rearranged.



In this configuration the rear speakers may be placed slightly above the listeners and mounted on the wall for excellent coverage of the listening area. If the speakers have narrow dispersion, angle them slightly to provide for adequate coverage.



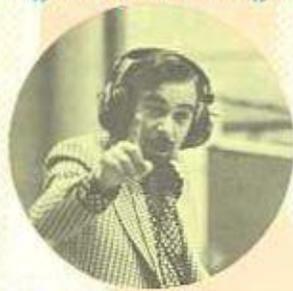
For a typical living room/dining room combinations in contemporary homes, this arrangement may serve to illustrate an idea that will make an effective quad environment.

# "I've already chosen."

Advocates of the CD-4 Compatible Discrete 4-Channel Disc are an unusually enthusiastic bunch. Because once anyone involved with the art of sound reproduction—be it artist, producer, engineer or industry leader—becomes involved with CD-4, avid enthusiasm for its uncompromised sonic accuracy and unlimited creative flexibility is a natural result.

Listen to what a few of this growing group of CD-4 devotees have to say about the discrete disc. Once you do, you won't find it difficult to understand why CD-4 has become the overwhelming choice of professionals who won't accept anything less than the very best in sound reproduction.

## Hugo Montenegro Henry Mancini



### "CD-4 means freedom."

"The fact is that 4-channel sound has opened up a new world of creativity for the composer/arranger/producer. We now have the freedom to surround the listener with any sound environment our imaginations can conceive. The freedom to locate a sound anywhere within the environment. And the freedom to manipulate and move sound in any direction. But these new freedoms can only exist—and be utilized, if the final product can be faithfully reproduced on disc without any limitations. Of the several quadraphonic disc formats on the market, in my opinion, only the compatible discrete 4-channel record meets these criteria. That's why, to me, CD-4 means freedom."



### Quadraphonic the new sound

"Quad shouldn't be compared to stereo," says Mancini. "It's a whole new listening experience, a real wrap around sound. Actually, it's an extension into the home of the new techniques that have been developed for wide-screen movies, mixed media shows and the new environments in which the listener is completely immersed in sound. It's amazing what it does for any kind of music, from Mozart to Sousa to Jazz. I have my own system in my billiard room in Malibu with four speakers mounted in corners. With Sousa in quad, the bold lines of the writing and the bright colors of the instruments come jumping out of the speakers. I get that 50-piece band marching right into the room."

## Jac Holzman



"Our commitment to CD-4 was the result of almost two years of exhaustive research by the Warner/Elektra/Atlantic engineering team. Involved was a scrupulously detailed evaluation of all competing quad systems. Only then did we make our decision," says Jac Holzman, Senior Vice President, Warner Communications and Chairman, Quadraphonic Planning Group of the Warner/Elektra/Atlantic Labels. "Why CD-4? The WEA labels are blessed with an awesome roster of talent. Frank Sinatra. Carly Simon. Gordon Lightfoot. Aretha Franklin. The Doobie Brothers. Bread. Deep Purple. Alice Cooper. Mystic Moods. Seals and Crofts. Judy Collins. Artists of this magnitude demand the ultimate in state-of-the-art recording technology. They deserve the only 4-channel disc that encourages full creative freedom without limitation

## Richard Perry



### a man who knows what he's talking about talks about CD-4:

Richard Perry is one of the main men in the music business today. Not only is he the brilliant independent producer for Ringo Starr, Carly Simon, Barbra Streisand, Harry Nilsson and Ella Fitzgerald, he's also a twice-named producer of the year with 10 gold albums and 5 gold singles to his name. In other words, when Richard Perry talks about

or compromise. "And, they'll settle for nothing less. "Our software efforts, when added to comparably vigorous thrusts by RCA and other important CD-4 recording companies, provides continuing dramatic evidence of our far-reaching commitment to CD-4. Everyone, from hardware manufacturer to retailer to customer can be assured there will always be CD-4 product. "The

CD-4, he knows what he's talking about.

"I think I can safely say I've been involved with virtually every kind of music that's being produced today. The more we get into four-channel recording, four-channel mixing, and creating special effects, the more we want the most faithful reproduction of our efforts. I'm confident when I say that CD-4 is the truest reproduction there is. "I'm concerned with the total musical environment I create. I want my music to be as exciting visually as it is musically. The only way to achieve this potential today is to do the disc in CD-4. "One of the highest moments I've ever experienced in a studio was the first time I heard my work back in four-channel. What I heard really made me believe that CD-4 is the only way to go."

public gets a fair deal, too. With CD-4, the record buyer—with his quality equipment—doesn't have to settle for a disc that is 'less discrete' than the quad tape he plays over his more modest car system. "Today's CD-4 discs stand toe to toe with any stereo product. In frequency response, total playing time and in physical durability. And, they play true quad."

# The CD-4 roster.

It doesn't make any difference how good the quadrasonic disc recording process is. If the audio hardware manufacturers don't produce the equipment you need to hear it in all its glory at home, it isn't worth a hoot. But again, that takes a major commitment on the part of the hardware manufacturer. It means new designs, new tooling, new models, new marketing direction. It means that he has to believe in the technical and sales viability of the product strongly enough to

invest the many thousands of dollars required to make that kind of production and marketing conversion.

That's why we're exceptionally proud of the growing roster of hardware manufacturers who have joined the CD-4 ranks. Today, there are more than 25 CD-4 cartridges to choose from. And at latest count, more than 50 electronic equipment manufacturers include CD-4 demodulation capabilities in their quadrasonic products—over 5 as many

as those who provide full logic matrix circuitry. An absolute must, by the way, for matrix performance that even begins to approach the separation quality of CD-4, and then only under certain performance conditions.

