

Q R G

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C a b l e "

Synapse "Smart Cable" for USB Interface Guide



S y n a p s e “ S m a r t C a b l e ”

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Patents

This product is covered by one or more of the following U.S. and foreign Patents:

U.S. Patent No. 4,593,186; 4,603,262; 4,607,156; 4,652,750; 4,673,805; 4,736,095;
4,758,717; 4,760,248; 4,806,742; 4,816,660; 4,845,350; 4,896,026; 4,897,532; 4,923,281;
4,933,538; 4,962,717; 5,015,833; 5,017,765; 5,021,641; 5,029,183; 5,047,617; 5,103,461;
5,113,445; 5,130,520; 5,140,144; 5,142,550; 5,149,950; 5,157,687; 5,168,148; 5,168,149;
5,180,904; 5,216,232; 5,229,591; 5,230,088; 5,235,167; 5,243,655; 5,247,162; 5,250,791;
5,250,792; 5,260,553; 5,262,627; 5,262,628; 5,266,787; 5,278,398; 5,280,162; 5,280,163;
5,280,164; 5,280,498; 5,304,786; 5,304,788; 5,306,900; 5,324,924; 5,337,361; 5,367,151;
5,373,148; 5,378,882; 5,396,053; 5,396,055; 5,399,846; 5,408,081; 5,410,139; 5,410,140;
5,412,198; 5,418,812; 5,420,411; 5,436,440; 5,444,231; 5,449,891; 5,449,893; 5,468,949;
5,471,042; 5,478,998; 5,479,000; 5,479,002; 5,479,441; 5,504,322; 5,519,577; 5,528,621;
5,532,469; 5,543,610; 5,545,889; 5,552,592; 5,557,093; 5,578,810; 5,581,070; 5,589,679;
5,589,680; 5,608,202; 5,612,531; 5,619,028; 5,627,359; 5,637,852; 5,664,229; 5,668,803;
5,675,139; 5,693,929; 5,698,835; 5,705,800; 5,714,746; 5,723,851; 5,734,152; 5,734,153;
5,742,043; 5,745,794; 5,754,587; 5,762,516; 5,763,863; 5,767,500; 5,789,728; 5,789,731;
5,808,287; 5,811,785; 5,811,787; 5,815,811; 5,821,519; 5,821,520; 5,823,812; 5,828,050;
5,848,064; 5,850,078; 5,861,615; 5,874,720; 5,875,415; 5,900,617; 5,902,989; 5,907,146;
5,912,450; 5,914,478; 5,917,173; 5,920,059; 5,923,025; 5,929,420; 5,945,658; 5,945,659;
5,946,194; 5,959,285; 6,002,918; 6,021,947; 6,029,894; 6,031,830; 6,036,098; 6,047,892;
6,050,491; 6,053,413; 6,056,200; 6,065,678; 6,067,297; 6,082,621; 6,084,528; 6,088,482;
6,092,725; 6,101,483; 6,102,293; 6,104,620; 6,114,712; 6,115,678; 6,119,944; 6,123,265;
6,131,814; 6,138,180; 6,142,379; 6,172,478; 6,176,428; 6,178,426; 6,186,400; 6,188,681;
6,209,788; 6,209,789; 6,216,951; 6,220,514; 6,243,447; 6,244,513; 6,247,647; 6,308,061;
6,250,551; 6,295,031; 6,308,061; 6,308,892; 6,321,990; 6,328,213; 6,330,244; 6,336,587;
6,340,114; 6,340,115; 6,340,119; 6,348,773; 6,380,949; 6,394,355; D305,885; D341,584;
D344,501; D359,483; D362,453; D363,700; D363,918; D370,478; D383,124; D391,250;
D405,077; D406,581; D414,171; D414,172; D418,500; D419,548; D423,468; D424,035;
D430,158; D430,159; D431,562; D436,104.
Invention No. 55,358; 62,539; 69,060; 69,187, NI-068564 (Taiwan); No. 1,601,796; 1,907,875;
1,955,269 (Japan); European Patent 367,299; 414,281; 367,300; 367,298; UK 2,072,832; France
81/03938; Italy 1,138,713
rev. 06/02

Introduction

The Synapse™ “Smart Cable” family provides connection to many host systems by simply changing the Synapse cable, so your scanner can interface to virtually any host.

