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What is PSP-Nx-v4-REF (with Referee Signal Receiver)

PSP-Nx-v4-REF has an Infra Red Referee Signal Receiver (as shown here).

It can receive IR signals from TV/VCR/DVD remotes and mindsensors' 'Satellite Referee Controller'.

In a tournament or competition, this device can be used to synchronize beginning/stopping of Robots with following:

- Game Ready
- Autonomous Mode Begin
- User Controlled (Teleop) Mode Begin
- Game End

Mounting PSP-Nx-v4-REF for Best Reception

Ensure that the Receiver is roughly in direct line of sight of the Referee Transmitter.

For best reception, it is recommended that the Referee Signal Receiver be mounted facing up on your robot.

The range of reception will vary based on the Referee Transmitter being used. It's a good idea to check before you begin that your robot always remains within the reception zone. (Follow the Reception Test' section described below.)

Programming Techniques for Referee Signal

NXT-G Method:
Following block from url below provides Referee Signal related data, download this block and install it in your NXT-G IDE.
PSP-Nx-v4-RefereeSignal.zip

http://www.mindsensors.com/index.php?module=documents&JAS_DocumentManager_op=viewDocument&JAS_Document_id=202

Installation instructions for NXT-G are available at:
http://www.mindsensors.com/index.php?module=pagemaster&PAGE_user_op=view_page&PAGE_id=81

⚠ **NOTE**
Ensure to use latest LEGO firmware on NXT (1.29 or higher).

NXC Method:
Download the library file and sample programs from following URL, and modify the sample programs to suit your needs.
http://www.mindsensors.com/index.php?module=documents&JAS_DocumentManager_op=viewDocument&JAS_Document_id=203

If you need to use PSP-Nx-v4 in your existing program, at the top of your NXC program file, include the library with following directive:

```
#include "PSP-Nx-v4-lib.nxc"
```

⚠ **NOTE**
Ensure to use latest LEGO firmware on NXT (1.29 or higher).

LED Indications:

The blinking of LED on PSP-Nx-v4 indicates following:

LED state	Situation
LED blinks Green	LED will blink Green momentarily when it receives a packet from Wireless Controller.
LED Blinks Blue at about 1 second interval.	Wireless Receiver Dongle is not attached correctly to PSP-Nx-v4
LED lights up Red **(For Models equipped with Referee Signal Receiver).**	The Referee has sent a signal that disables Controller input to your NXT program. i.e. Joystick value changes or button presses will not be received by your program.

Referee Signal Codes:

Below is the table of codes that are returned for Referee Signal Transmitter. Even if Wireless Joystick inputs are disabled, these referee signals are always available to NXT. (in addition to these signal codes, raw values of Referee Transmitter button presses and transmitter type are also available).

Command	Numeric Code Returned	Indications

	hex (decimal)	
Key 'Play'	0x35 (53)	This command enables sending wireless controller inputs to NXT. (and turns OFF Red LED)
Key 'Stop'	0x36 (54)	This command disables sending wireless controller input to NXT. (and turns ON Red LED)
Key 'Fast Forward'	0x34 (52)	
Key 'Fast Rewind'	0x32 (50)	

Reception Test (with TV/VCR/DVD Remote):

1. Ensure that the Receiver is roughly in direct line of sight of the Referee Transmitter and Power on your Robot with PSP-Nx-v4-REF.
2. **Press the 'Stop' button on the Referee Controller** – that should turn ON the Red LED on your PSP-Nx-v4-REF.
3. **Press the 'Play' button on the Referee Controller** – that should turn OFF the Red LED on your PSP-Nx-v4-REF.
4. Repeat this check in all the area where you desire to receive the signal.

Troubleshooting connectivity with TV/VCR/DVD Remote:

To ensure that remote button presses are transmitted correctly to PSP-Nx-v4-REF:

1. Upload program '**CheckRemote**' on your NXT. **
2. Attach PSP-Nx-v4-REF to Sensor Port 1
3. Run the program and watch the on screen output.
4. Press the Remote buttons defined in section '**Referee Signal Codes**', and ensure that the respective button name appears on the screen.

** You can download CheckRemote.nxc (or executable version - CheckRemote.rxe) from following url:
http://www.mindsensors.com/index.php?module=documents&JAS_DocumentManager_op=viewDocument&JAS_Document_id=206

If your remote is not being recognized, and you need assistance, please write e-mail to mindsensors.com support team.

Advanced Information

I2C Registers for Referee Signal:

Register	Value	Data Type
0x56	Referee Signal Code	1 byte
0x57	Referee Transmitter Type – There are various brands/models of remotes, each transmits a transmitter type code which may be different from model to model.	1 byte
0x58	Referee Signal Raw Value	Long (4 bytes)
0x5C	Signal Count – this will increment each time it receives a signal from Referee. In other words, Change in this number means Referee has sent you a signal.	1 byte (note, this register will roll over to 0 after reaching 255)