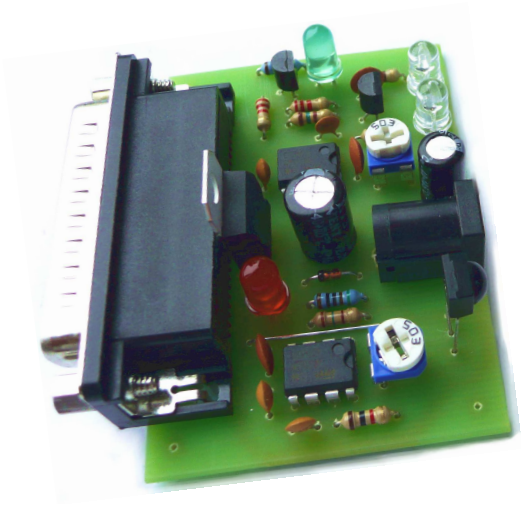
EPSICOM

Ready Prototyping

Colecția Proto Lab-Service **EP 0089**



Cuprins

Prezentare Proiect
Fișa de Asamblare
1. Funcționare 2
2. Schema 2
3. Lista de componente 3
4. PCB 3
5. Descriere program 4
6. Program C++ 6 - 12

IR RECORD PLAYBACK
ÎNREGISTRARE REDARE
SEMNALE IR TELECOMENZI

- Avantaj Pret/Calitate
- Livrare rapida
- Design Industrial
- Proiecte Modificabile
- Adaptabile cu alte module
- Module usor de asamblat
- Idei Interesante

Idei pentru afaceri

Hobby & Proiecte Educationale

www.epsicom.com/kits.php
a division of **EPSICO Manufacturing**

Construcție compactă a unui IR receiver-transmitter cu posibilitatea memorării semnalului, analizarea acestuia și retransmiterea prin portul paralel. Inițial, proiectul a fost dezvoltat de Chris Dodge pentru controlul diverselor aparate precum televizoare, CD, tunere,... cu ajutorul unui PC.

Caracteristici:

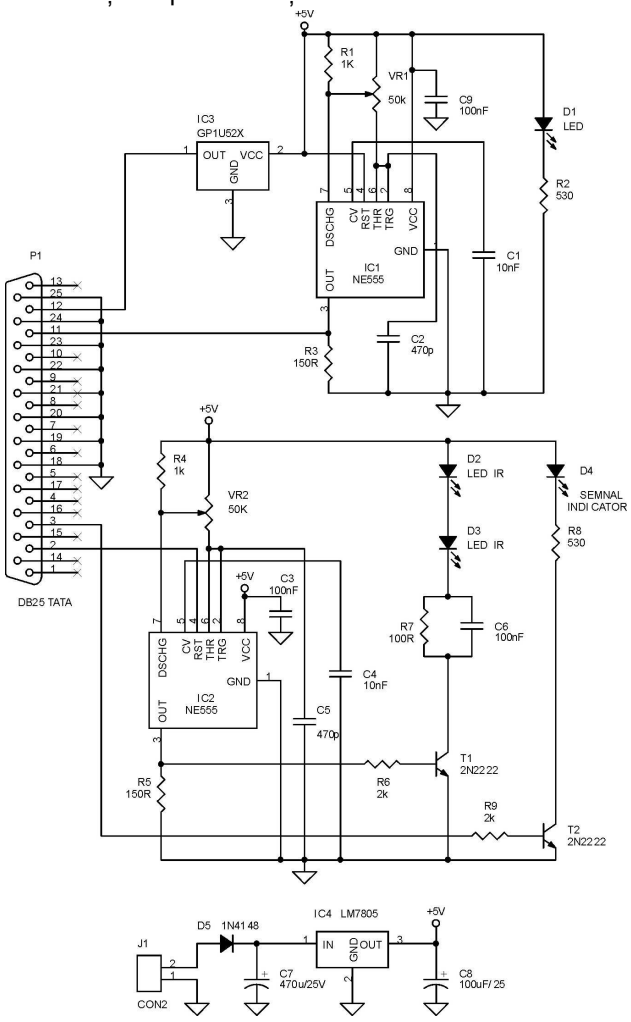
- **Construcţie On Board**
- **Tensiune alimentare 8-12Vcc**

Funcționare

Semnalele de control la distanță în infraroșu sunt modulate cu o purtătoare de 40KHz. Funcție de codul folosit, acestea conțin adrese, date, nr. de cicluri .. astfel că înainte de a începe contrucția acestor dispozitive trebuie cunoscut foarte bine codul cu care lucrăm și frecvența exactă de emisie și recepție. Altfel totul devine straniu, inacceptabil și pur și simplu NU MERGE.