The Synapse cable you’ve purchased connects Symbol scanners to USB (Universal Serial Bus) and operates with all USB capable hosts including:

- Desktop PCs and Notebooks
- Apple™ iMac, G4, iBooks
- IBM SurePOS terminals
- Network computers

Ask your vendor if your host supports USB.

The following operating systems support Symbol scanners using this cable:

- Windows 98, 2000, ME, XP
- MacOS 8.0 and above
- 4690 OS v2.3 and above.

Ask your vendor if your version of the operating system supports USB. For more information on USB technology, hosts, and peripheral devices, visit www.usb.org.

Programming

There are two types of parameters used to program your system: scanner parameters, contained in your scanner programming guide, and interface (Synapse) parameters, provided in this guide. Both types of parameters are stored in the scanner.

The default value for each Synapse parameter is identified under the default bar code. If you are using the default settings, no bar codes need to be scanned to set up your Synapse. (If you are using the LS 9100 scanner, the **ENABLE LS 9100 COMMUNICATION** bar code on [page 5](#) must be scanned.) The programming bar codes in this guide cannot be used to program Synapse interface cables that are not STI85-0XXX.

Power Supply

The USB host system or hub provides power for most hand-held scanning systems, including the LS 400X, LS 210X, P3XX, and LS 190X scanners, so additional power supplies are usually not required.

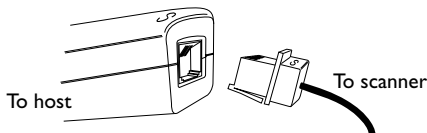
If an additional power supply is required, a message will display on the host system. In this case, unplug the Synapse from the USB host and start the setup procedure again.

Fixed mount scanners, such as the LS 5700 and LS 5800 require their own power supply.

Setup

Setting up Synapse is easy:

1. Plug your Synapse module into the scanning cable with the "S"-shaped graphics aligned.



If you need to disconnect the cable from your Synapse module, squeeze the cable at the "S" and pull it from the module.

2. Connect the scanning cable to the scanner.
3. If a power supply is required, plug the power supply in the Synapse power jack and the other end into an AC outlet.
4. Plug the series A connector of the Synapse cable into the USB host or hub.
5. Select the USB device type starting on [page 6](#).
6. When you are using Windows, the software prompts you to select or install the USB device driver. Follow the installation instructions on the screen. The scanner powers up during this installation.
7. If you are using an LS 9100 scanner, scan the [Enable LS 9100 Communication](#) bar code on [page 5](#).
8. If you are not using a North American keyboard, scan the appropriate country bar code under *Country Selection* section on page 8.
9. If you'd like to secure your Synapse cable to the host, remove the backing on one side of the two-sided tape provided and press it to the side of your Synapse module. Make sure the power supply port is not covered.
10. Remove the backing on the other side of the tape, and press the Synapse against the host at the desired location.

If you are having any problems with your system, see [Troubleshooting](#) on page 23.

STI85-0200 USB Synapse

The STI85-0200 connects any Synapse-compatible Symbol scanner to a USB host system. The STI85-0200 supports the following USB device selections depending on the host type and the mode of operation desired.

The mode of operation can be dynamically changed. The scanner resets and re-enumerates each time a new mode is selected. The re-enumeration process can take a few seconds to complete, during which the scanner turns off.

HID Keyboard Emulation

In this mode, the scanned data is presented to the system as if coming from a USB HID (Human Interface Device) keyboard. Most operating systems have native support for this device, so no additional driver installation is required.

IBM SurePos Hand-Held Bar Code Reader

This mode is supported by an IBM hand-held bar code reader driver on IBM SurePos terminals.