Look through the following list of hardware manufacturers who think enough about the potential of CD-4 to make their equipment completely ready for the significant marketplace it represents.

You might come to the conclusion that most hardware manufacturers have already made their choice, too.

## Equipment Manufacturers

AKAI	Kokusai Musen	Rotel
Audio World	Magnavox	Sanyo
B & O	Marantz	Sansui
B.G.W.	Miida	Sharp
Brother	Mitsubishi	Sherwood
Clarion	Muntz	Shin Shirasuna Denki
Cybernet	NEC	Sonab
Crown Radio	Nikko	Standard
Denki Onkyo	Nippon Columbia	Superscope
Electrohome	Noresco	Sylvania
Fisher	Onkyo	Tanasawa
Foster	Panasonic	Technics by Panasonic
General	Phillips	Terutron
Gladding Claricon	Pilot	Toshiba
Harman Kardon	Pioneer	Union
Heath	Plessey	Wells Gardner
Hitachi	Quadrasonics	Yamaha
JVC	RCA	
Kenwood	Roland	

## Cartridge Manufacturers

ADC	Grace	Panasonic
Audio Technica	Grado	Pickering
B & O	JVC	Pioneer
Elac	Micro Acoustic	Stanton
Empire	Ortofon	Toshiba

# The sound on CD-4.

Many of the world's great musical artists have already made their CD-4 debut. We think it's an impressive list and present it here for your convenience.



The Modern Jazz Quartet	QD-1652
Blues Are Back	QD-1653
Charles Mingus	QD-1653
Mingus Moves	QD-1653
Billy Cobham	QD-1653
Spectrum	QD-1653
Roberta Flack	QD-1653
Killing Me Softly	QD-1653
Herbie Mann	QD-1653
Hold On, I'm Comin'	QD-1653
Baun' N' Roll Live	QD-1653
Black Oak Arkansas	QD-1653
Donny Hathaway	QD-1653
Extension of A Man	QD-1653
Bette Midler	QD-1653
The Divine Miss M	QD-1653
The Spinners	QD-1653
Aretha Franklin	QD-1653
The Best of Aretha Franklin	QD-1653
Duke Ellington	QD-1653
New Orleans Suite	QD-1653
Gil Evans	QD-1653
Svegnali	QD-1653
Aretha Franklin	QD-1653
Live at Fillmore West	QD-1653
Mike Oldfield	QD-1653
Tubular Bells	QD-1653
Eric Clapton	QD-1653
451 Ocean Blvd	QD-1653
George Flynn	QD-1653
John Cage	QD-1653
Bill Wyman	QD-1653
Monkey Grip	QD-1653
Eric Salzman	QD-1653
Wetlap	QD-1653
Herbie Mann	QD-1653
Reggae	QD-1653
Average White Band	QD-1653
J. Geils Band	QD-1653
Nightmares	QD-1653
Spinners	QD-1653
New And Improved	QD-1653
Kahlil Gibran	QD-1653
The Prophet	QD-1653
The Modern Jazz Quartet	QD-1653
The Last Concert	QD-1653



Hugo Montenegro	APD1-0001
Love Theme from 'The Godfather'	APD1-0001
Henry Mancini	APD1-0013
Mancini Salutes Sousa	APD1-0013
Hugo Montenegro	APD1-0025
Scenes & Themes	APD1-0025
Danny Davis and The Nashville Brass	APD1-0034
Travelin'	APD1-0034
Nat Stuckey	APD1-0080
Take Time to Love Her!	APD1-0080
I Used to Fall on You	APD1-0080
Carolyn Hester	APD1-0088
Henry Mancini, Doc Severinsen	APD1-0098
Brass, Ivory and Strings	APD1-0098

Perry Como	APD1-0100
And I Love You So	APD1-0100
The Jimmy Castor Bunch	APD1-0103
Dimension III	APD1-0103
The Guess Who - #10	APD1-0130
Hugo Montenegro	APD1-0132
Nani's Diamonds	APD1-0132
Jose Feliciano	APD1-0141
Compartment	APD1-0141
Dottie West	APD1-0151
If It's Alright with You, Just What	APD1-0151
I've Been Looking For	APD1-0151
Floyd Cramer	APD1-0155
Super Country Hits	APD1-0173
David Clayton Thomas	APD1-0173
Charley Pride	APD1-0217
Sweet Country	APD1-0217
Danny Davis and The Nashville Brass	APD1-0232
Caribbean Cruise	APD1-0232
Jerry Reed	APD1-0238
Lord, Mr. Ford	APD1-0238
The Best of The Guess Who	APD1-0269
Vol. II	APD1-0269
Henry Mancini, His Piano, Orch	APD1-0270
and Cho. Country Gentleman	APD1-0270
The Friends of Distinction	APD1-0278
Greatest Hits	APD1-0278
Dolly Parton	APD1-0286
Bubbling Over	APD1-0286
Floyd Cramer	APD1-0299
Class of '73	APD1-0299
Nilsen Schmilsson	APD1-0319
Jefferson Airplane	APD1-0320
Volunteers	APD1-0320
Chet Atkins	APD1-0329
Superstrokes	APD1-0329
Charley Pride	APD1-0397
Amazing Love	APD1-0397
The Guess Who	APD1-0405
Road Food	APD1-0405
B.W. Stevenson	APD1-0410
Calabassas	APD1-0410
Hugo Montenegro	APD1-0413
Hugo in Wonderland	APD1-0413
Elvis Presley	VPSX-6089
Elvis-Aloha from Hawaii Via	VPSX-6089
Satellite	VPSX-6089
Hair (The American Tribal Love	ABD1-0245
Rock Musical)	ABD1-0245
The New Birth	APD1-0265
It's Been a Long Time	APD1-0265
Danny Davis	APD1-0565
Nashville Brass in Bluegrass	APD1-0565
Country	APD1-0565
Floyd Cramer	APD1-0469
The Young and the Restless	APD1-0469
Pure Love	APD1-0500
Ronnie Milsap	APD1-0500
Harry Nilsson	APD1-0570
Pussy Cats	APD1-0570
Jim Ed Brown	APD1-0572
It's That Time of Night	APD1-0572
Perry Como	APD1-0585
Stephen Michael Schwartz	APD1-0604
APD1-0604	APD1-0604
Elvis Recorded Live on	APD1-0606
Stage in Memphis	APD1-0606
Dottie West	APD1-0543
House of Love	APD1-0543