Circuitul este simplu și se bazează pe cele două blocuri, emițător și receptor, plasate pe același PCB cuplat pe portul paralel al PC-ului pentru comunicație bilaterală cu un modul emițător sau receptor situat la o distanță de până la câțiva metri. Semnalele folosite sunt "Paper Tray Empty" și "Printer Busy" ca intrări și Data Lines ca ieșiri 0 și 1.

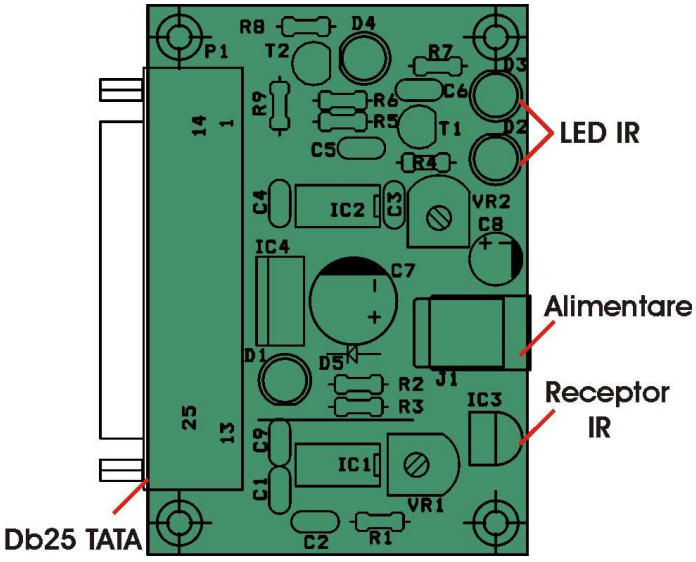
Ca receptor s-a folosit un detector IR cu demodulator integrat, ce are și funcția de sincronizare, a cărui ieșire este cuplată direct la PC. Problema interfațării cu PC-ul este determinarea frecvenței de eșantionare rezolvată cu un timer extern tip NE555. Programul generează semnalele stocate și le generează prin portul paralel pin 2, le modulează cu frecvența purtătoarei de 40KHz generată de un al doilea 555 și le transmite către led-urile D2 și D3 în IR.



Schema electrică

Lista de componente

Nr.Crt.	Componenta	Denumire	Valoare	Cant
1	C1,C4	Condensator NP	10nF	2
2	C5,C2	Condensator NP	470pF	2
3	C3,C6,C9	Condensator NP	100nF	3
4	C7	Condensator POL	470µF/25V	1
5	C8	Condensator POL	100µF/25	1
6	D1,D4	LED	LED	2
7	D2,D3	LED Emitator IR	LED IR	2
8	D5	Diodă	1N4148	1
9	IC2,IC1	C.I.	NE555	2
10	IC3	Receptor IR	GP1U52X(SFH5110)	1
11	IC4	C.I.	LM7805	1
12	J1	Alimentare	CON2	1
13	P1	Conector	DB25 tată	1
14	R1,R4	Rezistență	1KΩ	2
15	R8,R2	Rezistență	530Ω	2
16	R5,R3	Rezistență	150Ω	2
17	R9,R6	Rezistență	2KΩ	2
18	R7	Rezistență	100Ω	1
19	T1,T2	Tranzistor	2N2222	2
20	VR1	Semireglabil	50KΩ	1
21	VR2	Semireglabil	50KΩ	1



Amplasarea componentelor

Acest produs se livrează în varianta circuit imprimat, circuit imprimat + componente sau în varianta asamblată în scopuri educaționale și va fi însoțit de documentația completă de asamblare pe CD.

Programul executabil pentru înregistrarea, analiza şi memorarea semnalelor IR recepţionate a fost scris în C++ de ***Chris Dodge***

Datele IR

Datele sunt stocate în forma prezentată în fișierul IRINFO.DAT.

Fiecare aparat (Video, TV, etc.) are nevoie de mai mulți parametri pentru un descrierea completă a semnalului, plus semnalul de date. Fișierul IRINFO.DAT este accesat de program și conţine valori proprii pentru un aparat dacă doriți să captați semnal, plus denumirea semnalului și semnale propriuzise. Acest lucru este usor de facut într-un text editor, dar trebuie să vă adere la formatul givenName mai târziu.