IBM SurePos Tabletop Bar Code Reader

This mode is supported by an IBM tabletop bar code reader driver on IBM SurePos terminals.

Simple COM Port Emulation

In this mode, scanned data is presented to the host as if it originated in a COM port. A driver is required to support this mode, but it provides compatibility for an application which supports a bar code reader attached to a COM port. The simple driver supports data transfers in one direction only, from scanner to host, with no handshaking. The software will prompt you to select or install the driver. Follow the instructions on the screen.

Set Synapse Defaults

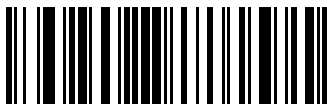
Scan the bar code below to set defaults for the parameters in this guide.



Set Synapse USB Defaults

Enable LS 9100 Communication

If you're using an LS 9100, scan the bar code below to communicate with Synapse. You'll hear a warble beep. If, after you have been using Synapse, a non-Synapse interface is enabled in your LS 9100 scanner, this bar code will need to be scanned again to re-enable the Synapse interface.



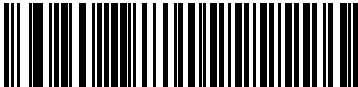
Enable LS 9100 Communication

USB Device Type

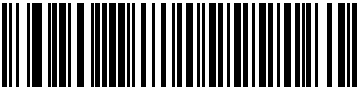
Select the desired type of USB device. The default varies depending on the Synapse cable model.

Synapse Cable Model	Default
STI85-0200	HID Keyboard
STI85-0300	IBM Hand-held

Note: *When changing USB Device Types, the scanner turns off briefly and re-enumerates to properly communicate with the host.*



Default USB Type

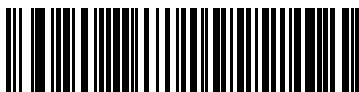


IBM Hand-Held USB

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IBM Table Top USB



HID Keyboard Emulation



Simple COM Port Emulation



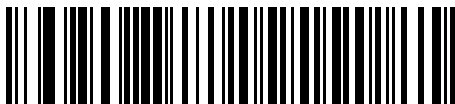
Country Selection

This setting applies only to the HID Keyboard Emulation device. Select the desired country according to the USB host device. The MacOS and Windows implement international keyboards differently. If your host platform does not appear here, select the Windows settings. If your country does not appear, do not set this parameter; use [Alternate Numeric Keypad Emulation](#) on page 15 instead.

Note: *When changing Country Selection, the scanner turns off briefly and re-enumerates to properly communicate with the host.*



North American, Standard USB Keyboard

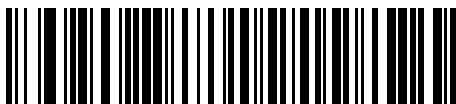


French, Windows



French, MacOS

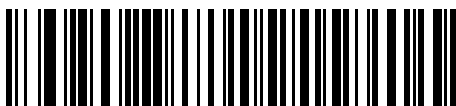
S y n a p s e " S m a r t C a b l e " QRG



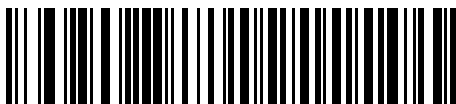
German, Windows



German, MacOS



French Canadian, Windows

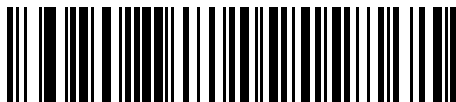


French Canadian, Windows XP/2000



French Canadian, MacOS

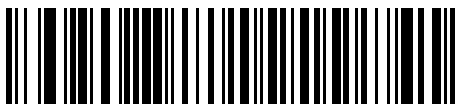
S y n a p s e " S m a r t C a b l e " 



