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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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NHD-C128128CZ-FN-GBW

COG (Chip-On-Glass) Liquid Crystal Display Module

NHD-	Newhaven Display
C128128-	128 x 128 pixels
CZ-	Model
F-	Transflective
N-	No backlight
G-	STN-Gray
B-	6:00 view
W-	Wide Temp (-20°C ~ +70°C)
	RoHS Compliant

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Document Revision History

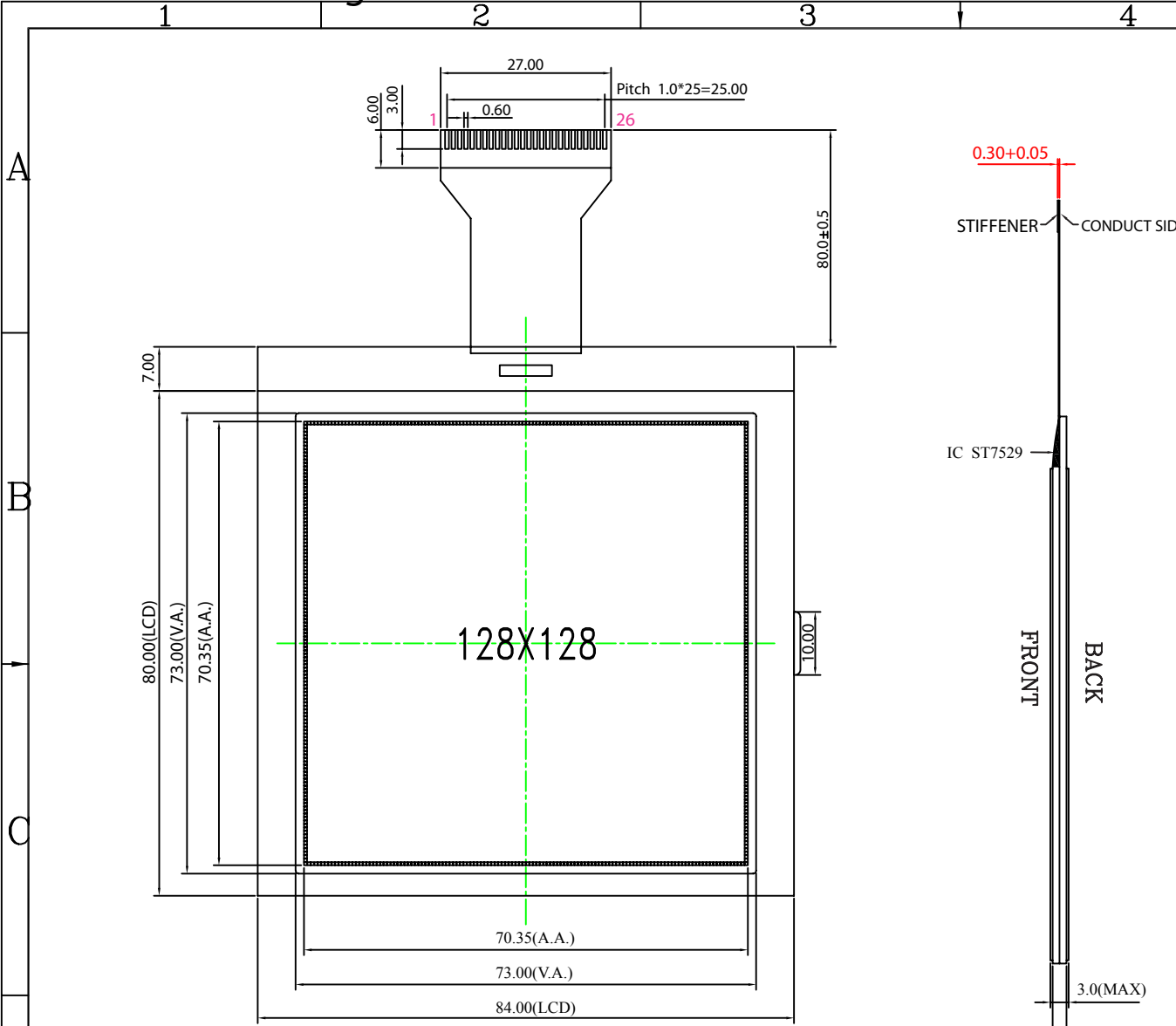
Revision	Date	Description	Changed by
0	6/17/2007	Initial Release	-
1	8/4/2009	User guide reformat	BE
2	10/14/2009	Updated Electrical Characteristic	MC

Functions and Features

- 128 x 128 pixels
- Built-in ST7529 controller
- +3.0V power supply
- 1/128 duty cycle; 1/12 bias
- RoHS Compliant