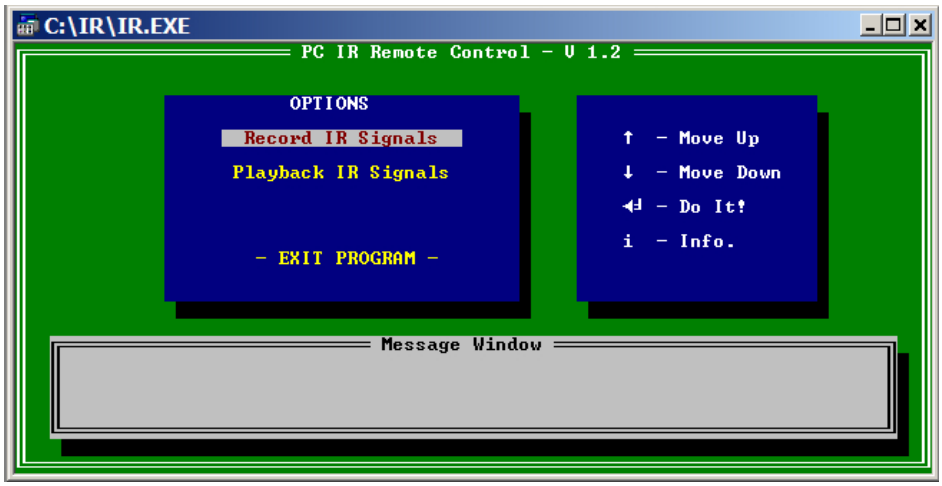
După ce ați folosit programul pentru analiza semnalelor, datele sunt înscrise în fișierul IRTEMP.DAT şi pot fi examinate cu orice text editor, și dacă corespund , pot fi copiate în fişierul IRINFO.DAT pentru următorul set de semnale sau testări.

Meniul principal al programului IR

Meniul principal program vă oferă două opțiuni:

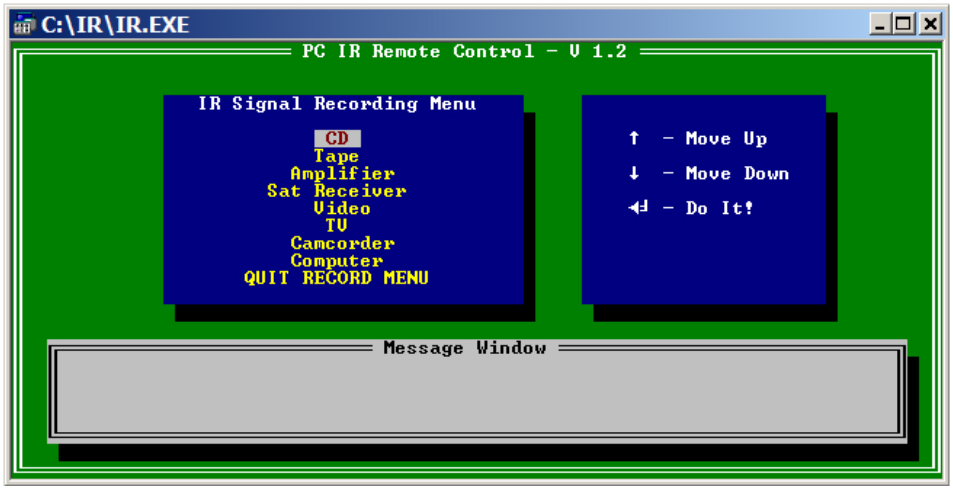
- înregistrarea semnalulelor IR,
- redarea semnalelor.

Redarea reprezintă cea mai convenabilă metodă de testare a datelor și/sau hardware-ul cu multe alte aplicaţii de comandă a echipamentelor cu ajutorul PC-ului.