Spanish (Traditional), Windows



Spanish ISO, MacOS

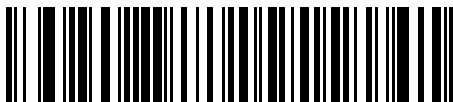


Italian, Windows

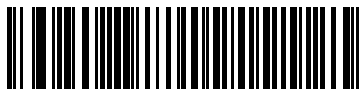


Italian, MacOS

S y n a p s e " S m a r t C a b l e "



Swedish, Windows



Swedish, MacOS



UK English, Windows



UK English, MacOS



Japanese, Windows



Japanese, MacOS

Keyboard Emulation

Keystroke Delay

This option applies only to the HID Keyboard Emulation device. Select the desired delay between transmitted keystrokes. Only change this setting for slower host PCs that cannot accommodate the speed of data transmitted.



No Delay (0 ms)



Medium Delay (20 ms)



Long Delay (40 ms)

Keyboard Emulation - CAPS LOCK

This option applies only to the HID Keyboard Emulation device. By default, if a bar code is scanned, CAPS LOCK Override is disabled and the case of the bar code data is not preserved. For example, if the CAPS LOCK is off and an uppercase character is transmitted, the host reads this as a lowercase character. By selecting "Enable Caps Lock Override", the caps lock is turned off during transmission to preserve the case of the bar code data, then restored after transmission.

Note: This feature does not work with Windows XP systems using the French or German country code setting.



Disable Caps Lock Override (Default)



Enable Caps Lock Override

Keyboard Emulation and IBM - Ignore Unknown Characters

This option applies only to the HID Keyboard Emulation device and IBM device. Unknown characters are characters the host does not recognize. When “Send Bar Codes With Unknown Characters” is selected, all bar code data is sent except for unknown characters, and no error beeps sound. When “Do Not Send Bar Codes With Unknown Characters” is selected, bar codes containing at least one unknown character are not sent to the host, and an error beep sounds.



Send Bar Codes With Unknown Characters (Default)



Do Not Send Bar Codes With Unknown Characters

**Alternate Numeric Keypad Emulation
(not available in all versions of this product)**

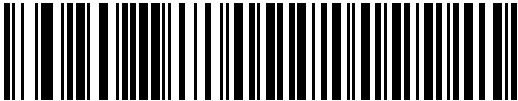
This feature allows emulation of other country keyboard layouts not listed in the *Country Selection* parameter. All Microsoft operating systems typically support this feature.

When enabled, all characters are sent as ASCII sequences over the numeric keypad. For example, ASCII A is sent as:

“ALT make” 0 6 5 “ALT Break”



Enable Keypad Emulation



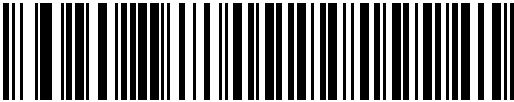
Disable Keypad Emulation

Function Key Mapping
(not available in all versions of this product)

When enabled, ASCII values appearing in bold in the following table are transmitted as the corresponding single keystroke value in bold, instead of the control sequence.



Enable Function Key Mapping



Disable Function Key Mapping

ASCII Value (C39FA)	Interpretation	ASCII Value (C39FA)	Interpretation	ASCII Value (C39FA)	Interpretation
0 (%U)	None	11 (\$K)	Ctrl K	22 (\$V)	Ctrl V
1 (\$A)	Ctrl A	12 (\$L)	Ctrl L	23 (\$W)	Ctrl W
2 (\$B)	Ctrl B	13 (\$M)	ENTER/Ctrl M	24 (\$X)	Ctrl X
3 (\$C)	Ctrl C	14 (\$N)	Ctrl N	25 (\$Y)	Ctrl Y
4 (\$D)	Ctrl D	15 (\$O)	Ctrl O	26 (\$Z)	Ctrl Z
5 (\$E)	Ctrl E	16 (\$P)	Ctrl P	27 (%)	ESC/None
6 (\$F)	Ctrl F	17 (\$Q)	Ctrl Q	28 (%B)	None
7 (\$G)	Ctrl G	18 (\$R)	Ctrl R	29 (%C)	None
8 (\$H)	BKSPACE/ Ctrl H	19 (\$S)	Ctrl S	30 (%D)	None
9 (\$I)	HORIZ TAB/Ctrl I	20 (\$T)	Ctrl T	31 (%E)	None
10 (\$J)	Ctrl J	21 (\$U)	Ctrl U	32	SPACE

Simulated Caps Lock
(not available in all versions of this product)

When enabled, the scanner inverts upper and lower case characters on the scanned bar code as if the Caps Lock state is enabled on the keyboard. This occurs regardless of the keyboard's Caps Lock state.