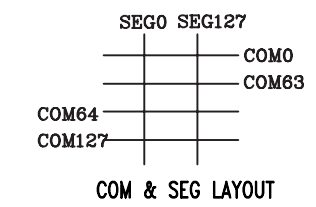
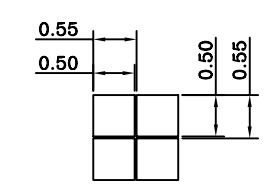
Mechanical Drawing

REV	DESCRIPTION:	DATE



PIN ASSIGNMENT

NO.	SIGNAL
1	A0
2	RW
3	DB0
4	DB1
5	DB2
6	DB3
7	DB4
8	DB5
9	DB6
10	DB7
11	E
12	RST
13	CSB
14	VDD
15	VSS
16	VDDA
17	VLCDIN
18	V4
19	V3
20	V2
21	V1
22	V0
23	NC
24	NC
25	NC
26	NC



Specification:

- 1). Driving: 1/128 Duty, 1/12 Bias, Vlcd: 16.0V
- 2). Viewing Direction: 6 O'clock
- 3). Display mode: STN/Positive/Transflective/Gray mode
- 4). Operating temp.: -20°C~+70°C
Storage temp.: -25°C~+75°C
- 5). Driver : ST7529 Vdd:3V
- 6). RoHS Compliant

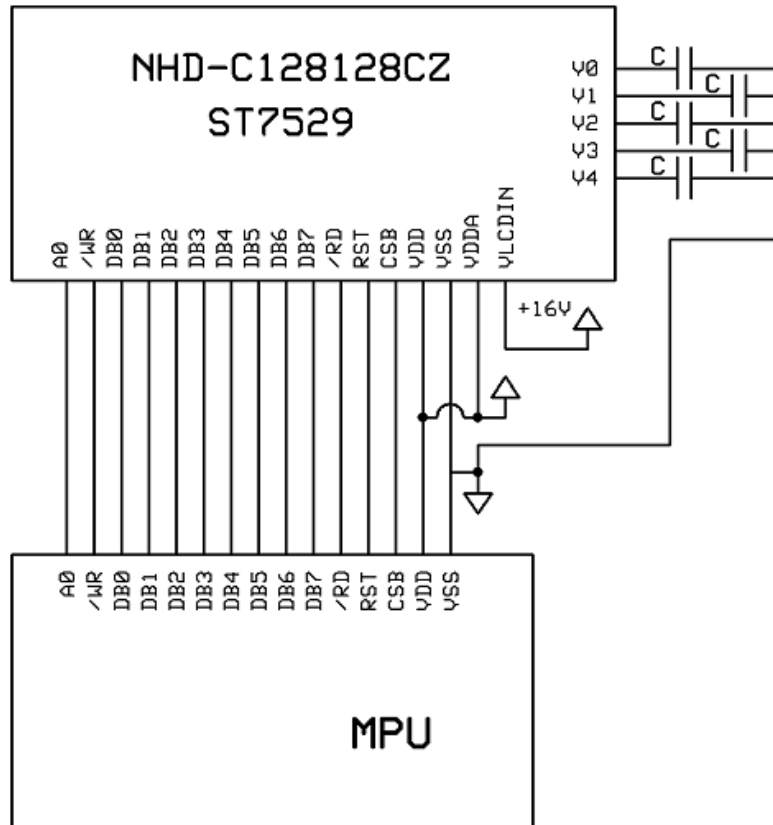
Model Name: NHD-C128128CZ-FN-GBW		<h1>Newhaven Display</h1>	
GENERAL TOL: ± 0.3			
APPROVALS	DATE	DRAWN NO.	SCALE: 1:1
DWN: YE.GUO.XIANG		SIZE: A4	UNIT: mm
CHK:	APP:		Page: 1-1

Pin Description and Wiring Diagram

Pin No.	Symbol	External Connection	Function Description
1	A0	MPU	Register select signal. A0=1: Data, A0=0: Command
2	/WR	MPU	Active LOW Write signal
3-10	DB0-DB7	MPU	Bi-directional 8-bit data bus.
11	/RD	MPU	Active LOW Read signal
12	RST	MPU	Active LOW Reset signal
13	CSB	MPU	Active LOW Chip select
14	VDD	Power Supply	Power supply for LCD and logic (+3V)
15	Vss	Power Supply	Ground
16	VDDA	Power Supply	Power supply for analog circuit (+3V)
17	VLCDIN	Power Supply	LCD driver supply voltage input (+16V)
18	V4	Power Supply	1.0uF-2.2uF cap to Vss
19	V3	Power Supply	1.0uF-2.2uF cap to Vss
20	V2	Power Supply	1.0uF-2.2uF cap to Vss
21	V1	Power Supply	1.0uF-2.2uF cap to Vss
22	V0	Power Supply	1.0uF-2.2uF cap to Vss
23-26	NC	-	No Connect