Înregistrarea Semnalelor

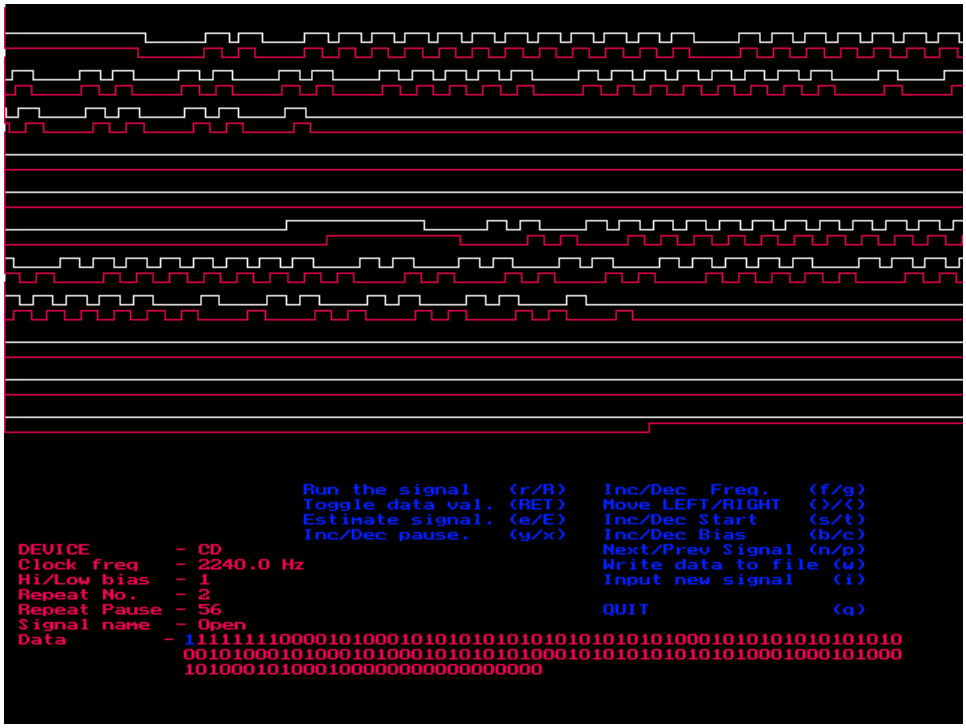
Din acest Menu se selectează aparatul ale cărui semnale captate vor fi înregistrate ca date.



Parametrii dispozitivului și semnalelor sunt notate cu roșu iar instrucțiunile cu albastru. Cele două semnale (albe și roșii) sunt semnalul de intrare de la detector și semnalul calculat din fișierul de date.

Cum captăm semnalul?

a) Fişierul IRINFO.DAT va avea configurate toate semnalele de intrare pe care dorim să le captăm pentru aparatul dorit.
b) Cuplam hardware-ul
c) Selectăm modul captare dim Menu (de mai sus) și apăsăm "i" (pentru intrare).
Programul așteaptă apoi semnalele IR de intrare. Dacă nu avem hardware-ul conectat, rutina de înregistrare se oprește iar singura cale de ieșire este comutatorul de resetare.
d) Odată captat, semnalul va fi afișat. Apasăm 'e' (pentru estima), iar programul va încerca să estimeze semnalul captat.
e) Pentru a obține un semnal stocat similar cu originalul va trebui să facem câteva teste.Scopul este de a obține pe ecran un șir de date aproape identic cu semnalul de la telecomandă. Pentru primele semnale captate de la un aparat va fi necesar să acordam mai multă atenţie la frecvența după care să fie identice pentru restul.
Acest lucru, se face adaptând frecvența, hi/low, etc, prin apăsarea tastei "e", pentru a vedea ce am recepţionat. Dacă este necesar, vom ajusta valoarea offset start pentru a obține două semnale în fază, pentru funcționare corectă. Dacă nu putem obține semnalul fayate, putem edita manual șirul de date prin mutarea cifrei cu tastele cursor, ca in imaginea de mai jos:



Prin utilizarea tastei SHIFT și a caracterului de control vom incrementa/decrementa parametri cu10.
e) Dacă dvs. de lucru apropiați, încercați să "r" la semnalul RUN. Are TV, video, sau orice răspunde?
f) Apăsăm pe "n" pentru semnalul următor și repetăm procesul de mai sus .... pentru semnalul urmator.
g) Dacă am finalizat înscrierea semnalelor, apăsăm "w" pentru înscrierea datelor în fișierul de ieșire IRTEMP.DAT.

Redarea semnalelor
Avem posibilitatea de a testa toate semnalele captate.
Opțiunea "repetare semnal" este o opţiune de a genera semnalul ales o dată la fiecare secundă. Acest lucru poate fi util la poziționarea transmițătorului IR sau ajustarea frecvenței ceasului (circuitului NE555) la redare pentru a obține un răspuns bun.