Enable Simulated Caps Lock

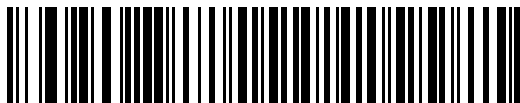


Disable Simulated Caps Lock

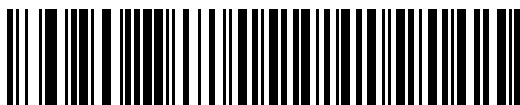
Convert Case

(not available in all versions of this product)

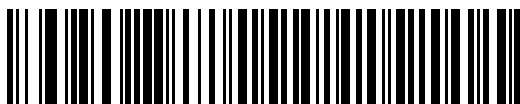
When enabled, the scanner converts all bar code data to the selected case.



Do Not Convert Case



Convert To Upper Case



Convert To Lower Case

Synapse "Smart Cable"

ASCII Character Set

Prefix/ Suffix Value	Full ASCII Code 39 Encode Char.	Keystroke	Prefix/ Suffix Value	Full ASCII Code 39 Encode Char.	Keystroke
1048	0	0	1091	%K	[
1049	1	1	1092	%L	\
1050	2	2	1093	%M]
1051	3	3	1094	%N	^
1052	4	4	1095	%O	~
1053	5	5	1096	%W	~
1054	6	6	1097	+A	a
1055	7	7	1098	+B	b
1056	8	8	1099	+C	c
1057	9	9	1100	+D	d
1058	/Z	:	1101	+E	e
1059	%F	;	1102	+F	f
1060	%G	<	1103	+G	g
1061	%H	=	1104	+H	h
1062	%I	>	1105	+I	i
1063	%J	?	1106	+J	j
1064	%V	@	1107	+K	k
1065	A	A	1108	+L	l
1066	B	B	1109	+M	m
1067	C	C	1110	+N	n
1068	D	D	1111	+O	o
1069	E	E	1112	+P	p
1070	F	F	1113	+Q	q
1071	G	G	1114	+R	r
1072	H	H	1115	+S	s
1073	I	I	1116	+T	t
1074	J	J	1117	+U	u
1075	K	K	1118	+V	v
1076	L	L	1119	+W	w
1077	M	M	1120	+X	x
1078	N	N	1121	+Y	y
1079	O	O	1122	+Z	z
1080	P	P	1123	%P	{
1081	Q	Q	1124	%Q	
1082	R	R	1125	%R	}
1083	S	S	1126	%S	~
1084	T	T	1127	Undefined	
1085	U	U			
1086	V	V	7013		ENTER
1087	W	W			
1088	X	X			
1089	Y	Y			
1090	Z	Z			



ALT Keys

ALT Keys	Keystroke
2064	ALT 2
2065	ALT A
2066	ALT B
2067	ALT C
2068	ALT D
2069	ALT E
2070	ALT F
2071	ALT G
2072	ALT H
2073	ALT I
2074	ALT J
2075	ALT K
2076	ALT L
2077	ALT M
2078	ALT N
2079	ALT O
2080	ALT P
2081	ALT Q
2082	ALT R
2083	ALT S
2084	ALT T
2085	ALT U
2086	ALT V
2087	ALT W
2088	ALT X
2089	ALT Y
2090	ALT Z
2091	ALT [
2092	ALT \
2093	ALT]
2094	ALT 6
2095	ALT -

GUI Shift Keys

The Apple™ iMac keyboard has an apple key on either side of the space bar. Windows-based systems have a GUI key to the left of the left ALT key, and to the right of the right ALT key.