However, many new CD-4 albums featuring the most popular artists of today are scheduled for release after the printing of this publication. For the most current list of CD-4 Compatible Discrete 4-Channel Discs, check with your local record retailer.

Floyd Cramer	APD1-0661
in Concert	APD1-0661
The Gil Evans Orchestra Plays	APD1-0667
the Music of Jimi Hendrix	APD1-0667
Henry Mancini	APD1-0672
Hangin' Out With Henry Mancini	APD1-0672
The Jazz Piano Quartet	APD1-0680
Let It Happen	APD1-0680
Jefferson Starship	APD1-0717
Dragon Fly	APD1-0717
Charley Pride	APD1-0757
Pride of America	APD1-0757
Danny Davis and the Nashville Brass	APD1-0774
Latest and Greatest	APD1-0774
The Huey Corporation	APD1-0775
Rockin' Soul	APD1-0775
The Guess Who	APD1-0936
Flavorfuls	APD1-0936
Hugo Montenegro	APD1-0764
Others by Brothers	APD1-0764
Harry Nilson	APD1-0817
Duit on Man Dei	APD1-0817
Ronnie Milsap	APD1-0846
A Legend in My Time	APD1-0846
Elvis Presley	APD1-0873
Promised Land	APD1-0873
Floyd Cramer	APD1-0893
Piano Masterpieces 1900-1975	APD1-0893
Ormandy/The Philadelphia Orch.	APD1-0002
The Fantastic Philadelphians	APD1-0002
Vol. 1	APD1-0002
Ormandy/The Philadelphia Orch	APD1-0014
Shostakovich, Symphony No. 15	APD1-0014
Dr. Telesny's Incredible Plugged in	APD1-0015
Orchestra-Ken Howard and	APD1-0015
Alan Blackley Present: Slobin Goods	APD1-0015
Games Lifted from the Masters	APD1-0015
Ormandy/The Philadelphia Orch.	APD1-0017
The Fantastic Philadelphians	APD1-0017
Vol. 2	APD1-0017
Ormandy/The Philadelphia Orch.	APD1-0018
Sibelius, Symphony No. 2	APD1-0018
Ormandy/The Philadelphia Orch.	APD1-0026
Bach's Greatest Fugues	APD1-0026
Ormandy/The Philadelphia Orch.	APD1-0027
Tchaikovsky, Suite from	APD1-0027
'The Nutcracker'	APD1-0027
Ormandy/The Philadelphia Orch	APD1-0028
Rimsky-Korsakov	APD1-0028
Scheherazade	APD1-0028
Ormandy/The Philadelphia Orch	APD1-0029
Debussy, La Mer	APD1-0029
Ravel, Daphnis and Chloe, Suite No. 2	APD1-0029
Debussy, Prelude to the Afternoon	APD1-0029
of a Faun	APD1-0029
Ormandy/The Philadelphia Orch.	APD1-0030
Tchaikovsky, Suite from	APD1-0030
'Swan Lake'	APD1-0030
Rubinstein, Ormandy/The	APD1-0031
Philadelphia Orch.	APD1-0031
Rachmaninoff, Concerto No. 2	APD1-0031
At Stewart's Museum of	APD1-0032
Modern Brass	APD1-0032
Fiedler/Boston Pops	APD1-0035
Greatest Hits of the '70s	APD1-0035
Virgil Fox	APD1-0081
Heavy Organ at Carnegie Hall	APD1-0081
Ormandy/The Philadelphia Orch.	APD1-0169
Tchaikovsky, Suite from	APD1-0169
'The Sleeping Beauty'	APD1-0169