Recommended LCD connector: 1.0mm pitch, 26 pin FFC. Molex p/n: 52207-2685

Backlight connector: --- **Mates with:** ---



Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Temperature Range	Top	Absolute Max	-20	-	+70	°C
Storage Temperature Range	Tst	Absolute Max	-25	-	+75	°C
Supply Voltage	VDD		-	3.0	-	V
Supply Current	IDD	Ta=25°C, VDD=3.0V	-	0.3	0.5	mA
Supply for LCD (contrast)	VDD-V0	Ta =25°C	-	16.0	-	V
"H" Level input	Vih		2.2	-	VDD	V
"L" Level input	Vil		0	-	0.6	V
"H" Level output	Voh		2.4	-	-	V
"L" Level output	Vol		-	-	0.4	V

Optical Characteristics

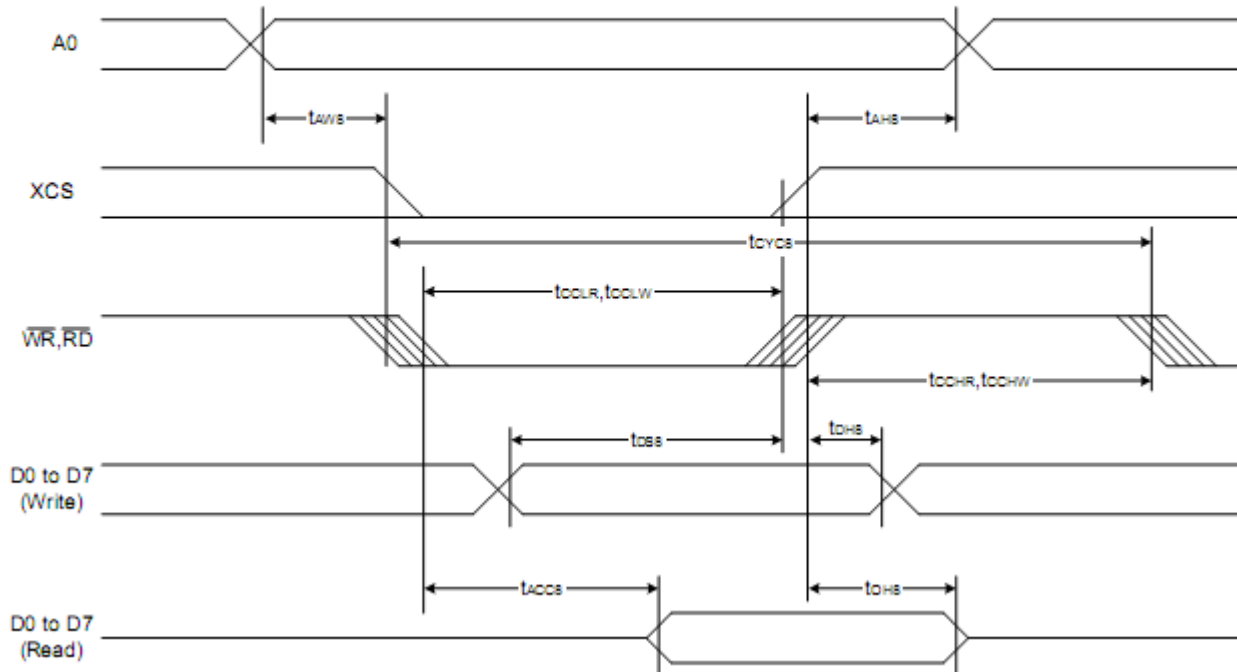
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Viewing Angle - Vertical	θ	Cr≥2	-60	-	+35	°
Viewing Angle - Horizontal	Φ		-40	-	+40	°
Contrast Ratio	CR		-	6	-	-
Response Time (rise)	Tr	-	-	150	250	ms
Response Time (fall)	Tf	-	-	150	250	ms

Controller Information

Built-in ST7529. Download specification at http://www.newhavendisplay.com/app_notes/ST7529.pdf

Timing Characteristics

System Bus Read/Write Characteristics 1 (For the 8080 Series MPU)



Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	tAH8	-	20	-	ns
Address setup time		tAW8	-	20	-	
System cycle time		tCYC8	-	200	-	
Enable L pulse width (WRITE)	WR	tCCLW	-	100	-	
Enable H pulse width (WRITE)		tCCHW	-	100	-	
Enable L pulse width (READ)	RD	tCCLR	-	100	-	
Enable H pulse width (READ)		tCCHR	-	100	-	
WRITE Data setup time	D0 to D7	tDS8	-	150	-	
WRITE Address hold time		tDH8	-	20	-	
READ access time		tACC8	CL = 100 pF	-	40	
READ Output disable time		tOH8	CL = 100 pF	-	30	

Table of Commands

Ext=0 or Ext=1

Index	Command	A0	RD	WR	D7	D6	D5	D4	D3	D2	D1	D0	Function	Hex	Parameter
1	Ext In	0	1	0	0	0	1	1	0	0	0	0	Ext=0 Set	30	None
2	Ext Out	0	1	0	0	0	1	1	0	0	0	1	Ext=1 Set	31	None

Index	Command	A0	RD	WR	D7	D6	D5	D4	D3	D2	D1	D0	Function	Hex	Parameter
1	DISON	0	1	0	1	0	1	0	1	1	1	1	Display On	AF	None
2	DISOFF	0	1	0	1	0	1	0	1	1	1	0	Display Off	AE	None
3	DISNOR	0	1	0	1	0	1	0	0	1	1	0	Normal Display	A6	None
4	DISINV	0	1	0	1	0	1	0	0	1	1	1	Inverse Display	A7	None
5	COMSCN	0	1	0	1	0	1	1	1	0	1	1	COM Scan Direction	BB	1 byte
6	DISCTRL	0	1	0	1	1	0	0	1	0	1	0	Display Control	CA	3 bytes
7	SLPIN	0	1	0	1	0	0	1	0	1	0	1	Sleep In	95	None
8	SLPOUT	0	1	0	1	0	0	1	0	1	0	0	Sleep Out	94	None
9	LASET	0	1	0	0	1	1	1	0	1	0	1	Line Address Set	75	2 bytes
10	CASET	0	1	0	0	0	0	1	0	1	0	1	Column Address Set	15	2 bytes
11	DATSDR	0	1	0	1	0	1	1	1	1	0	0	Data Scan Direction	BC	3 bytes
12	RAMWR	0	1	0	0	1	0	1	1	1	0	0	Writing to Memory	5C	Data
13	RAMRD	0	1	0	0	1	0	1	1	1	0	1	Reading from Memory	5D	Data
14	PTLIN	0	1	0	1	0	1	0	1	0	0	0	Partial display in	A8	2 bytes
15	PTLOUT	0	1	0	1	0	1	0	1	0	0	1	Partial display out	A9	None
16	RMWIN	0	1	0	1	1	1	0	0	0	0	0	Read and Modify Write	E0	None
17	RMWOUT	0	1	0	1	1	1	0	1	1	1	0	RMW end	EE	None
18	ASCSET	0	1	0	1	0	1	0	1	0	1	0	Area Scroll Set	AA	4 bytes
19	SCSTART	0	1	0	1	0	1	0	1	0	1	1	Scroll Start Set	AB	1 byte
20	OSCON	0	1	0	1	1	0	1	0	0	0	1	Internal OSC on	D1	None
21	OSCOFF	0	1	0	1	1	0	1	0	0	1	0	Internal OSC off	D2	None
22	PWRCTRL	0	1	0	0	0	1	0	0	0	0	0	Power Control	20	1 byte
23	VOLCTRL	0	1	0	1	0	0	0	0	0	0	1	EC control	81	2 bytes
24	VOLUP	0	1	0	1	1	0	1	0	1	1	0	EC increase 1	D6	None
25	VOLDOWN	0	1	0	1	1	0	1	0	1	1	1	EC decrease 1	D7	None
26	RESERVED	0	1	0	1	0	0	0	0	0	1	0	Not Use	82	0

Ext=0

27	EPSRRD1	0	1	0	0	1	1	1	1	1	0	0	READ Register1	7C	None
28	EPSRRD2	0	1	0	0	1	1	1	1	1	0	1	READ Register2	7D	None
29	NOP	0	1	0	0	0	1	0	0	1	0	1	NOP Instruction	25	None
30	STREAD	0	0	1	Read Data							Status Read			
31	EPINT	0	1	0	0	0	0	0	0	1	1	1	Initial code(1)	07	1 byte