Other Value	Keystroke
3048	Apple/GUI 0
3049	Apple/GUI 1
3050	Apple/GUI 2
3051	Apple/GUI 3
3052	Apple/GUI 4
3053	Apple/GUI 5
3054	Apple/GUI 6
3055	Apple/GUI 7
3056	Apple/GUI 8
3057	Apple/GUI 9
3065	Apple/GUI A
3066	Apple/GUI B
3067	Apple/GUI C
3068	Apple/GUI D
3069	Apple/GUI E
3070	Apple/GUI F
3071	Apple/GUI G
3072	Apple/GUI H
3073	Apple/GUI I
3074	Apple/GUI J
3075	Apple/GUI K
3076	Apple/GUI L
3077	Apple/GUI M
3078	Apple/GUI N
3079	Apple/GUI O
3080	Apple/GUI P
3081	Apple/GUI Q
3082	Apple/GUI R
3083	Apple/GUI S
3084	Apple/GUI T
3085	Apple/GUI U
3086	Apple/GUI V
3087	Apple/GUI W
3088	Apple/GUI X
3089	Apple/GUI Y
3090	Apple/GUI Z

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F Keys	Keystroke	Extended Keypad	Keystroke
5001	F1	7001	Break
5002	F2	7002	Delete
5003	F3	7003	PgUp
5004	F4	7004	End
5005	F5	7005	Pg Dn
5006	F6	7006	Pause
5007	F7	7007	Scroll Lock
5008	F8	7008	Backspace
5009	F9	7009	Tab
5010	F10	7010	Print Screen
5011	F11	7011	Insert
5012	F12	7012	Home
		7013	Enter
Numeric Keypad	Keystroke	7014	Escape
6042	*	7015	Up Arrow
6043	+	7016	Down Arrow
6045	-	7017	Left Arrow
6046	.	7018	Right Arrow
6047	/		
6048	0		
6049	1		
6050	2		
6051	3		
6052	4		
6053	5		
6054	6		
6055	7		
6056	8		
6057	9		
6058	Enter		
6059	Num Lock		

Beeper Indications

Indication	Action
Scanner gives a reset beep after scanning a USB Device Type.	Communication with the bus must be established before the scanner can operate at the highest power level.
This reset beep occurs more than once.	The USB bus may put the scanner in a state where power to the scanner is cycled on and off more than once. This is normal and usually happens when the PC cold boots.
Transmit error beeps hi/hi/hi/hi sound shortly after scanning.	Scanner has not completed initializing between scans. Wait several seconds and scan again.

Troubleshooting

Problem	Possible Solution
Parameters are not working.	<p>Make sure you're using the correct Interface Guide.</p> <p>Make sure you've selected the correct parameter set.</p> <p>If you scanned a Set Defaults bar code from your scanner manual, re-enter parameters.</p>
No data transmits, or incorrect data transmits, or you hear a lo/lo/lo/lo beep.	<p>Check cable connection to scanner and host.</p> <p>Make sure the correct terminal type and country code parameters are set for the currently attached scanner.</p> <p>Increase Intercharacter Delay.</p>
Lo/hi/lo/hi beep sequence sounds.	<p>Parameter storage space in the scanner is full.</p> <p>Scan a Set Defaults bar code from page 5 for cables no longer in use.</p>
Scanner is not responding after you plug into Synapse.	<p>Unplug the cable from the USB. Plug in the cable from the scanner to Synapse. Attach the power supply if required. Then, plug the cable from the Synapse to the USB.</p>

See [Service Information](#) on page 26 if you're still having trouble.