Ormandy/The Philadelphia Orch.  
The Yellow River Concerto  
(Daniel Epstein, Piano)  
Folk Song "San Pei"  
(Chinese Works and Peasants  
March) - Soula - The Stars and  
Stripes Forever, Respighi  
Pines of Rome ARD1-0415  
Joseph Payne  
Spaced-Out Bach ARD1-0439  
Virgil Fox  
Heavy Organ at Carnegie Hall  
Vol. 2 ARD1-0477  
Fox, Ormandy/The Philadelphia Orch.  
Saint-Saens: Symphony No. 3  
In C Minor, Op. 78 ("Organ") ARD1-0484  
Isao Tomita  
Snowflakes Are Dancing ARD1-0488  
Foster/Boston Pops  
Greatest Hits of the 70s, Vol. 2 ARD1-0552  
Steakaus/London Symph. Orch.  
Tchaikovsky Symphony No. 5  
in E Minor (Patriotic) ARD1-0426  
Ormandy/The Philadelphia Orch.  
Spectacular Overtures ARD1-0453  
Serebrin/London Philharmonic Orch.  
The John Alden Chor-Paces  
Symphony No. 4 ARD1-0580  
Ormandy/The Philadelphia Orch.  
Ives: Symphony No. 2 ARD1-0663  
Ormandy/The Philadelphia Orch.  
Tchaikovsky Symphony No. 5  
in E Minor ARD1-0664  
Ormandy/The Philadelphia Orch.  
Tchaikovsky Symphony No. 4  
in F Minor ARD1-0665  
Virgil Fox  
The Entertainer ARD1-0666  
G. Solti/London Philharmonic Orch.  
The John Alden Chor-Paces/  
La Boheme ARD2-0371  
Levine/New Philharmonic Orch.  
Verdi: I Vespri Siciliani ARD1-0568  
Motta/New Philharmonic Orch.  
Puccini: Tosca ARD1-0587  
Gerhardt/National Philharmonic Orch.  
Citizen ARD1-0707  
Kane-The Classic Film Scores of  
Bernard Herrmann ARD1-0707  
Gerhardt/National Philharmonic Orch.  
Sunset Boulevard-The Classic Film  
Scores of Franz Waxman ARD1-0708  
Fodor/Leinsdorf/New Philharmonic Orch.  
Tchaikovsky Violin Concerto  
in D ARD1-0781  
Gerhardt/National Philharmonic Orch.  
Cagliostro Classic Film Scores  
for Humphrey Bogart ARD1-0422  
Julius Ruter/New Philharmonic Orch.  
The Ambrosian Opera Chorus, Anna  
Mollo-Jules Massenet/Thais ARD3-0842  
Peter Maag/New Philharmonic Orch.  
The Ambrosian Opera Chorus,  
Anna Mollo-Heroines from  
Great French Operas ARD1-0644  
Tomita Pictures at an  
Exhibition ARD1-0838  
C. Gerhardt/National Philharmonic Orch.  
Spellbound/The Classic Film Scores  
of Miklos Rozsa ARD1-0911



The Eagles  
On The Border EQ-1004  
The Scuther Hillman  
Fury Band EQ-1006  
Jackson Browne  
Late For The Sky EQ-1017  
Sergio Mendes EQ-1027  
David Gates  
Never Let Her Go EQ-1028  
Judy Collins  
Juju EQ-1032  
Carly Simon  
Playing Possum EQ-1033  
Tony Orlando & Dawn  
He Don't Love You EQ-1034



Seals & Crofts  
Summer Breeze BS4-2629  
America  
Holiday W4-2808  
Randy Newman  
Good Old Boys MS4-2192  
Maria Muldaur  
Waltress in the Dining Shop MS4-2194  
Jeffrey Tamb  
Cafe-1844  
War Child CH4-1067  
Allman Brothers Band  
At Fillmore East CX4-0131  
Seals & Crofts  
Unborn Child WS4-2761  
The Doobie Brothers  
What Were Once Vices WS4-2750  
Alice Cooper  
Muscle of Love BS4-2748  
The San Sebastian Strings  
Summer BS4-2707  
Seals & Crofts  
Diamond Girl BS4-2699  
The Doobie Brothers  
The Captain and Me BS4-2694  
Alice Cooper  
Billion Dollar Babies BS4-2685  
James Taylor  
One Man Dog BS4-2660  
Deep Purple  
Machine Head BS4-2607  
Black Sabbath  
Paranoid WS4-1887  
Frank Sinatra  
Some Nice Things I've Missed F4-2195  
Gordon Lightfoot  
Sun Down MS4-2177  
Frank Sinatra  
Oh, Blue Eyes Is Back FS4-2195  
Arvo Guthrie  
Last of the Brooklyn Cowboys MS4-2142  
Frank Sinatra  
Frank Sinatra's Greatest Hits,  
Vol. 2 FS4-1034  
Frank Sinatra  
My Way FS4-1029  
Frank Zappa  
Apostrophe DS4-2175  
The Mothers  
Overnite Sensation DS4-2149  
Mystic Moods  
Love the One You're With BS4-2577  
Doobie Brothers  
Toulouse Street BS4-2634  
Mystic Moods  
Highway One BS4-2648  
Highway One BS4-2658  
Mystic Moods  
Awakening BS4-2690  
Mystic Moods  
Clear Light BS4-2743  
Grit Bird, South  
Sounds of Railway BS4-2751  
Steam Engines  
(Railroad Sounds) BS4-2757  
Last Train to Waterloo BS4-2757  
Mystic Moods  
Erogenous BS4-2786  
Storm and the Sea BS4-2788  
Graham Central Station BS4-2783  
Deep Purple BS4-2832  
Stormbringer BS4-2832  
The Doobie Brothers  
Stampede BS4-2835

Dionne Warwick  
On The Border BS4-2846  
Seals & Crofts  
I'll Play for You BS4-2846  
America  
Hearts BS4-2852  
Gordon Lightfoot  
Cold On The Shoulder BS4-2205  
Frank Sinatra  
The Main Event BS4-2207  
The Allman Brothers Band  
Eat a Peach 2C4-0102



Varese  
O'Riendes, Integrates, Octandre  
Educatonal HQ-1269  
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Kurt Weill  
Music From The Threepenny  
Opera/DARJUS MILHAUD HQ-1281  
La Creation Du Monde HQ-1283  
George Rochberg  
String Quartet 1-3 HQ-1284  
Piano Music by  
George Gershwin HQ-1286  
L'Ambranso HQ-1291  
Perkussion Music HQ-1291  
Crumb HQ-1293  
Mavroskosmos, Volume 1 HQ-1295  
Gornet Favorites HQ-1301  
Festival of Trumpets HQ-1301



