

Transcription – Switches  
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Hello everybody. I'm not very accustomed to doing this type of presentation, so you and I will be learning together. My name is Amy Henningsen. I'm an occupational therapist. I've been working for approximately 30 years in a variety of settings with developmental disabilities. I've been working in the area of assistive technology since 1986. Currently, I'm working for the Utah Assistive Technology Program, who is putting this presentation on today and I also work for the Up-To-Three early intervention program. Our topic today is switches. Switches are an interface for individuals who have severe physical disabilities or severe cognitive disabilities. What it does is bypass the need to do any type of complicated movement patterns that may be impossible for them to do. The first thing we can do is talk about what a switch is. I have an example of what they call a buddy switch here. Basically what a switch is, is an electrical mechanical device which is used to activate an electrical signal. See, I'm nervous you guys. I'll try to settle down here. It works by opening and closing, so when the switch is not activated, when it's just sitting there, it is open. That means that the signal cannot get through. When you activate the switch and push it, it closes the circuitry and makes the device or whatever you are using work. So that's how those work. There are a couple of other aspects with switches. We have what they call momentary control or lack of control. We're going to show you a Power Link 3. This device lets you either do the latch or direct. This would be a direct. I hit the switch – whoops, I'm afraid you can't see my lights. I have the lights hooked up that will go on. If I do the latch device, when I hit the switch, it goes on and stays on until I hit it again. So that is how latch or momentary switches work. That's the different between them. A lot of that depends on the type of individual you're going to be working with. To get into the assessment part of using switches, number one, the goal is not to use a switch. The goal is to accomplish a certain activity. For example, for young children, it might be play, so we may have a device like this that allows a child to hit a switch (music playing) which turns on a fan and plays music to reinforce them for hitting the switch. For other individuals, you may have environmental controls for a person who is cognitively intact and may have say for example multiple sclerosis; you may have a device like these that plug into the sockets at your home. You plug these in and you plug your lamp, or your blender, or your radio into the outlet. They're color coded so the blue would go with the blue switch, so you would operate the blue switch and it would turn on your light, so that is a latch control. So there are a lot of different applications and we're going to get into more of those later. When you're looking at doing an assessment for switches, the number one aspect that you're looking for to begin with is positioning. As an occupational therapist, I do a lot of work on positioning in wheelchairs and other types of equipment, so this workshop today is much too short to get into all the aspects of positioning, so we're going to kind of bypass that, other than saying that you want to put the person in the most optimal position that you can. Also, you may want to look at alternative positioning. You may want to have someone who is working in a stander or you may have a child that is in a side lyer, which is an advantage, because the child has nice visual regard to the switch and also, they can bring their hands to midline, so that may be a nice position for a child. Prone on their stomachs, if you have them on a wedge

or something like that, that's a nice position because the kids are able to lift their heads, hit the switch and watch the action. There are a lot of different aspects of positioning you want to get into. Oftentimes, when you're assessing a person, if you don't have them in the most optimal position, they may not be able to operate the switch at all because of muscle tone or because of visual regard. Some of those aspects may completely limit the person in accessing a switch, so you really need to have someone who is familiar with the child. If you don't have a therapist available, I would ask the caregiver, whether it's a parent or the nursing home or whoever it is that is working with the individual to go ahead and tell you what their most optimal position is. Generally, those people will be able to help you with that. The next thing you want to look for is a movement pattern. You want a consistent, reliable movement pattern that causes the least amount of fatigue. When you're using a switch for someone who has ALS, they may not be able to repeatedly hit a switch; therefore, what you want to do is be able to put the switch in a location where they just have to make a minimal movement so they don't fatigue. You want to look at their joint range of motion. If you're looking at using a hand switch, if their hand only goes out this far and you put the switch beyond that, they're not going to be able to access it, so you want to be able to look at what their active range of motion is. Once again, to limit fatigue, you may want to have it within a small range of motion. So you want to look at each one of the joints. One of the things you talk about when you're looking at site control is the fact that you want to look at the head position. That might be a site for a switch. You may want to use a shoulder that would pull back and hit a switch or an elbow. Any number of those body parts can be used to activate a switch. The control site is where you are activating that switch and you may have one control site or multiple sites. If you have someone who has a lot of involvement, ALS, also known as Lou Gehrig's disease, where a person is losing all their muscle control, they may be able to just move a little but, so you may want to use an eye blink switch or a sip and puff type of switch because the respiratory system is one of the last systems that they lose. The hand is the most common site. Obviously, we all use our hands and that's the site that we're most familiar with, but you may want to use the other sites: head, shoulders, elbow, knee, or foot. You have small muscle movements, for example if you have someone who is just able to pinch their fingers or tap their fingers, there are little switches you can position right by the tip of their finger, or if you have someone who has a lot of movement, or someone who has fluctuating muscle tone, you may want to have a switch like the squabble switch, so as they hit the switch and they use a lot of ungraded movement, they don't break the switch or knock it out of position. So you really have to look at the quality of the movement that they have. We're going to go ahead and get into the different types of switches. The simple switches are the ones that you push. You may push it with any one of those control sites. When we are looking at the different switches – I gave you a handout that says characteristics of the switches and what that allows you to do is you want to just not say this individual is unable to access a keyboard, they're unable to use Intelli Keys, you want to discuss the fact that they may need to use a switch to interface with the activity that they're doing, but you want to be able to look at the movements that they have and the abilities that they have. For example, this is a membrane switch and this is one of the simple switches where you would just push the switch. This particular switch doesn't give you any feedback. Many of the switches will have either a click, they may light up, and they may vibrate. This particular switch is just a flat membrane switch