Programul **PC IR - C ++**
Formatul fișierului de date (IRINFO.DAT) este explicat aici, dar poate este mai ușor să ne uităm pur și simplu la un exemplu. Vă recomandăm crearea unui fișier de date cu valori false înainte de a începe programul de IR. Este mult mai uşor dacă programul are datele editate decât să creem totul de la zero.

```
Comments start with a '#'

 # Info for IR Remote control
    # Chris Dodge - May 1994
```

The paramters for a particular device use a name, in this case 'Sat' . This name is used by programs to refer to this data.

Clock - frequency of IR signal itself (not the modulation frequency).

Sat Clock 1726.000000

Bias - the difference in the high/low signal ratio.

Sat Bias 10

SignalNo - the number of signals for 'Sat'.

Sat SignalNo 27

SignalLen - the length of the signal data string for 'Sat'.

Sat SignalLen 150

Repeat - number of times the signals are repeated.

Sat Repeat 1

Pause - If the repeat value is > 1, then this is the pause between repeats (units of a single data string value).

Sat Pause 0

The signal data itself, in the form: [Device] Signal [Signal Name] [Data]
That is, the keyword MUST be there, to indicate that this is a signal, what's in the other fields are up to you.

Sat Signal Standby 11111111111111111000000001.....

```
// $Id: irutils.h_v 1.1 1994/06/09 20:57:37 chris Exp chris $
// Utilities for programs using the IR remote controller
// This class automatically loads the data and allows
// easy calling of the various signals.
// Chris Dodge - May 1994
#include "irdefs.h"
// -- ASM functions --
extern int PlayIR(char*, int);  // ASM - Play signal back
// Global vars
char Signal[SIZE];
class IRDEV {
private:
        DeviceData DeviceDat;
        SigDat SigData[SIGNO];
        int ReadData(char*, DeviceData*, SigDat[]);  // Reads data for this device
        void CalcSignal(int, int, int);  // Calcs signal from data
public:
        void LoadData(char*);  // Loads data from file
        int SigCount();  // Returns signal count
        void PlaySignal(char*);  // Plays a signal
        void PlaySignal(int);  // Plays a signal (numeric)
};
// Loads data from disk for this device
void IRDEV::LoadData(char *DevName)
{
        if (ReadData(DevName, &DeviceDat, SigData)) {
                fprintf(stderr, "ERROR: Can't initialize IRDEV class - data file not found!\n");
                exit(1);
        }
        return;
}
// Returns the no.  of signals for this device
int IRDEV::SigCount()
{
        return DeviceDat.SignalNo;
}
```

```
// Plays the signal with the name passed
void IRDEV::PlaySignal(char *Name)
{
	int i=0, j;
	// Search for this string in the signal names
	while (i   SIZE) To = SIZE;
			if (From >= SIZE) return;
			for (j=From; j   Name, Dev);
	SigCount = 0;  ValidityCount = 0;
	// Read the data file.....
	do {
		// Read each line....
		ch = fgetc(data);
		ChPos = 0;
		type = 0;
		while ((ch!='\n')&&(ChPos<(SIGLEN+18))&&(ch!=EOF)) {
			line[ChPos] = ch;
			ChPos++;
			ch = fgetc(data);
		}
		line[ChPos] = '\0';  // Null-terminate line.
		// Cancel previous values otherwise they stay on NULL lines
		// ie.  they are not cleared by scanf
		sprintf(ThisDev, "\0");
		sprintf(Signal, "\0");
		// Extract the device type and info type
		NoFields = sscanf(line, "%s %s", ThisDev, Info);
		// If this device is of the wanted type, then read data
		// else ignore.
		if (!(strncmpi(ThisDev, Dev, strlen(Dev)))) {
			// Act on the word type option.
			if (!(strcmpi(Info, "Clock"))) {
				NoFields = sscanf(line, "%s %s %f", ThisDev, Info, &F);
				DeviceDat->Clock = F;
				ValidityCount++;
			}
			if (!(strcmpi(Info, "Bias"))) {
				NoFields = sscanf(line, "%s %s %d", ThisDev, Info,
                                                                                &DeviceDat->Bias);
				ValidityCount++;
			}
			if (!(strcmpi(Info, "SignalNo"))) {
				NoFields = sscanf(line, "%s %s %d", ThisDev, Info,
                                                                                &DeviceDat->SignalNo);
				ValidityCount++;
			}
			if (!(strcmpi(Info, "SignalLen"))) {
				NoFields = sscanf(line, "%s %s %d", ThisDev, Info,
                                                                                &DeviceDat->SignalLen);
				// Check length value
				if (DeviceDat->SignalLen > SIGLEN) {
					fprintf(stderr, "*** ERROR: Required signal length too long ***");
					getch();
					exit(1);
				}
				ValidityCount++;
			}
			if (!(strcmpi(Info, "Pause"))) {
				NoFields = sscanf(line, "%s %s %d", ThisDev, Info,
                                                                                &DeviceDat->Pause);
				ValidityCount++;
			}
			if (!(strcmpi(Info, "Repeat"))) {
				NoFields = sscanf(line, "%s %s %d", ThisDev, Info,
                                                                                &DeviceDat->Repeat);
				ValidityCount++;
			}
			if (!(strcmpi(Info, "Signal"))) {
				if (SigCount == SIGNO) {
					fprintf(stderr, "*** Error: Too many signals ***");