Wonderful! CD-4 Sound CD4B-5001  
New Creative Sounds/The Dock of  
the Bay CD4B-5002  
The Latest Film Themes/  
The April Fool CD4B-5003  
I Dream of Naomi/  
The Sound Limited CD4B-5004  
Love, Mary and Other Great  
Movie Themes CD4B-5005  
4 Dimensions by 4 Saxos CD4B-5006  
Toshiko Akoyoshi/  
The Personal Aspects in Jazz CD4B-5007  
Latin Rhythm Festival CD4B-5008  
Rock & Drums/Eleanor Rigby  
Green Green Grass of Home/  
Country Songs CD4B-5010  
Rock & Drums/Free  
Harlem, Nocturne Fascinating  
Tenor Sax CD4B-5012  
Moog Sounds/Black Magic  
Woman CD4B-5015  
Your Favorite Russian Folk  
Songs CD4B-5021  
Bridge Over Troubled Water  
Beyland/The Reel/Hawaiians  
Urnamchi, Jensei/Main Vocal  
Dazzling Trumpets/Fight of  
the Bumble Bee CD4B-5028  
Frank Nagra/Marie Vocal  
Godfather/Tenor Sax CD4B-5029  
The Shadow of Your Smile/  
Fantastic Sound CD4B-5032  
Latin Drums/Spinning Wheel  
Exodus CD4B-5033  
Golden Screen Themes/  
The Graduate CD4B-5038  
Victor CD-4 Sound Orchestra  
Excellent CD-4 Sound (II) CD4B-5037  
The More I See You/Primo CD4B-5038  
Mina Aze Big Hit/Female Vocal  
Yuri Furi Suroi CD4B-5039  
New Dimensions Group CD4B-5040  
Victor Orchestra and Latin  
Rhythm Boys Latin Festival CD4B-5042  
Folk & Rock CD4B-5044  
The Garnets CD4B-5045  
Moog Electric Sounds,  
Eiji Kitamura and others  
Eiji Kitamura on Stage,  
Swinging Claret CD4B-5048  
J.S. Bach/Musikakademie Opfer CD4B-5049  
Golden Jam Sessions at Junk  
Victor Orchestra CD4B-5049  
The Latest Screen Music  
Best 13 CD4B-5050  
CD-4 Sound Orchestra  
CD-4 Sound Special CD4B-5063  
Aiko Sprague Zarathustra CD4B-5063

The Jewels of the Madonna/  
Nini Rosso CD4W-7001  
My Shikell CD4W-7002  
The World of Francis Lai  
Days of Youth and Cherry  
Blossoms CD4W-7003  
Marches of the World  
Art Blakey and the Jazz  
Messengers CD4W-7004  
Mambo Jambo CD4W-7005  
The World of Michel Legrand  
Godfather/Sound of Cine Action CD4W-7006  
The Godfather/Nini Rosso CD4W-7010  
Nini Rosso in Concert CD4W-7015  
Mandolin Serenade  
One For Lady Live Jazz/  
Kumi Kasai, Mai Wadron CD4W-7016  
Golden Screen Music CD4W-7017  
Russian Folk Songs/Nini Rosso CD4W-7019  
Cuarteto Roberto Pansera  
La Comparsita CD4W-7020  
Glen Miller Orchestra  
A String of Pearls CD4W-7021  
Glen Miller Orchestra  
Moonlight Serenade CD4W-7024  
Orquesta Frenchie/Ponier  
Tanguera/Frenchie with Pointor CD4W-7025  
Lady Sings The Blues CD4W-7025  
Nini Rosso CD4W-7030  
Adoro CD4W-7031  
Golden American Screen  
Themes CD4W-7031  
Jack de Mello Hawaiian Art Stars  
Hawaiian Sound in CD-4 CD4W-7032  
The Film Studio Orchestra  
The Poseidon Adventure CD4W-7033  
Los Quilla Huasi CD4W-7034  
El Concor Paso CD4W-7034  
Paul Yoder and His Brass Orchestra  
Marches of the World II CD4W-7035  
Los Quilla Huasi CD4W-7036  
La Comparsita CD4W-7036  
The Film Studio Orchestra  
Themes from "007" Series CD4W-7038  
Perez Prado and His Orchestra  
Perez Prado in CD-4 CD4W-7042  
Francini y su Orquesta Sinfonica  
Continental Tango in CD-4 CD4W-7055  
Nini Rosso  
Nini Rosso Plays Western Movie  
Themes CD4W-7056  
Sunny Rollins  
Sunny Rollins in Japan CD4W-7059  
Nini Rosso  
Nini Rosso Plays Francis Lai  
Blue Seas Grand Orchestra CD4W-7060  
Poetry of the Sea CD4M-7001  
Locomotive Sounds in CD-4 CD4K-7001  
Live in Nema, Vol. 1/  
Shoji Suzuki CD4K-7002  
Live in Nema, Vol. 2/  
Shoji Suzuki CD4K-7003  
Locomotive Sounds in CD-4,  
Vol. 2 CD4K-7004  
Bizet, Carmen Suite/Serge Baudo,  
Yomhuri Symphony CD4K-7501  
Mrs. Piano Concerto/  
H. Wakasugi, Symphony CD4K-7502  
Bach, Brandenburg Concerto No. 5/  
Deutsche Bach Solisten CD4K-7503  
Khachaturian, Violin Concerto/  
I. Tokunaga, The Tokyo  
Symphony CD4K-7504  
Bach, Toccata & Fugue in D Minor/  
A. Webersinke CD4K-7507  
Vivaldi, Flute Sonata No. 4/  
S. Gazzelloni CD4K-7509  
Beethoven, No. 3, Eroica/K. Masur,  
Gewandhaus Symphony CD4K-7510  
Beethoven, No. 5, Coriolan/K. Masur,  
Gewandhaus Symphony CD4K-7511  
Beethoven, No. 6, Pastorale/K. Masur,  
Gewandhaus Symphony CD4K-7512  
Mahler, Symphony No. 8/T. Asafina,  
Osaka Philharmonic Orchestra CD4K-7513  
Helmut Winschermann/Deutsche  
Bachsolisten CD4K-7515  
J.S. Bach/"Musikakademie Opfer"  
K. Masur/Gewandhaus Orch., Leipzig  
Symphony No. 7 A Major Op. 92/  
The Men of Prometheus, Overture  
Op. 43/Konig Stephen, Overture  
Op. 117 CD4K-7517  
K. Masur/Gewandhaus Orch., Leipzig  
Symphony No. 4B Major Op. 60/  
The Consecration of the House,