Warranty

(A) Seller's hardware Products are warranted against defects in workmanship and materials for a period of twelve (12) months from the date of shipment, provided the Product remains unmodified and is operated under normal and proper conditions. Warranty provisions and durations on software, integrated installed systems, Product modified or designed to meet specific customer specifications ("Custom Products"), remanufactured products, and reconditioned or upgraded products, shall be as provided in the applicable Product specification in effect at the time of purchase or in the accompanying software license. (B) Products may be serviced or manufactured with parts, components, or subassemblies that originate from returned products and that have been tested as meeting applicable specifications for equivalent new material and Products. The sole obligation of Seller for defective hardware Products is limited to repair or replacement (at Seller's option) on a "return to service depot" basis with prior Seller authorization. Shipment to and from Seller will be at Seller's expense, unless no defect is found. No charge will be made to Buyer for replacement parts for warranty repairs. Seller is not responsible for any damage to or loss of any software programs, data or removable data storage media, or the restoration or reinstallation of any software programs or data other than the software, if any, installed by Seller during manufacture of the Product. The aforementioned provisions do not extend the original warranty period of any Product that had either been repaired or replaced by Seller. (C) The above warranty provisions shall not apply to any Product (i) which has been repaired, tampered with, altered or modified, except by Seller's authorized service personnel; (ii) in which the defects or damage to the Product result from normal wear and tear, misuse, negligence, improper storage, water or other liquids, battery leakage or failure to perform operator handling and scheduled maintenance instructions supplied by Seller; (iii) which has been subjected to unusual physical or electrical stress, abuse, or accident, or forces or exposure beyond normal use within the specified operational and environmental parameters set forth in the applicable Product specification; nor shall the above warranty provisions apply to any expendable or consumable items, such as batteries, supplied with the Product. EXCEPT FOR THE WARRANTY OF TITLE AND THE EXPRESS WARRANTIES STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES ON PRODUCTS FURNISHED HERUNDER INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE. ANY IMPLIED WARRANTIES THAT MAY BE IMPOSED BY LAW ARE LIMITED IN DURATION TO THE LIMITED WARRANTY PERIOD. SOME STATES OR COUNTRIES DO NOT ALLOW A LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS OR THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR CONSUMER PRODUCTS. IN SUCH STATES OR COUNTRIES, FOR SUCH PRODUCTS, SOME EXCLUSIONS OR LIMITATIONS OF THIS LIMITED WARRANTY MAY NOT APPLY. The stated express warranties are in lieu of all obligations or liabilities on the part of Seller for damages, including but not limited to, special, indirect or consequential damages arising out of or in connection with the use or performance of the Product or service. Seller's liability for damages to Buyer or others resulting from the use of any Product or service furnished hereunder shall in no way exceed the purchase price of said Product or the fair market value of said service, except in instances of injury to persons or property.

S y n a p s e " S m a r t C a b l e "

Service Information

Before you use the unit, it must be configured to operate in your facility's network and run your applications.

If you have a problem running your unit or using your equipment, contact your facility's Technical or Systems Support. If there is a problem with the equipment, they will contact the Symbol Support Center:

United States ¹	1-800-653-5350 1-631-738-2400	Canada	905-629-7226
United Kingdom	0800 328 2424	Asia/Pacific	+65-6796-9600
Australia	1-800-672-906	Austria/Österreich	1-505-5794-0
Denmark/Danmark	7020-1718	Finland/Suomi	9 5407 580
France	01-40-96-52-21	Germany/Deutschland	6074-49020
Italy/Italia	2-484441	Mexico/México	5-520-1835
Netherlands/Nederland	315-271700	Norway/Norge	+47 2232 4375
South Africa	11-8095311	Spain/España	91 324 40 00 Inside Spain
Sweden/Sverige	84452900		+34 91 324 40 00 Outside Spain
Latin America Sales Support	1-800-347-0178 Inside US +1-954-255-2610 Outside US		
Europe/Mid-East Distributor Operations	Contact local distributor or call +44 118 945 7360		

¹Customer support is available 24 hours a day, 7 days a week.

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<http://www.symbol.com/manuals>.



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