Ext=1

<i>Index</i>	<i>Command</i>	<i>A0</i>	<i>RD</i>	<i>WR</i>	<i>D7</i>	<i>D6</i>	<i>D5</i>	<i>D4</i>	<i>D3</i>	<i>D2</i>	<i>D1</i>	<i>D0</i>	<i>Function</i>	<i>Hex</i>	<i>Parameter</i>
1	Gray 1 Set	0	1	0	0	0	1	0	0	0	0	0	FRAME 1 Gray PWM Set	20	16 bytes
2	Gray 2 Set	0	1	0	0	0	1	0	0	0	0	1	FRAME 2 Gray PWM Set	21	16 bytes
3	ANASET	0	1	0	0	0	1	1	0	0	1	0	Analog Circuit Set	32	3 bytes
4	SWINT	0	1	0	0	0	1	1	0	1	0	0	Software Initial	34	None
5	EPCTIN	0	1	0	1	1	0	0	1	1	0	1	Control EEPROM	CD	1 byte
6	EPCOUT	0	1	0	1	1	0	0	1	1	0	0	Cancel EEPROM	CC	None
7	EPMWR	0	1	0	1	1	1	1	1	1	0	0	Write to EEPROM	FC	None
8	EPMRD	0	1	0	1	1	1	1	1	1	0	1	Read from EEPROM	FD	None

Example Initialization Program

```
/******  
void write_command(unsigned char i)  
{  
A0=0; /*Instruction register*/  
E=1; /*Read inactive*/  
P1 = i; /*put data on port 1*/  
CSB=0; /*Chip select active*/  
RW=0; /*Write active*/  
RW=1; /*Write inactive; latch in data*/  
CSB=1; /*Chip select inactive*/  
}  
/******  
/******  
void write_data(unsigned char i)  
{  
A0=1; /*DDRAM data register*/  
E=1;  
P1 = i;  
CSB=0;  
RW=0;  
RW=1;  
CSB=1;  
}  
/******  
/******  
void initEEPROM(void){  
    write_command(0x30); /*ext=0  
    write_command(0x07);  
    write_data(0x19);  
    write_command(0x31); /*ext=1  
    write_command(0xCD);  
    write_data(0x00);  
    delay(8);  
    write_command(0xFD);  
    delay(4);  
    write_command(0xCC);  
    write_command(0x30); /*ext=0  
}  
/******  
/******  
void lcd_init(void){ /*ST7529  
    write_command(0x30); /*extended set off  
        write_command(0x94); /*sleep out  
    write_command(0xD1); /*OCS on  
        delay(2);  
    write_command(0x20); /*power control  
        write_data(0x0B); /*booster  
        delay(8);  
    write_command(0x81); /*electronic control  
        write_data(0x3F); /*vop=14.0v  
        write_data(0x04);  
    write_command(0xCA); /*display control  
        write_data(0x00); /*CL=X1  
        write_data(0x27); /*Duty=128  
    write_data(0x00); /*FR set  
    write_command(0xA7); /*normal display  
    write_command(0xBB); /*com direction  
    write_data(0x01);  
    write_command(0xBC); /*scan direction  
    write_data(0x01); /*normal  
        write_data(0x00); /*RGB arrangement  
        write_data(0x02); /*65k color  
        write_command(0x31); /*ext instruction  
    write_command(0x32); /*analog circuit set  
        write_data(0x06); /*osc frequency  
        write_data(0x01); /*booster efficiency  
        write_data(0x00); /*bias = 1/4  
        write_command(0x22);
```

```

write_data(0x03);
write_data(0x02);
write_data(0x02);
write_command(0x34);           //software init
initEEPROM();
write_command(0xAF);          //display on
}
/*****/

```

Quality Information

Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	+75°C , 48hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-25°C , 48hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time.	+70°C 48hrs	2
Low Temperature Operation	Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time.	-20°C , 48hrs	1,2
High Temperature / Humidity Operation	Endurance test applying the electric stress (voltage & current) and the high thermal with high humidity stress for a long time.	+40°C , 90% RH , 48hrs	1,2
Thermal Shock resistance	Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress.	-0°C,30min -> 25°C,5min -> 50°C,30min = 1 cycle 10 cycles	
Vibration test	Endurance test applying vibration to simulate transportation and use.	10-55Hz , 15mm amplitude. 60 sec in each of 3 directions X,Y,Z For 15 minutes	3
Static electricity test	Endurance test applying electric static discharge.	VS=800V, RS=1.5kΩ, CS=100pF One time	

Note 1: No condensation to be observed.

Note 2: Conducted after 4 hours of storage at 25°C, 0%RH.

Note 3: Test performed on product itself, not inside a container.

Precautions for using LCDs/LCMs

See Precautions at www.newhavendisplay.com/specs/precautions.pdf

Warranty Information and Terms & Conditions

http://www.newhavendisplay.com/index.php?main_page=terms