and whatever you would turn on and off would be the feedback that you got from that. The target size is about two inches and it is nicely colored so you can have a nice target to look at. Those are some of the features that you want to look at. If you look at the characteristics of switches that I gave you, you want to look at the physical size of the switch and the type of feedback. Like I said, on this particular switch, you do not get feedback. You want to determine what type of material they are made out of. Depending on whether the person has, for example some of the blood pressure medications may cause an individual to bleed easy, so for that person, you're not going to want to have anything with any sharp edges. Another thing to look at for a switch like this one, you're looking at positioning is you don't want the switch to be moving around. There are a number of different materials that you can use to help stabilize the switch on a table top. This material is called Dycem and it's a non-skid material and it prevents movement of whatever you put on top of it. We use it a lot for all kinds of activities, under trays at lunch and under plates on the lunch try to keep them from tipping over. It's a non-skid material and is available through the medical catalog such as Fred Sammons. We also tend to use drawer liners which also offer some non-skid material. They're not quite as effective as the Dycem, but they are much less costly. Another thing that we find ourselves doing – I just found this piece of cardboard as I was walking into the presentation today and I was thinking depending on the switch size you had, it may be something that you want to Velcro a switch to and then be able to use a "C" clamp to stabilize it on a tabletop. It's real important that the switch stays in one location so they are successful at what they are doing. That's one of the reasons I like to use some of the commercially available switches even though I've made switches, because oftentimes they are very consistent in their use. This is what they call a buddy switch. These come in a number of different colors. They come with designs on them and faces and the kids really like them a lot. You can assign different colors for different activities, you can use some of the Boardmaker programs to put your little symbols on there, for example, this one might be for the music box so when they hit the switch, the music box goes on. You'd have a symbol for music on that. Another simple switch is what they call the soft switch. This is also a pressure switch and as you can see, some of the characteristics of this one is that it has a nice fuzzy surface on it which is very nice to feel, it's got a relatively nice sized target for it. There's a little bit of an auditory click, but nothing significant. I don't know if you noticed with the pink switch that there is a sound to that so that gives the individual some feedback, whereas this one just has very little feedback. This takes quite a bit of strength and that's one of the aspects that you want to look at as well. How much strength is it going to take to activate the switch? If you have someone who has normal strength, then that's not an issue, but if you have someone with decreased strength, that can be a very large issue. There's also some micro switches that are activated with just very, very light pressure. For this particular switch, if you have someone who has a lot of weakness or limited movement, this would be a very nice switch to activate the device that you have it hooked to. If you were using this for a child, it would be a small switch, a more difficult switch to operate. One of the things that I listed on the different types of switches is I gave you the resources where you can get some of the switches, but I just want you to know that these are a just a few of the switches that are out on the market. There are so many switches and if you have a particular person who needs a certain type of switch, they're out there. This one is also a