					printf("%s\n", line);
					getch();
				}
				else {
					NoFields = sscanf(line, "%s %s %s %s", ThisDev, Info,
```

```
SD[SigCount].Name, SD[SigCount].data);
                                                // Check signal data length, if too short, fill with 0's
                                                if ((strlen(SD[SigCount].data)   SignalLen)) {
                                                        for (i=(strlen(SD[SigCount].data)-1); i<(DeviceDat->SignalLen-1); i++)
                                                                SD[SigCount].data[i] = '0';
                                                        SD[SigCount].data[DeviceDat->SignalLen] = '\0';
                                                }
                                                SigCount++;
                                        }
                                }
                        }
                } while (ch != EOF);
                if (SigCount == 0) {
                        fprintf(stderr, "No signals for device!");
                        return 1;
                }
                if (ValidityCount!=6) {
                        fprintf(stderr, "Not enough parameter data for device!");
                        return 1;
                }
                fclose(data);
                return 0;
}

 // Defs for IR class, for PC IR control
//
// Chris Dodge
#define TRUE 1
#define FALSE 0
#define SIZE 30000 // Size of signal data array
#define CLKTICK 0X1C // Clock tick interrupt
#define SIGLEN 250 // Maximum signal length
#define SIGNO 34 // Number of signals for a device that can be held
#define SAMPLEFREQ 100000 // Frequency at which the signal is sampled
// Structures for holding signal data
struct DeviceData{
                char Name[8];  // Device name
                float Clock;  // Basic timing speed of signal
                int Bias;  // Unevenness in hi/low signal lengths
                int SignalNo;  // Number of signals
                int SignalLen;  // Length of signal (bytes)
                int Repeat;  // No of times the signal is played
                int Pause;  // Pause in between signal repeats
};
struct SigDat {
                char Name[9];  // Signal name
                char data[SIGLEN];  // Signal data
};

 # Info for IR Remote control
# Chris Dodge - May 1994
Sat Clock 1726.000000
Sat Bias 10
Sat SignalNo 27
Sat SignalLen 150
Sat Repeat 1
Sat Pause 0
Sat Signal Standby
1111111111111111000000001000101010001010101000101000100010100010001000100010101010101010101000100010001000100010001000100010001000
0000000000000000000000000
Sat Signal One
1111111111111111000000001000101010001010101000101000100010100010001000100010101010101010101000100010001000100010001000100010001000
0000000000000000000000000
Sat Signal Two
1111111111111111000000001000101010001010101000101000100010100010001000100010100010101010101000101000100010001000100010001000
0000000000000000000000000
Sat Signal Three
1111111111111111000000001000101010001010101000101000100010100010001000100010001010101010101010001000100010001000100010001000
0000000000000000000000000
Sat Signal Four
1111111111111111000000001000101010001010101000101000100010100010001000100010001000101010101010101000100010001000100010001000
0000000000000000000000000
```

Sat Signal Five
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal Six
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal Seven
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal Eight
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal Nine
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal Zero
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal Mute
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal Mode
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal Mo/St
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal A/B
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal AudioUp
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal AudioDn
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal ChanUp
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal ChanDn
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal V/H
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal FreqUp
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal FreqDn
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal Dev
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal Dec
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal Int/Ext
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal Store
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
Sat Signal Erase
11111111111111110000000010001010100010101010001010001000101000100010001000101000100010101010100010101000100010001000100010001000000000000000000000000
CD Clock 2240.000000
CD Bias 1
CD SignalNo 33
CD SignalLen 150
CD Repeat 2
CD Pause 56
CD Signal Open
11111111000010100010101010101010101010101000101010101010101000101000101000101000101010101000101010101010100010001010001010001010000000000000000000000