Overture Op. 124, Ruins of  
Athens Overture Op. 113 CD4K-7520  
K. Masur/Gewandhaus Orch., Leipzig  
Symphony No. 1 C Major Op. 21/  
Symphony No. 8 F Major Op. 93 CD4K-7521  
Kurt Masur/Gewandhaus Orch., Leipzig  
Beethoven/Music from Fidelio CD4K-7524  
Vaclav Hudecek/Josef Mala  
Beethoven/Sonata for Violin and  
Piano No. 5 "Spring" F Major Op. 24/  
Sonata for Violin and Piano No. 9  
G Major Op. 30 CD4K-7525  
Beethoven, Complete Set of Nine  
Symphonies/K. Masur CD4K-7530/7  
Gewandhaus Symphony



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Spanish Strings PR-5086CD  
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Twenty-One Trombones PR-5024CD  
V. Lawson & B. Haggart  
World's Greatest Jazzband PR-5033CD  
Enoch Light  
The Brass Menagerie PR-5086CD  
Tony Mottola  
The Best of Tony Mottola PR-5041CD  
Spaced Out  
Music of Bach, Bacharach &  
The Beatles PR-5043CD  
Enoch Light  
Permissive Polyphonic PR-5048CD  
Enoch Light  
The Big Band Hits of '30s PR-5049CD  
Enoch Light  
The Big Band Hits of the  
'30s & '40s PR-5056CD  
Enoch Light  
The Brass Menagerie '73 PR-5086CD  
Tony Mottola  
Superstar Guitar PR-5062CD  
4 Channel Dynamite! PR-5086CD  
Tony Mottola  
Tony & Strings PR-5069CD  
Enoch Light  
Charge! PR-5073CD  
Big Band Hits of the '40s & '50s PR-5076CD  
Enoch Light  
Future Sound Shock PR-5077CD  
Tony Mottola & The Quad  
Guitars PR-5078CD  
The Nashville Jets  
Nashville Now PR-5079CD  
Enoch Light  
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the Decade PR-5081CD  
Tony Mottola  
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Enoch Light and Brigades  
Great Hits From the Galsby Era PR-5086CD  
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Love the One You're With SB4-7508  
Erogenous SB4-7509  
Awakening SB4-7510  
Sounds in Motion SB4-4501  
Green Board Sound SB4-4502  
Last Train to Waterloo SB4-4503  
Storm & The Sea SB4-4551  
Mystic Moods  
"Love the One You're With" BS4-2577  
Mystic Moods  
"Highway One" BS4-2648  
"Sound in Motion" BS4-2656  
Mystic Moods  
"Awakening" BS4-2690  
Mystic Moods  
"Clear Light" BS4-2745  
Sounds of Railway  
Steam Engines BS4-2751  
Last Train to Waterloo  
(Railroad Sounds) BS4-2757

Mystic Moods  
"Erogenous" BS4-2788  
"Storm and the Sea" BS4-2788



Rick Wakeman  
Journey to the Centre of the  
Earth GU-53621  
Rick Wakeman  
The Myths and Legends of King  
Arthur And The Knights of the  
Round Table GU-54515  
Chuck Mangione  
Chase the Clouds Away GU-54816



Bob Kroghstad Singers  
Happiness ZLP-9125



Mothers-Overnite  
Sensation S4-2149  
Frank Zappa  
Apostrophe S4-2175



Jethro Tull  
Aqualung CH4-1844  
Jethro Tull  
War Child CH4-1067



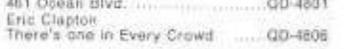
Allman Brothers Band  
At Fillmore East CX4-0131



Black Oak Arkansas  
Raunch 'N' Live QD-7019  
Donny Hathaway  
Extension of A Man QD-7029  
Black Oak Arkansas  
Street Party QD38-101  
James Gang  
Miami QD36-182



Mike Oldfield  
Tubular Bells QD15-105



Eric Clapton  
481 Ocean Blvd. QD-4801  
Eric Clapton  
There's one in Every Crowd QD-4806



George Flynn  
John Cage QD-9006  
Eric Salzman  
Wretap QD-9005



Bill Wyman  
Monkey Grip QD-79100



A lot of People Would Like to See Armand  
Schaubroek - Dead Armand Schaubroek  
Steals



Harlow  
Live in Quad GXSLP-00472

# Coming to terms with quadraphonic.

Every new technological advancement brings with it its own unique language. Words that suddenly mean something different than they've ever meant before. Words that have been invented to describe the features and functions of a new invention.

Quadraphonic sound—an invented term in itself—is no different. To help you understand 4-channel sound reproduction on its own terms, we offer the following glossary of quadraphonic vernacular.