very small target, but is also much harder to activate than the last switch was. It takes much more pressure. Even though it's small in size, it requires more strength. Another type of switch that we have are what we call lever switches. A lever switch works off a certain point like a lever, so on this particular one, you can see that it's stabilized here and that the part of the switch that is activated is at the end of that, so you have a lever action, which helps reduce the amount of pressure that you need. This one also has an auditory click, so that gives some feedback to the individual. Its nice red color is very easy to see and that would be a very nice switch for a lot of individuals. Another specialty switch is this grip switch. This particular switch is activated as you squeeze it. So you would squeeze the handle and it would activate the switch. This will give you what they call kinesthetic feedback. That's more feeling the movement and having the pressure gives you that type of feedback. Once again, you're not getting any auditory feedback using that. A lot of the switches that I'm showing you right now are TASH switches. We purchased one of their assessment kits that has a number of different switches in it, so it really gives you a wide variety of switches. This is what they call a Peta switch. This is a more of a directional switch, so you could actually operate a wheelchair with this particular switch, because it has the four different movements, plus a center one, for example if you're going forward, you would hit the switch in the middle to go backwards, so this could interface with a wheelchair if you have someone who is unable to have the range of motion to operate a standard joy stick. It works very well for some individuals. This is a cup switch. This one once again is activated by pressure and this one gives you that auditory click, so depending on say if you had someone maybe this would be a nice elbow switch. You could put it on their wheelchair so that it is positioned in such a way that they could access it. So there are all different type of switches and you want to be able to make your decision on switches based on the needs that you find the individual has, what their range of motion is, what there strength is, what their endurance dictates the type of switch you use. There are also a number of specialty switches. This is what the call a scatter switch and it uses infrared and you can use it with any type of movements, so if you have someone who can blink their eye, you can set it up so it will read the eye blink. You could use it with a shoulder movement – it will read a shoulder movement. This is a very nice switch. It is much more high tech, much more expensive and there are a number of adjustments that can be made on it so that it can be used from certain distances, or close up, or far away. Some of the other specialty switches would be like a sip and puff switch. Those are all listed on the types of switches. There is a wafer switch which is like the Peta switch that has four different locations and also a fifth location so once again you can actually drive a wheelchair with it. There are tongue switches that operate like a lever switch and there's also what they call a tongue switch that has a surface on top of the palate and you can activate computers or wheelchairs by movements of your tongue putting switches inside the mouth. So there's just about any type of switch that you're looking for and as I say, if you get on the website, look up adapted switches and you'll find a lot of different types of switches. One of the most difficult things with using switches is actually mounting the switch. There's a number of different ways you can mount switches. This is actually an adapted cup holder. This came from the One Step Ahead catalog, but it's really nice. It's very kid friendly and moves around so you can position it wherever you want. You would just hook your switch to it and be able to put it to and from the reach of the child. This is

a wobble switch and it comes on a gooseneck, which also allows you to position it where you want. The difficult part with some of these is they generally will move, so if you have someone who has a large range of motion or a lot of strength, they may bat this out of the way. If that's the case, you can look at a mounting system more like this one. This is the Slim Armstrong mounting system and this actually comes with a kit. Inside the kit is all kinds of wonderful, wonderful modifications that you can use to adapt the switch in which ever way you want to use it. It has a ball and a socket so it will let you position this wherever you want. You can tighten it up by turning the knob; you can make it longer or shorter. This one has a little knob at the top you can twist around and once again position it where you want and then stabilize it. If you have someone who is moving their switch around a lot, these types of mounting systems are much more effective. On your handout, I put a list of a number of different places where you can get a switch mount. There's an adapted switch laboratory out of Texas. They have all kinds of switches and all kinds of mounting systems. If you get on their website, listed on your paper, you can actually become certified in the use of switches. Also, you can make switches. Linda Berkhardt, whose website I also gave you has several books out that show you how to make switches. They are relatively simple. Most of these switches we've gone through, pressure switches, lever switches, they can run anywhere from \$50-\$150 and the scatter switches and the sip and puff switches are far more than that. So that's a large sum of money to put out of your budget, so a lot of times, we'll make switches. We make it out of speaker wire and we get these little attachments from RadioShack – the plugs – and if my fingers were working better, which they're not, this black casing unscrews and you slide it off and you solder the two wires to the two different projections that are within the casing. They are very inexpensive to make. This one was just made with a Nerf ball, so this is a Nerf ball switch, so it costs very little to make that switch, however, you have to be pretty good with a soldering iron to have it work consistently. This particular switch takes a firm amount of pressure and once again it's kind of nice, because it's raised and it's kid friendly. That's how it operates the toy. Some kids will go to hit the switch and they are unable to hold it on, so they're not getting very much feedback from that. You can you what they call a switch latch timer, similar to the one we saw on the Power Link. This one operates by plugging the end of the latch timer into the device you want to turn on and the switch into the box. You have a latch mechanism which will turn it on and leave it on, or you can do switch training with this. This goes from 1-60 seconds, so if I have a child who hits the switch, it gives them feedback so that they want to do it again. After a short period of time, it will turn off. The Power Link actually has the timer so you can go anywhere from seconds to minutes. One of the nice parts of the Power Link is that you can use AC power with it, so if you have a fan or blender, or some other applications, kids making their lunch by turning on the blender, or participating and making popcorn by turning on the popcorn maker. There's a lot of different things you can use to plug into this. Able Net has some really nice books that tell you how to apply these types of devices in the classroom. Another type of switch which could be used as an augmentative communication system is this little photo album, or photo picture book. They have a little plug where you can talk into the device and we use either a felt pad to push this button to give a response. You would generally have a symbol on here, for example, this one says, "Let's go to McDonald's," so generally what you would do is have a picture of McDonald's on there. "Let's go to McDonalds." So that's a really nice, basic,