CD Signal Stop
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101010101010101010100010100010100010100
0010000000000000000000
CD Signal Pause
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101010001000101010101010101000100010100
0101000100000000000000
CD Signal Play
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000101000101010101010101010001010
0010000000000000000000
CD Signal SearchDn
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000101010101010101010001010001010
0010000000000000000000
CD Signal SearchUp
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000100010101010101010001010100010100
0101000100000000000000
CD Signal SkipDn
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000101010001010100010100010001010101
0010001000100000000000
CD Signal SkipUp
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000101000101010001010101010100010
0010001000000000000000
CD Signal One
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101010101000101010101000101000100010000
0101000100000000000000
CD Signal Two
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000101010001010101000100010100010000
1000101000100000000000
CD Signal Three
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000101010001010101010100010001000
0101000100000000000000
CD Signal Four
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000100010101000101010100010101000100
0100010100010000000000
CD Signal Five
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000101000101010101000100010001000
0100010100010000000000
CD Signal Six
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000101000101010101000100010001000
0100010001010001000000000
CD Signal Seven
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000100010100010101010100010001000
0100010100010000000000000
CD Signal Eight
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000100010001010001010101000101000100
0100010001010001000000000
CD Signal Nine
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101010100010001010101010001010100010000
0101000100000000000000
CD Signal Ten
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000101000101010101000100010001000
0101000101010000000000
CD Signal GtTen
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101010100010101010100010100010001000101
0010101000000000000000
CD Signal Zero
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000101010001000101010100010001010100
0100010100010000000000
CD Signal Program
1111111110001010001010101010101010101010100010101010101010100010100010100010100010101010101000101000101010100010101010101000
1010000000000000000000
CD Signal Clear
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101010101010101000101000101000101000100
1010000000000000000000
CD Signal Recall
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000101010101010001000100010100010100
0010101000000000000000
CD Signal TimeMode
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000101000101000101000101000100010000
0010001000100010001000
CD Signal A-BRept
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101010100010101000101010001010101000100
0010001000000000000000
CD Signal Repeat
1111111100001010001010101010101010101010100010101010101010100010100010100010100010101010101000100010001010101000101000101000100
1010001000100010000000000

CD Signal Random
1111111110000101000101010101010101010101010001010101010101010001010001010001010001010101010001010001000101010001010001000100010
101000100010001000000000
CD Signal AutoCue
1111111110000101000101010101010101010101010001010101010101010001010001010001010001010101010001000101000101010100010001010101010
001010100000000000000000
CD Signal LevelDn
1111111110000101000101010101010101010101010001010101010101010001010001010001010001010101010001010101010001010100010001010001010
101000100000000000000000
CD Signal LevelUp
1111111110000101000101010101010101010101010001010101010101010001010001010001010001010101010101010101010001010101000101000101010
001000000000000000000000
CD Signal TapeLen
1111111110000101000101010101010101010101010001010101010101010001010001010001010001010101010001000101000101000101000100010101010
101010100000000000000000
CD Signal SideA/B
1111111110000101000101010101010101010101010001010101010101010001010001010001010001010101010101000100010100010100010100010001010
101010100000000000000000
CD Signal PkSearch
1111111110000101000101010101010101010101010001010101010101010001010001010001010001010101010001000100010001010101000100010100010
101000101010000000000000
Amp Clock 1741.000000
Amp Bias 9
Amp SignalNo 15
Amp SignalLen 230
Amp Repeat 1
Amp Pause 0
Amp Signal Power
1111111111111111100000000101000101010001010001000100010100010001010001000101010100010101010100010001010001000100010001000100
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Amp Signal Speak_A
1111111111111111100000000101000101010001010001000100010100010001010001000101000101010001000101000101010001000101010001010001000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Amp Signal Speak_B
1111111111111111100000000101000101010001010001000100010100010001010001000101010001010001000101000101000101000101010001010001000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Amp Signal SourceD
1111111111111111100000000101000101010001010001000100010100010001010001000101010100010101010001010001000101000100010001010001000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Amp Signal Aux
1111111111111111100000000101000101010001010001000100010100010001010001000101010001000101010101010001010100010001000100010001000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Amp Signal Tuner
1111111111111111100000000101000101010001010001000100010100010001010001000101000100010100010101010101010001010001000100010001000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Amp Signal Phono
1111111111111111100000000101000101010001010001000100010100010001010001000101010001010001010101010001010001010001000100010001000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Amp Signal CD
1111111111111111100000000101000101010001010001000100010100010001010001000101000101010001010101010100010001010001000100010001000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Amp Signal Tape-1
1111111111111111100000000101000101010001010001000100010100010001010001000101010101000101010101000100010001010001000100010001000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Amp Signal Tape-2
1111111111111111100000000101000101010001010001000100010100010001010001000101000100010001010101010101010100010001000100010001000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Amp Signal Video-1
1111111111111111100000000101000101010001010001000100010100010001010001000101010001000100010101010100010101010001000100010001000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Amp Signal Video-2
1111111111111111100000000101000101010001010001000100010100010001010001000101000101000100010101010100010101000100010001000100
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Amp Signal Mute
1111111111111111100000000101000101010001010001000100010100010001010001000101000101000101010101010101000101000100010001000100010001000
0000000000000000000000000000000000000000000000000000000000000000000000000011111111111111110000100000000000000000
Amp Signal Vol_Up
1111111111111111100000000101000101010001010001000100010100010001010001000101010001010101010101000101000100010001000100010001000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Amp Signal Vol_Dn
1111111111111111100000000101000101010001010001000100010100010001010001000101000100010101010101010101000100010001000100010001000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Video Clock 1119.000000
Video Bias 15
Video SignalNo 20