## **ambience:**

A sound characteristic resulting from reverberance—such as the effect that occurs in a concert hall when the direct sound of an instrument reaches your ear a split second ahead of the same sound after it's been reflected off the walls and ceiling of the auditorium.

## **carrier:**

The primary signal transmitted in radio broadcasting. Also used to describe the ultrasonic frequency signal that provides the two additional discrete channels on the CD-4 Quadradisc.

## **CD-4:**

Stands for Compatible discrete 4-channel.

The only full range discrete 4-channel disc system on the market. Bears the trade name "Quadradisc."

## **channel:**

A sound path. Monaural (mono) systems utilize a single channel. Stereo uses two channels—left (L) and right (R). Quadraphonic sound has four channels—left front (Lf), right front (Rf), left back (Lb) and right back (Rb).

## **compatibility:**

The ability of source material to be used equally well on monaural, stereo or quadraphonic playback equipment.

## **crosstalk:**

A blending of information between one channel and another which reduces

separation and decreases the full dynamics of the original master recording. Particularly detrimental to quadraphonic sound accuracy.

## **decoder:**

An electronic device that takes matrix encoded signals and translates them into 4-channel output.

## **demodulator:**

Circuit used to extract the four discrete channels from the CD-4 Quadradisc.

## **discrete:**

A constantly independent audio signal, such as those stored on each track of a master tape. Also used to describe the type of sound produced by the CD-4 Quadradisc system.

## **Dorren system:**

A discrete 4-channel FM broadcasting system. Named for its inventor, Lou Dorren.

## **dynamic range:**

The volume span between the softest and loudest sounds or electrical signals.

## **four (4)-channel sound:**

See "quadraphonic sound."

## **integrated circuit:**

The "IC" or "chip." A miniature electronic circuit, sometimes as small as a pinhead, that performs the same equivalent functions of larger conventional circuits. Has provided the means to put complex electronic circuits into equipment with relatively compact dimensions.

## **joystick:**

A panning-type audio control designed to facilitate 4-channel balancing. Usually on the panel of the 4-channel receiver. Performs the same function as separate left-right, front-rear controls.

## **logic:**

A special circuit in an SQ matrix decoder that electronically reconstructs some of the quadraphonic effect lost during the SQ encoding-decoding process. Various degrees of logic are provided in playback equipment, but only a "full logic" circuit has the ability to reproduce quadraphonic recordings with separation approaching that of present stereo records—and then only under special conditions.

## **matrix:**

Any system that reproduces quadraphonic sound by mixing 4 channels into two (encoding), and electronically returns them to four channels (decoding) during the playback process. Also referred to as the "4-2-4" system.

## **phase lock loop:**

A feedback circuit that maximizes frequency accuracy and stability in FM tuners and multiplex decoders. Also used to assure utmost accuracy in CD-4 demodulators.

## **Quadradisc:**

The trade name for the CD-4

discrete 4-channel record.

## **quadraphonic broadcasting:**

4-channel transmission via FM signal. Although no standard system has yet been adopted, tests are currently being conducted in both the matrix and discrete formats. Since FM broadcasters consider matrix to be basically a stereo system, the greatest test interest has been in the discrete area. The selection of a standard 4-channel FM system is expected about a year after those tests are concluded and the results submitted to the FCC.

## **quadraphonic sound:**

Also called "quadrasonic" and often shortened to "quad." All refer to the sound field created by information being recorded and reproduced from four different directions—a 360 degree circle of sound with the listener in the middle. This is accomplished by recording four separate channels on a master tape, then reproducing them through four separate amplifiers and four separate speakers in the listening room. Considered by many experts to be a greater advancement in sound reproduction than stereo was to mono.

## **QS:**

See "RM."

## **Q-8:**

8-track tape cartridges containing 4-channel programming.

## **RM:**

Stands for "regular matrix." Also known as the QS system.

## **separation:**

The degree of isolation maintained during the stereo or quadraphonic recording and reproduction process. The opposite of "crosstalk." A high degree of separation prevents dilution and distortion of the sound field present on the original master tape.

## **Shibata stylus:**

An advanced stylus design created to reproduce the discrete 4-channel disc, yet provide perfect compatibility with existing stereo or monaural records. Permits retrieving of signals up to 60,000 Hertz. Also provides longer record life than elliptical stylus tracking at the same pressure.

## **SQ:**

The matrixing method developed by CBS Records for encoding four channels of sound into two channels. Stands for "stereo-quadraphonic."

## **synthesizer:**

Electronics that enhance 2-channel recordings when played through a 4-channel system.

## Q&A×4.

Even though quadraphonic sound has been around for many years now, there are a number of disturbing questions that still cast their shadows on the efficacy of the 4-channel medium. Since one of the prime functions of this publication is to shed more light on the field of quadraphonic sound, we present the questions we most frequently encounter about 4-channel sound's present position and future potential, along with answers we hope will reduce some of the unnecessary apprehension that surrounds it.

**Q** Where is 4-channel sound going in the U.S.? Is it, as many say, dying out as a market entity?

**A** Quadraphonic sound is more alive than it ever has been, and it's getting healthier all the time. Today, however, the audio industry has a much more realistic view of its growth potential. It has not become, as some initially professed, a complete revolution in the marketplace, nor was it ever realistic to believe it would be. Quad is not a revolution, but instead an evolution. An orderly growth in the hardware marketplace geared to as fast a software growth as can be reasonably expected from record companies. In addition, new technological achievements in quadraphonic integrated circuitry have recently made their appearance. Which now means better performance at a lower price—and an increase in the market potential. Add to it the fact that quadraphonic software releases continue to emerge, quadraphonic hardware sales continue to grow, and many touring rock groups and motion picture theatres have now converted to quadraphonic sound systems. It simply means that 4-channel sound is very much alive, and its growth rate may surprise us all very pleasantly.