simple system that you can use with this switch. For example, with a young child, you may want to have, "Mom, come here." That's one of the things that a severely involved child is unable to do. Another device that you can use with the same type of child is to use one of these touch lights. These also work as call buttons, so you can get some of these that aren't quite as fancy as this one. This one turns different colors. You can just get the touch lights for the closets out of the dollar store and when the child hits it, it lights up and you can use it to call someone. Another real simple switch that I like is one from RadioShack. Like I say, a lot of these switches, and in fact this same switch that you can get for \$35 out of the catalog costs \$5 at RadioShack. It's called a foot tread switch and I use this a lot with kids because they can turn on music with it. Music playing. The foot tread switch will plug into the remote of your tape recorder and turn off the music, so as you hit the switch, it turns it on. When you purchase a switch, it is really difficult to activate it. It has a small silver pin in it that I will use something like an awl and you can push these out. You can see part of it come out. I didn't bring a pair of pliers. Usually when playing with switches, you need a lot of different equipment. If I had a pair of pliers, I could pull this pin out and inside there is a spring. Once you take the spring out, it makes a switch that is very, very easy to activate. This is fun for things like musical chairs, where the kid can hold the switch down and the music plays and when it stops, everybody runs for a chair. It's very reinforcing for them. That's a really simple and inexpensive way to have a switch. Some of the other applications that you can use switches for are for environmental controls. I showed you the one earlier from TASH that had the four different switches and this is another one called Mini Relax. This one is specifically for the TV. It's got the plug right here on the side and it scans through the different choices and as it scans, you hit it again and it will turn on the TV, change the channel up or down, change the volume, or mute the TV. That's another one that's very nice. This particular one we use for an individual who had a C2 spinal cord injury, therefore he wasn't even able to move his head too well independently, so he was using a sip and puff to activate this through scanning. Another aspect of using switches in terms of placement is whether they are flat or whether you have them on a little bit of an angle. When you have them angled visually, they are able to see the switch better – it's just an easier switch to hit. Also, if you have someone who has limited movement, sometimes the flat switches are difficult for them to activate. This one, the characteristic here is it's a tactile switch – it's a big surface and it's got the suction cups to keep it from moving around as the child or adult plays with it. This was another piece of cardboard I found as I was coming in to do this presentation and this is very nice, because it's angled. One of the pieces of equipment we use all the time, which I can't locate at the moment, but you're very familiar with it is Velcro. You would take a piece of Velcro, hook it onto the side so it's curved and then mount your switch onto it. That would be a very easy way of making a flat switch into an angled switch. Another thing that I've done with switches is I have put them inside a Rubbermaid box. If I have an individual, for example if I had the tape recorder and I had someone who was using the switch, but had a tendency to throw the tape recorder – I've worked with these type of individuals – what you can do is put this inside of a Tupperware, I mounted it on a piece of wood so I could clamp it onto a surface, mounted the switch onto the same piece of wood so that everything is attached to a surface and they can't knock it away or over. Let's see. I'd like to go through some of the different uses for switches. Augmentative communication systems you use with

switches, you can do a variety of scanning, you can do what they call linear scanning, which is just going across, you can do row/column scanning where you hit the device twice, once when you want it to go across and once when you want it to go down. There's inverted scanning – if you have someone who has difficulty with movement patterns, sometimes being able to initiate and stop a movement is hard, so you may want to use inverted scanning where they put their hand on the switch and it keeps scanning until you take your hand off the switch. My dog's still hooked up to that one. Another application for switches is with the computer. This is what you call an assisted mouse adapter and what this allows you to do is it allows you to use switches with your mouse. They have different delay buttons, one for single hit and one for a double click. These are very nice. Jim West who is part of the UAAACT team in Davis County has done a lot with adapting different types of switches and mouse interfaces. He has some very nice training CDs. You could contact him through the UAAACT teams and request some of those. I don't know if he's doing it anymore, but he has in the past come out and done trainings, so there are all types of different applications. This is a really nice CD that came from TASH. This is a switch edition and what it does is shows you how to assess and use switches. It goes through the process of the evaluation, going through the physical evaluation, the site location, the different types of switches, how much pressure they require. They go through the mounting system. It's a very nice interactive CD, so you can request that through TASH – The Step by Step Guide to Assistive Technology. I think that's in a nutshell what I have to go over with you. Probably the toughest thing with switches is when you have someone who really has a lot of limitations and you want to be able to hook up the switch, it can be very, very difficult to actually assess where you want to have the control site. Sometimes you want to have two control sites. You might want to have one that does one thing and another one that does something else because of the fatigue factor. A lot of times with powered mobility, those chairs already come with a control box so you can interface switches with them and run them with switches. So I think we will stop there. I gave you a number of resources that you are welcome to look up on the web. I just want to remind you that this presentation was hosted from the Utah Assistive Technology Program. We'd like you to fill out your evaluations and I guess at this time, you can turn off your high resolution screen.