Video SignalLen 200
Video Repeat 1
Video Pause 0
Video Signal Standby
101011010011001101001011010000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101011010011001101001011010000000000000000000000000000000000000000000000000000000000
Video Signal Stop
101101010011001010110010110000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101101010011001010110010110000000000000000000000000000000000000000000000000000000000
Video Signal Play
101011010011001010110011001000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101011010011001010110011001000000000000000000000000000000000000000000000000000000000
Video Signal FFwd
101101010011001011001010110000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101101010011001011001010110000000000000000000000000000000000000000000000000000000000
Video Signal Rewind
101011010011001011001011010000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101011010011001011001011010000000000000000000000000000000000000000000000000000000000
Video Signal Eject
101101010011001011001011001000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101101010011001011001011001000000000000000000000000000000000000000000000000000000000
Video Signal Jog_On
101011010011001011001101001000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101011010011001011001101001000000000000000000000000000000000000000000000000000000000
Video Signal Slow_Fwd
101101010011001011001101010000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101101010011001011001101010000000000000000000000000000000000000000000000000000000000
Video Signal Slow_Bk
101011010011001011010100110000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101011010011001011010100110000000000000000000000000000000000000000000000000000000000
Video Signal Stil_Fwd
101101001101001011001101010000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Video Signal Stil_Bk
101101001101001011001101001000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
Video Signal Prog+
101011010011001011010101010000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101011010011001011010101010000000000000000000000000000000000000000000000000000000000
Video Signal Prog-
101011010011001011010101001000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101011010011001011010101001000000000000000000000000000000000000000000000000000000000
Video Signal Sp/Lp
101101010011001010101100110000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101101010011001010101100110000000000000000000000000000000000000000000000000000000000
Video Signal RecMode
101011010011001100101010110000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101011010011001100101010110000000000000000000000000000000000000000000000000000000000
Video Signal Tuner
110101010011001010101011001000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000110101010011001010101011001000000000000000000000000000000000000000000000000000000000
Video Signal Audio
101011010011001011010100101000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101011010011001011010100101000000000000000000000000000000000000000000000000000000000
Video Signal Go_To
101101010011001010110100101000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000101101010011001010110100101000000000000000000000000000000000000000000000000000000000
Video Signal Repeat
110101010011001010101101010000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000110101010011001010101101010000000000000000000000000000000000000000000000000000000000
Video Signal Index
110101010011001010110101010000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000110101010011001010110101010000000000000000000000000000000000000000000000000000000000
=== ==============

Două proiecte au fost găsite la site-ul anonim FTP de bode.ee.ualberta.ca

Bibliografie

Infra-Red - telecomanda cu infraroșu pe portul de imprimantă PC.
Dieter Bartoschak, Gary Bente. "C't" 1991, Numărul 7, P200.
PC-ul cu infrared - analizor logic infraroșu pe Drukerport.
http://www.armory.com/~spcecdt/remote/remote.html .