**Q** When will the battle of the systems be over, and who will be the winner?

**A** In the tape format, there are no competing systems. With the disc, however, there is, on the

surface at least, a battle between two matrix systems and one discrete disc system. Our advice to the consumer is simply that he shouldn't worry about any battle. Just buy the program material he wants regardless of the format. Nearly all new 4-channel receivers provide circuitry to reproduce both matrix and discrete formats, so the consumer really won't have to make any choice at all. From our point of view, the battle of the 4-channel disc is also over. There is only one real 4-channel disc—the CD-4 Compatible Discrete Disc. As we see the future of the quadraphonic disc, the discrete catalog will grow rapidly and eventually the matrix systems will be relegated to their primary role—enhancement of stereo product.

**Q** Are retail dealers responding favorably to 4-channel in both hardware and software markets?

**A** As dealers and salesmen on the retail level gain greater experience in the 4-channel medium, their response is becoming increasingly more enthusiastic. Software dealers are now asking for larger stocks of Quadradiscs. Audio hardware dealers are devoting more display and demonstration space to 4-channel equipment. In fact, those dealers who have made a full commitment to 4-channel are finding that it is representing a larger and larger portion of their overall business. The key to quadraphonic growth, however, is knowledge and the dissemination of accurate, understandable information about it. We hope this publication will help toward that end.

**Q** Is 4-channel software getting easier to find?

**A** The prime factor a record retailer has to consider is product movement. He has to give the most room to the product that moves through his store the quickest. There is no question that currently stereo records are that product. However, with more and better 4-channel records becoming available and a more positive attitude about the future of the 4-channel disc, sales of quadraphonic product are moving closer to those of stereo product, accounting for a more significant share of the retailer's profit. For that reason alone, the availability of 4-channel software has increased dramatically in the past year. Add to that the fact that record producers now see the potential of the 4-channel disc and are recording more and more of their artists in this medium. A bigger quadraphonic catalog means greater consumer interest and a correspondingly great availability of 4-channel software at the retail level.

**Q** How fast is the 4-channel software catalog growing, and how fast will it grow in the future?

**A** It is difficult to view the growth of the catalog apart from the world's economic developments. There is always a shortage of product during the initial introduction of any software medium, because it is simply impossible to "create" a catalog of 1500 or so items in as short a time as hardware manu-

facturers can bring out three or four models of electronics. Add to that the material shortage caused by such an unpredictable thing as a petroleum shortage.

As 1974 progressed, however, there was a significant relaxation of the compound shortage, and quadraphonic releases are back on schedule. Right now, the total availability of CD-4 product in the U.S. is about 200, and the hopes are to at least double that number by the end of 1975.

**Q** Is a 4-channel sound system a lot more expensive than a stereo system?

**A** Since additional circuitry and additional speakers are needed for 4-channel reproduction, a quadraphonic system is initially more expensive than an equivalent stereo system. However, with new developments in IC's and 4-channel technology, excellent quadraphonic systems can now be assembled for about the same outlay as a medium-priced stereo system. But whatever the additional cost, any truly involved music lover who has already made the 4-channel investment will tell you that the new experience in total sound it provides is well worth it—and more.

**Q** What do 4-channel records cost?

**A** CD-4 records cost only slightly more than stereo records—about 20% on the average—yet deliver twice as much information and an exciting new musical dimension to the listener.

**Q** What is the playing time of a 4-channel disc?

**A** Essentially the same as a stereo disc.

**Q** Will a 4-channel disc system still play my stereo records?

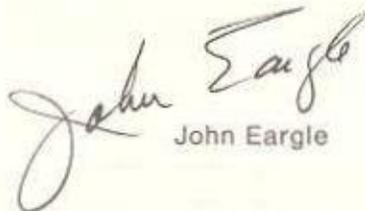
**A** Absolutely. Any system designed to play CD-4 records will also play any standard stereo record—but with a new degree of depth possible only with a 4-channel playback system.

**Q** Are 4-channel records any more difficult to handle than a stereo record?

**A** No. Simply clean them frequently as you would a standard stereo record, use the proper stylus pressure, and your CD-4 disc should deliver the same amount or even more performance life than the same stereo disc.



As a recording engineer, I have always felt that any quad disc system must offer the listener true concert hall realism and spatial integrity. To achieve this result it must have the same degree of separation which is inherent in a 4-channel master tape. In the long run, the consumer will be satisfied with nothing less. CD-4 has evolved rapidly over the last two and one half years and represents the only practical disc system embodying discrete performance.

  
John Eargle

John Eargle is one of America's foremost authorities in the field of sound recording. His present company, JME Associates, is a consultant to the CD-4 advocates Panasonic, JVC, RCA Records and the WEA Record group in areas related to four-channel technology. He holds the Degrees of Bachelor of Music, Bachelor of Science, Master of Music, and Master of Engineering. Mr. Eargle has written and lectured extensively in areas of recording technology. He is a member of the Acoustical Society of America, a senior member of the Institute of Electrical and Electronic Engineers, and currently president of the Audio Engineering Society.

It takes someone with a special kind of artistic appreciation to comprehend the aural magnitude of quadraphonic sound. Someone who wants to hear more than sound, listen to more than music. Someone who is totally involved in the music as well as the medium. If you've taken the time to read this entire booklet, you're that someone. And if you'd like someone who feels the same as you do to keep you informed about the latest developments in quadraphony, simply send your name and address to:

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A free copy of our informative newsletter, CD-4 Forum, will be sent to you each time it's published—our way of saying "thanks for being someone special."

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